

Development of a Research Competency Training System to Enhance Teachers' Research Skills in Indonesia Based on the Dick & Carey Development Model

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Abstract

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In Indonesia, teachers' ability to conduct research remains below average due to a lack of research knowledge and experience. As a result, teachers rarely engage in research and have not published scientific papers. Therefore, mentoring in the form of formal training is necessary to enhance teachers' research competencies. However, there is currently no structured training specifically designed to improve teachers' research skills. This study aims to develop a training system that will improve teachers' research abilities. The research and development process follows a modified Dick & Carey development model. As a result, a training system, including training modules, agendas, teaching books, and learning videos, has been developed and tested by experts. This training system is expected to be used by teachers in Indonesia to enhance their research skills, encouraging them to become more actively involved in research and produce scholarly publications.

Keywords:

Development, Research Skills, Development Model

Abstrak

Di Indonesia, kemampuan guru dalam melaksanakan penelitian masih tergolong rendah, disebabkan oleh kurangnya pengetahuan dan pengalaman dalam penelitian. Hal ini mengakibatkan guru jarang melakukan penelitian dan belum pernah mempublikasikan karya ilmiah. Oleh karena itu, dibutuhkan pembimbingan melalui pelatihan formal untuk meningkatkan kompetensi penelitian guru. Namun, hingga saat ini belum ada struktur pelatihan yang dirancang secara khusus untuk meningkatkan kompetensi penelitian guru. Penelitian ini bertujuan untuk mengembangkan sistem pelatihan yang dapat meningkatkan keterampilan penelitian guru. Proses penelitian dan pengembangan ini menggunakan model pengembangan Dick & Carey yang dimodifikasi. Sebagai hasil dari pengembangan ini, sebuah sistem pelatihan yang mencakup modul pelatihan, agenda pelatihan, buku ajar, dan video pembelajaran telah dirancang dan diuji oleh para ahli. Sistem pelatihan ini diharapkan dapat digunakan oleh guru di Indonesia untuk meningkatkan keterampilan penelitian mereka, sehingga dapat mendorong mereka untuk lebih aktif dalam melaksanakan penelitian dan menghasilkan publikasi ilmiah.

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INTRODUCTION

In the context of education, teachers play a critical role in shaping the academic and professional development of students. However, in Indonesia, the ability of teachers to engage in research remains underdeveloped. This is primarily due to a lack of adequate knowledge and experience in research methodologies. Consequently, many teachers seldom undertake research activities and have not contributed to scientific publications. The absence of a robust research culture



among educators limits the overall advancement of the teaching profession and its contribution to educational improvement.

Research is an essential component of professional development for teachers, as it enables them to refine their teaching practices, improve student outcomes, and contribute to the broader academic community. Despite this, there are significant barriers to research engagement, including a lack of training, access to resources, and support systems. This gap underscores the need for structured training programs that specifically aim to enhance teachers' research competencies. Such training would provide teachers with the necessary skills to conduct meaningful research and participate actively in academic discourse.

Currently, there is no standardized training system designed explicitly to equip teachers with the research skills needed to address these challenges. As a result, teachers are often left without the tools and guidance necessary to develop their research abilities. To address this issue, this study aims to create a comprehensive training system focused on improving teachers' research skills. The system will be designed using the Dick & Carey instructional design model, which is known for its systematic approach to developing effective learning environments. By leveraging this model, the training program will be tailored to meet the specific needs of teachers, incorporating practical components such as training modules, agendas, instructional books, and learning videos.

Through this research and development process, the study seeks to develop a training system that will empower teachers in Indonesia to enhance their research capabilities. Ultimately, the goal is to provide teachers with the tools and confidence to engage in research activities, contribute to scholarly knowledge, and improve the quality of education across the country. In Indonesia, education quality continues to fall short of expectations. The limiting factor is a lack of funds (Tandberg, 2010; Talaia, Pisoni, & Onetti, 2016; Peiris, 2013; Suryani, 2015; Marti, 2012; Ardiansyah, 2013) and teachers who are not yet a priority in education (Tandberg, 2010; Talaia, Pisoni, & Onetti, 2016; Peiris, 2013; Suryani, 2015; Marti, 2012; Ardiansyah, 2013). Teachers are critical to educational performance (Alawiyah, 2013; Aeni, 2015), with high-quality teachers having a significant impact on students' PISA (Program for International Student Assessment) results in Finland (Silander, 2013). This is in contrast to the situation in Indonesia, where teacher competency is still poor and minimal in creating learning innovations. Learning innovation is a result of a teacher's ingenuity as a learning architect. Changes in the use of learning methods, variations in the use of learning media, and even the ability to design new learning methods and media are all examples of innovation. Teachers in Indonesia are unable to design new learning methods and media, and even when they are used, they need to be improved. The quality of the learning process has a significant impact on student learning success (Marzano, 2003; Hattie, 2009; Walberg, 2006). Teachers are encouraged to increase their abilities to manage learning on a continual and systematic basis (Silander, 2013). A range of research activities are one way to develop the ability to control learning. Educational research, according to Hammersley (1993), should be an essential component of teachers' work in schools rather than an activity carried out on schools by outsiders. Why is this the case? A teacher can consistently improve the quality of learning in their class by undertaking research, it can be argued.

Systematic research and problem-oriented problem-solving can increase learning quality and provide in-depth comprehension for students (Cheruvu, 2014), and teachers who conduct research will be more analytical, focused, and profound, as well as having good learning habits (Zeichner, 2003). However, the competency of Indonesian teachers in doing research is inadequate, as evidenced by the paucity of research activities and publications by Indonesian teachers. Researchers found that more than 70% of teachers had incorrect knowledge of the concepts of problems and research in a preliminary examination of about 100 teachers. Nearly 90% of those polled did not undertake their own study (teachers sometimes do the Classroom Action Research only because it is required by the Government and tends to do the origin). As a result, every single teacher has never published a scholarly paper. This reality is exacerbated by the dearth of training activities aimed at boosting teachers' research competency. It is normally merely done as a formality, with no expectation that every instructor will be able to conduct research.

Due to the following factors, recent developments in teacher research show that there is a significant gap between teachers and academics in universities: (1) teachers lack the research skills required for rigorous inquiry; (2) teacher research is too idiosyncratic, self-referential, and ungeneralizable (Bullough & Pinnegar, 2001; Hiebert et al., 2002); and (3) the teacher role conflicts with or is incompatible with the academic role (Bullough & Pinnegar, 2001; Hammack, 1997; Hammer & Schifter, 2001). This illustrates that instructors are not expected to be researchers (particularly in Indonesia), thus it is not a major issue when they are unable to do so. This is in sharp contrast to the reality that a teacher who conducts research will be innovative and provide a wide range of learning opportunities. The goal of developing this training system is to create a system that can bridge the gap between the emergence of teachers who are also researchers.

The major strength of the American school, according to Miriam Kronish, is teacher training (Chatib, 2014). Training should be done in accordance with mature needs planning. It is also stated that the training should be properly organized and well-planned, including content selection, timing, location, method, and instructor quality (Musfah, 2012). This encourages researchers to create a training system aimed at enhancing teacher research capability. The training system is expected to provide government insight on how to systematically increase teacher quality, which will improve learning quality and achieve the spirit of the Teacher as Researcher. Teachers who conduct research will benefit their work as educators, as well as teaching and learning quality (Cheruvu, 2014).

METHODS

A development approach, a modified Dick & Carey development model, was employed as the research method (Fig. 1). The Dick & Carey model is integrated with the ADDIE model, as well as some crucial parts and inputs from the ARCS model, to create this development model's grand design. This model focuses on the training implementation strategy, specifically the use of collaborative learning and collaborative research in the implementation of learning, as well as the elements of the arcs strategy development (Attention, Relevance, Confidence,

Satisfaction) in learning and adult learners' involvement. Because the Dick & Carey model does not have a separate section for analysis, the analysis portion is based on a modified ADDIE model that incorporates the students' analysis of the Dick & Carey model. Richey and Nelson (2000) use development research to help researchers better understand new models, tools, and procedures so they can predict their efficacy and efficiency. We may then establish the applicability of context-specific discoveries to different teaching and learning situations, as well as identify new general design, development, and evaluation principles.

In essence, there is no such thing as the ultimate or best model. Only models that match the individual needs of each activity will be produced, whether for classical learning in education process classrooms at the elementary, junior high, or college level, or exceptional learning. Adults receive this type of training in order to refresh and develop their scientific abilities.

The following stages are used to achieve this development model: 1) Analysis. This step of analysis necessitates analysis activities, task analysis, program and reasonable training materials, and learner analysis. The entire step of this study will influence the formulation of general instructional objectives, which is the ultimate goal of creating a specific learning system. 2) Design. The actions in this phase of the design include identifying general instructional objectives, particular instructional objectives, determining the structure and method of delivery, and preparing activities, exercises, and strategies in the training activities. The entire design part is built around the ARCS (Attention, Relevance, Confidence, and Satisfaction) principles, as well as the concepts of Collaborative Learning and Collaborative Research. 3) Develop. Standard assessment equipment design activities, instructional materials design, and formative evaluation are all part of this phase of development. This stage includes the preparation of all training devices, such as assessment tools and instructional materials, as well as formative evaluation. 4) Implementation. Training implementation, tools in place, and observation are all things that are observed during implementation. The goal of implementation is to acquire a clear image of all of the plans that have been created so that they can be enhanced over time. The appropriateness of ARCS concepts, collaborative learning, and collaborative research are all issues that need to be addressed. 5) Evaluation. This is the overall evaluation process, and its goal is to get a student's reaction and determine their level of satisfaction, which includes awareness, knowledge, conduct, and outcome. This assessment confirms that the established training method is very effective and efficient for use in learning (in this case, training to improve the competency of teachers in conducting research). Teachers who taught in elementary, junior high, and high school were employed as test subjects. The study's final goal was to develop a teacher competency enhancement training system based on research and equipped with a variety of gadgets that support training activities and can increase classroom learning quality.

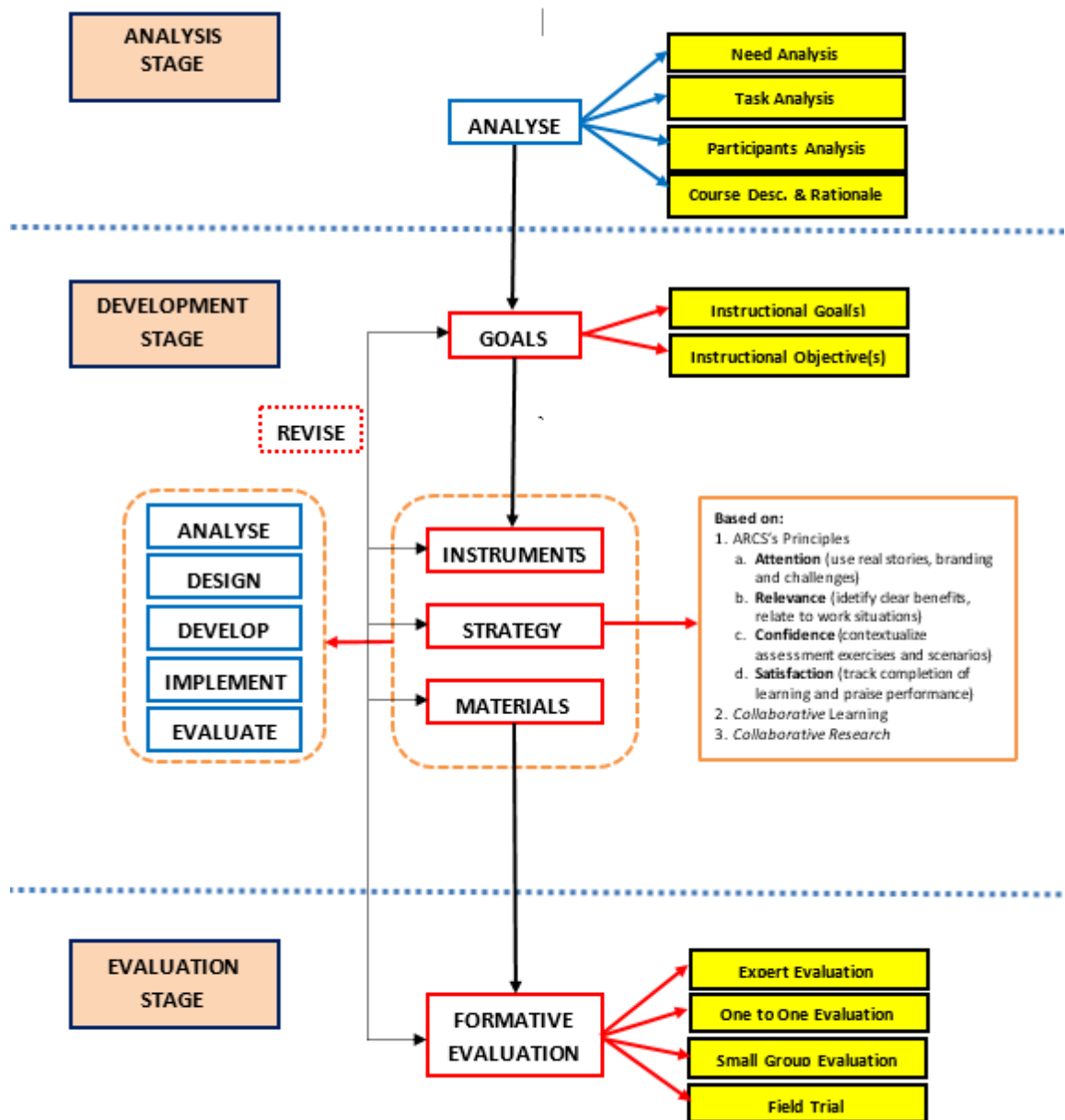


Figure 1. Modified Development Model

RESULTS & DISCUSSION

Results

The need analysis is an important aspect of development research. Analysis of needs is done through interviews with education and learning experts, including Prof. Zulkardi (Sriwijaya Mathematics Education Expert), Prof. Sumaryoto (Rector of Indraprasta PGRI University), Prof. Supardi U.S. (Chief of General Officer of PGRI), Prof. Muljani A. Nurhadi (graduate lecturer of Indraprasta PGRI University), Dr. Rully Charitas Indra Prahmana (lecturer at Ahmad Dahlan

University), and Dr. Somakin (Sriwijaya University lecturer). Expert information is gathered in order to establish general and specialized instructional objectives, training key concepts for teachers, materials that must be provided, and provisions on the trainees' criteria. Furthermore, everything generated in this study is based on a needs analysis in order to create a comprehensive and transparent guide. General instructional objectives, distinctive instructional objectives, and training material distribution are the findings of additional investigation. The following are significant results as a consequence of the expert needs analysis:

1. Teachers' demands in generating learning innovations are met through training activities.
2. Training approaches should be case-based and based on the experiences of each teacher in the classroom.
3. Trainees should be chosen based on specific qualities that support the use of technology, such as familiarity with computers, the Internet, and MS Word.
4. Participants should be gathered and research should be done in a collaborative manner.
5. The objective is to show real-life examples of published research articles so that implementers can get access to qualified scientific journals.
6. This training activity must provide an actual product that the learners can feel immediately, and
7. The following topics should be covered in this training: a) research concept, b) problem identification, c) search theory, d) instrument design, e) data analysis of research findings, and f) scientific paper design.

Instructional Goal (IG)

A long-term goal or the ultimate goal of a developed training activity is the instructional goal. The results of the need analysis are used to define general instructional goals. "If a sample of the article is given, a group of competency development trainees analyzes the instructor, the teacher will be able to produce 1 (one) research title in the form of a scientific article published in a national certified scientific journal," says the general instructional target.

Instructional Objectives (IO)

Specific instructional objectives and success indicators are further established based on the study of needs and analysis of general instructional objectives, which will guide building devices in support of training. The following are some of the specific teaching goals and success indicators:

IO 1. Participants can read and download articles from national (accredited or non-accredited) and international (international or recognized international) journals over the Internet, using the following indicators:

1. The participant has a gmail.com email address.
2. Each participant has a scholar.google.com account.
3. Participants will be able to recognize the characteristics of internationally published scientific journals.
4. Participants can access and register in the National Journal (accredited or not) and international journal's Web Open Journal System (International or reputable international).

5. Each National Journal has at least five articles that participants can download (at least Access 3 national journals).
 6. Participants can acquire information about a credible worldwide journal list by visiting scimagojr.com and scopus.com.
 7. Each respected international journal viewed allows participants to download a minimum of 5 articles (at least access three international journals).
- IO 2. Participants can manage scripts and undertake scientific article citations using the Mendeley application, which includes indicators such as:
1. Participants can download Mendeley and install it on his laptop.
 2. In Mendeley, participants can manage the article script input (article input, create a folder, delete a script, merge similar articles, and synchronize the script).
 3. Participants can make changes to the metadata in order to generate citations that follow the quote criteria.
 4. Participants can use MS Word to install the Mendeley Plugin.
 5. Participants were permitted to write a quotation in the article that was being designed using Mendeley.
- IO 3. Participants can comprehend issue concepts and study technique, as evidenced by the following indicators: Participants should be able to: a) comprehend the concept of research issues and be able to identify research problems to be raised; b) understand various research methodologies; and c) determine the research title.
- IO 4. Participants grasp and comprehend the experimental Research concept, as evidenced by the following indicators:
1. The notion of experimental research is understood by the participants.
 2. Participants are aware of the terms and conditions governing the conduct of experimental research.
 3. Participants will be able to participate in an experimental study procedure.
 4. Participants grasp and master experimental research data analysis methodologies.
- IO 5. Participants can comprehend and apply various learning methods to the conduct of research, as evidenced by the following indicators: a) participants comprehend various learning methods, including the syntax of each learning method; and b) participants can determine the learning method to be used in the research activities to be conducted.
- IO 6. Participants can create a learning plan that includes indicators, such as: Participants will be able to construct the learning plan if they: a) comprehend the most recent standard of the learning plan; and b) grasp the most recent standard of the learning plan.
- IO 7. Participants should be able to comprehend instrument principles and build HOTS-based validated research instruments, with the following indicators:
1. The notion of research instruments is understood by the participants.
 2. The correct sort of instrument in the study can be determined by the participants.
 3. Participants can create research instruments based on HOTS.
 4. Participants can test the study instrument that has been created.
- IO 8. Participants can comprehend the notion of sampling procedures, as evidenced by the following indicators:
1. Participants are familiar with the terms population and sample.

2. Depending on the sort of research, participants can decide the appropriate sampling approaches.
 3. Participants can choose the amount of samples they want to receive based on their needs.
- IO 9. The participant comprehends the notion of statistical analysis and is capable of doing it. Data processing of research findings, with indicators:
1. Participants can assess the study instrument's quality.
 2. Participants can put their data analysis skills to the test.
 3. Participants can put the assumption of traditional violations to the test.
 4. Participants can test their hypotheses.
- IO 10. Participants can follow the stages for writing a scientific article using the following indicators:
1. Acquiring a firm grasp on the conventions of scientific article writing
 2. Choose the appropriate title
 3. We're working on a solid abstract, a good introduction, and describing as many references to the study subject as possible.
 4. Carefully planning the research technique
 5. Carefully planning the research results part
 6. Creating an effective discussion section with as many references as possible from related studies
 7. Carefully designing the cover or conclusion
 8. Creating a well-designed library list

Trainees Criteria

Trainees are an important part of every training program. According to expert feedback, not all teachers are eligible to be trainees since there are specific criteria that must be met. This is meant to make training more effective and efficient, allowing the training results to be optimized in accordance with the goals stated. The following are the selection criteria for specific trainees: 1) follow the training from beginning to end, 2) complete each job and set a goal to meet the training objectives, 3) be comfortable with Microsoft Word, 4) be familiar with the Internet, and 5) be under 45 years old.

Training Agenda

The teacher's research competency improvement training is scheduled to take place within a month (excluding the review process of the article in the journal). In each school, there will be instructional activities as well as field research activities throughout the course of a month. Technically, this training will take place over three terms, with each term consisting of two days of training.

1st Term

The materials for the teacher's preparation skills as a researcher are found in Term 1. Participants will be encouraged to detect the problem, try to develop a solution technique of solving it, build scientific papers in the introduction, and be taught how to find credible international publications and use the Mendeley program. On the first period, the following goal was set:

1. Each participant is assigned to a research group, with one group consisting of three people.
2. Each group was assigned one title to be forwarded to a scientific journal.
3. The introduction section's scientific papers are complete.

The participants must accomplish the following tasks: 1) find at least ten international publications connected to the title of their group's study; and 2) find at least ten nationally accredited papers linked to the title of their group's research. The participants in the group must accomplish the following tasks: 1) design the RPP based on the learning method and bound variables chosen, and 2) draft scientific publications, specifically the introduction.

Activity details of Term 1:

Day 1:

09.00 – 10.00 General explanation & group division

10.00 – 12.00 Dynamics of the group & motivation as a researcher

12.00 – 13.00 Lunch

13.00 – 15.00 Quality reference search

15.00 – 17.00 Use of Mendeley and its application in MS Word

Day 2:

08.00 – 10.00 Concept of problem and research concept

10.00 – 12.00 Learning methods & formulating problems

12.00 – 13.00 Lunch

13.00 – 15.00 Experimental research concept (plus material on citation techniques, bibliography, and Sampling techniques)

15.00 – 17.00 Scientific article design (introductory section)

Note: There is a 1-week break to enter term 2.

2nd Term

Term 2 includes competency materials for putting experimental research into practice in the field. If the participant continues on to term 2, each group is required to accomplish the assignment assigned in term 1 and be prepared for RPP and study strategy. In term 2, participants will learn how to conduct experimental research, create HOTS-based evaluation instruments, conduct data analysis, and write scientific articles.

On the second term, the following goal has been requested:

1. Get HOTS-based assessment items ready for each group.
2. Each group is prepared to conduct experiments in the classroom.
3. Until the steps of the research technique are accomplished, the articles are completed.
4. Gain a thorough understanding of the data processing procedure.

The tasks that the participants must do in groups are:

1. creating and validating HOTS-based assessment instruments, and developing and validating HOTS-based assessment instruments.
2. executing the experimental process at school for two weeks, consisting of three meetings and one meeting to collect assessment data,
3. Entering data from the research into MS Excel
4. keeps track of findings during the experiment, including taking photographs.
5. We are gathering articles of linked research results, and

6. We are processing research results (descriptive analysis, test analysis required data, and hypothesis testing).

Activity details of term 2:

Day 1:

09.00 – 10.00 RPP Analysis and experimental process preparation in the field

10.00 – 12.00 Design of HOTS-based assessment instruments

12.00 – 13.00 Lunch

13.00 – 17.00 Problem planning and validation practices

Day 2:

09.00 – 12.00 Data analysis techniques

12.00 – 13.00 Lunch

13.00 – 17.00 Complete scientific article design practices

Note: There is a 3-week delay to enter term 3.

3rd Term

It was used in term 3 to verify data processing outcomes and to further the debate. Improvements to the scripts that each group of participants has designed will be made in this step, followed by practice submissions to the several pre-defined journals.

On term 3, the following goals have been set: 1) complete a paper; and 2) submit publications to scientific journals. Furthermore, participants in groups must fulfill the following tasks: 1) create further research endeavors independently and conduct experiments using the processes learnt previously, and 2) submit one article to each of the other journals.

Activity details of term 3:

Day 1:

09.00 – 12.00 Verification of data and discussion

12.00 – 13.00 Lunch

13.00 – 17.00 Finalizing scientific articles and submit a script to journals

Training Devices

Modules and presentation materials were created as training devices. This module and presentation materials were created based on a pre-determined requirement and an examination of the educational purpose.

Training Module

Modules are descriptions of the topics that will be studied during training. This module is meant to ensure that participants have a thorough understanding of the topic and have practiced the learning experience they will receive in person.

Covers, general instructional purpose descriptions, specific instructional purpose descriptions, success indicators, a table of contents, and a thorough description of all resources are all included in the modules. The first portion of the module is necessary content, or material that becomes a participant's basic competency as a researcher, such as the ability to utilize the Internet (creating a Gmail account, creating a Google Scholar account, creating an Orcid account, and the use of Mendeley as a reference management software). This section is planned

to include a provision as well as an appeal to participants to continue their training and research.

Problem concepts, research concepts, experimental research concepts, sample methodologies, data analysis techniques, and scientific article design are all covered in the core material part. This section is critical to the training's success and the learning process's success, as each piece of material learnt is expected to produce outcomes. Participants are encouraged to uncover and develop problems that will be lifted in their research when learning about problems, for example.

Specialists, including material experts and media experts, will validate the modules that have been constructed. Validation is carried out to obtain input into the repair module's framework, so that it can assist in the achievement of the training objectives.

Presentation Materials

The training procedure will be implemented in the classroom using presentation materials. The MS Powerpoint program is used to create presentation materials. This software is employed because it is easier to use in the creation of effective presentation materials. Given that the primary goal of this training is to improve instructors' research skills, the presentation material on show also encourages participants to become more enthusiastic about conducting research.

Experts, including learning design experts, material experts, and media experts, will then validate the presentation content that has been prepared. Validation is carried out to obtain feedback for repairing presentation content so that it can aid in the achievement of the training objectives.

Expert Test and Evaluation

Experts put newly created training systems and training gear to the test. The task of an expert is to identify areas where all of the gadgets can be enhanced and improved. Expert feedback is then used to make revisions, changes, additions, and subtractions to the gadget, as well as several other tasks.

Learning Design Expert

Learning design specialists' input and recommendations are grouped into five categories: development procedures, learning objectives, learning techniques, training materials, and assessment tools. Based on the findings of the learning design specialists, it can be determined that the components of the development procedure's implementation reveal that the entire development process met the required criteria. Developing standard, systematic, and appropriate steps will ensure that the product development is of high quality. This means that all phases are carried out exactly and in accordance with the plan, guaranteeing that the outcomes of each stage are reliable.

The assessor responds positively to the defined component of the goal and determines that the chosen objectives are appropriate and clear. Specific instructional objectives are designed to supplement, incredibly instructional objectives, and provide support for the defined common instructional objectives. This indicates that the training's goal-setting is adequate and that it is conceivable to build more training items and devices. Furthermore, it displays a reasonable

response in terms of the training approach adopted, but lower than other features. In this section, evaluators want the training technique to be more focussed on the participants, taking into account the teacher training process (andragogy). The training technique is also designed to increase participants' awareness and inventiveness, as well as motivate other colleagues who were unable to participate in the training sessions.

Last but not least, the material portion of the training and evaluation tools received rave reviews. This indicates that the training materials and evaluation tools generated meet all of the criteria and are regarded capable of meeting both the general and specialized instructional objectives. The training material is comprehensive and explicit, allowing trainees to closely follow each section and, in the end, fulfill all of their responsibilities and obligations as a trainee. The work and test are already following the objectives, and participants are being trained to be more serious and devoted to the research.

A modification in the training agenda, as a result of specific input from a learning design expert, adds to the training session duration. If only one term is two days long, the learning design expert recommends that the full term (all three) be two days long, making the planned class activity six days long in total.

The researcher eventually agreed to the plan, and each term was held for two days of classroom teaching. The addition of this time obviously influences the addition of materials presented, specifically the development of HOTS-based problems and a greater focus on the design of scientific papers, as well as the time assigned to participants to perform research independently. The following examples demonstrate the insertion of this material: 1) On the first day of activities, increasing the design material of HOTS-based assessment instruments and practicing problem planning and validation, 2) on the second day of activities, namely adding design materials Complete scientific article, 3) on the second day of activities, adding to the teacher's research competency evaluation material and preparing the material research plan for the teacher's research competency evaluation

Learning Media Experts

The learning media specialists' opinion and guidance are grouped into three categories: setting, cover, and visual illustration. Dr. Hasbullah (Deputy Dean of the Faculty of Postgraduate, University of Indraprasta PGRI) and Dr. Chandra Anugrah Putra are learning media experts who have been appointed as evaluators (Head of the Engineering Education Program Informatics Univ. Muhammadiyah).

The initial module view generated, according to media experts, did not meet the module standards. A standard module template is recommended by media professionals, and it is this template that researchers utilize to adjust the look of modules. The template makes a stronger first impression and includes an introduction to each module's content. The view also includes the amount of time required to study the material in the module, making it easy to analyze and evaluate the training room's implementation of material delivery. The template also makes it simple for researchers to create modules in which elements of each material are displayed more clearly and interestingly, in the hopes of increasing trainees' enthusiasm for learning each topic training within the module.

Part of the introduction is also more appealing because each subtitle is given in a more colorful manner and includes the name of the sheet's Instructional Objective. The glossary and index parts are intended to help trainees understand the meaning of the terminology used in the module and to make it easier for them to locate the content they want to study fast. The glossary and index were missing from the first draft module. Its existence, however, was critical in assisting trainees in learning the full module's contents.

Material Expert

Material compliance with the aim of training, general assessment of the quality of training materials/modules, general assessment of training techniques, and general assessment of assessment tools are the four components of the material experts' advice and suggestions. According to the material expert assessment results, the presented material follows the final objective of training (TIU), and the offered material is regarded adequate to be given to the trainees in the material aspect. This demonstrates that the structure of the supplied content is methodical and complimentary, and that it aids in the achievement of the training's ultimate goal. The teaching materials or modules also state that the module being utilized as a training guide is typical. This module is also thought to be capable of describing step-by-step training based on the material presented, so that trainees can complete the final task as the training's final goal, which is to design a scientific article to be submitted in an accredited National Journal, by following the training following the module.

In terms of the training plan, it's also acceptable to describe the material and adhere to the training objectives to the letter. The training technique that promotes trainee originality and ability will establish a training climate based on adult education concepts (andragogy) so that participants do not feel overly instructed. The training technique also encourages trainees to see that undertaking research is a way for them to continually improve their ability to learn. Finally, instruments are examined in the assessment element based on the training's final objectives and the learners' characteristics. Students are given assignments and assessments to encourage them to collaborate and finish each stage of collaborative research. This will undoubtedly have a good impact on their research operations, and they will hopefully be able to generate high-quality research as a result.

Expert input on the content and modules of the materials and modules is accommodated technically by making adjustments and significant changes to the materials and modules. The following is what has been corrected:

- 1) Incorporate content on HOTS planning as a means of improving teacher quality in the development of assessment instruments. This idea was fulfilled by include information on HOTS planning in the 7th Material module, which deals with assessment instrument design. Teachers also obtained information about the planning of HOTS-based challenges, which is much needed in the current educational era, as a result of the addition of this content and the ability to conduct research activities. The goal of HOTS issues is to increase learning quality and to train students' minds to be more creative and problem-solving oriented.

- 2) There is too much material on learning methods in the module; preferably, content on learning methods should be in the simplified module, and the whole material on learning methods should be translated into media. Other forms of education, such as ISBN books, are available. This has been enhanced by modifying the learning techniques to simply include the syntax of each learning method described as an image, with the full version being created into a book titled "Model dan Metode Pembelajaran di Kelas." The learning method's material simplification results in a reduction in the number of pages in the module, making it more compact and portable. This makes it easy for participants to apply training using the modules. Expert-recommended books include detailed descriptions of learning approaches, including theoretical foundations, syntax, benefits and drawbacks, and research findings. The ISBN for this book has been assigned, and it will be registered with Copyright. This book will also supplement existing modules, allowing trainees who want to use one of the learning ways to use it as a supplement to the theory and view the many study outcomes related to the learning methods chosen in his research.
- 3) Technical resources, such as how to use computers or the Internet, how to access journals through the OJS system, and how to utilize Mendeley, should include a video instruction that the trainees can quickly access. The next step is to convert the text in the module into a video tutorial for technical material, such as how to access national or international journals (<https://www.youtube.com/watch?v=zHVnL0jR5rs&t=54s>), how to create emails (<https://www.youtube.com/watch?v=EQe0Vh96fu0&t=31s>), how to register for Google Scholar (<https://www.youtube.com/watch>) This video supplements the material in the module, implying that the material in the module is not replaced but rather strengthened by the availability of the video, which the learners will ideally be able to access after the training is completed. The film was uploaded to youtube.com so that the trainees could watch it whenever and wherever they wanted. The trainees are supposed to be motivated by the videos posted on this YouTube channel, so they are encouraged to watch, pay attention, and finally execute what is depicted in the video. The purpose of this video's content is to help trainees better understand what content is being provided rather of focusing solely on the design display. This demonstrates that the video's concentration is on technical and operational stuff, and it is expected that anyone, particularly trainees, will practice it immediately.
- 4) The material on data processing with SPSS is thoroughly given to the learners. SPSS is still a new thing for teachers, according to an expert, thus its existence will be a unique uniqueness that attracts participants in doing research activities. This is further supported by the fact that most teachers (trainees) still struggle with manual statistics, therefore proficiency with SPSS is predicted to close those gaps. This information will be of interest to researchers, thus a full session has been planned to investigate the SPSS as well as the independent tasks that will be learned both individually and in groups.
- 5) The module view has to be fixed in general, such as adding a title page for each module's material title, finishing the Evaluation part for each module, building a glossary and index for each module, and adding a list of libraries (if any).

Discussion

The construction of a teacher training system to promote research competency has resulted in a successful training system that has been tested according to development research criteria. This development product includes all of the important features of a system, such as inputs, processes, and outputs. Inputs begin with the selection of prospective trainees who must meet specified criteria in order for the training process to run smoothly and meet the set goals. It is guaranteed quality from training materials, agendas and training schedules, and training methodologies to the evaluation instruments utilized, as it is guided by a process that experts in their respective fields have thoroughly evaluated. Finally, the system generates a training module, a specific resource that falls within the technical category, a textbook of learning methods, and learning media, as well as the learners' training goods.

In completing this research, the teacher competency enhancement training system is expected to meet the needs of Indonesian teachers, particularly in terms of researching competencies. There has been no training system related to research competencies for instructors in published scientific journals. If there is any research on teacher competence, it focuses on the learning process (Burgener & Barth, 2018; Varghese, Vernon-Feagans, & Bratsch-Hines, 2019; Verner, Massarwe, & Bshouty, 2019; Karababa & Caliskan, 2013), the use of various media learning (Nousiainen, Kangas, Rikala, & Vesisenaho, 2018; Far (Kim, Xie, & Cheng, 2017). This demonstrates that the training systems established are novel in terms of teacher competency, particularly training to improve teacher competency in doing research.

This training system has undergone expert testing to verify that the training system and the gadgets that result can truly satisfy the final purpose of training. The training technique used also attempts to guarantee that trainees are well-informed about the value of performing research and publishing scientific papers (Leonard, 2018), as well as to eliminate trainee resistance and unwillingness. Teacher research competencies are projected to be maximally strengthened with such a planned and comprehensive training framework.

There have been no study outcomes related to the training system to improve teachers' research competency, and there are no technologies that fully accommodate comparable training, as previously indicated. To that end, this article can serve as a valuable resource for the development of similar research in order to gradually improve teacher competency. Many of the specific elements developed in this training system are essential elements of the overall training material, including preparation materials like email use, Google Scholar account registration, OJS account registration, international reputable reference search, and even how to submit articles to scientific journals. Another element that has been produced based on expert input is the fact that this training system has accommodated expert advise, which is to contain resources on HOTS planning so that teachers can develop effective questions and use it as a research instrument for future research efforts.

Technically, several issues arise in the design of the training system for greater teacher competency in research, such as the curriculum on the course of research techniques, which has been a benchmark in research implementation. In

Indonesia, the research techniques curriculum tends to emphasize on knowledge, making it difficult to apply to the real world, particularly for teacher research. The outcomes of this research could provide an alternate remedy to the curriculum's shortcomings, therefore it's believed that instructors' or prospective teachers' research quality will increase, ultimately improving the quality of learning in Indonesia.

Individual quality research is impossible since a person's insight and vision are restricted by the extent of knowledge he or she can comprehend. As a result, it is critical to collaborate in research, particularly with researchers from other disciplines. Its goal is to gain a more comprehensive understanding of an issue so that the best solution may be proposed. Teachers with teachers (Keffer, Wood, Carr, Mattison, & Lanier, 1998; Ritchie & Wilson, 2000); academics with teachers (Allen & Shockley, 1998; Kapunscinski, 1997; Rust & Meyers, 2003; Wells, 2001); the entire team of school practitioners (Clayton, 2001; Senese, 2001); and collaborations from community practitioners (Cochran-Smith, 2001; Wells, 2001) are just a" Furthermore, Borko et al. (Borko & Whitcomb, 2008) write about "the relevance of research that" draws from a variety of fields, employs a variety of methods, and is rigorously done and documented." A study's main goal is to be able to be defined by its research methods, and its report must be complete and detailed. Other researchers will be able to verify and/or perform advanced study on the previously explored research theme provided the research method is complete and the report writing is thorough.

CONCLUSION

This study has highlighted the critical need to enhance teachers' research competencies in Indonesia, given the current gap in research knowledge and experience among educators. The development of a structured training system is essential to empower teachers, equipping them with the necessary skills and confidence to engage in research activities and contribute to academic discourse. By addressing the lack of formal training and mentorship in research, this study has successfully developed a training system that includes comprehensive modules, agendas, instructional books, and learning videos, all designed to improve teachers' research abilities. Through the use of the modified Dick & Carey development model, the training system has been systematically designed to ensure its effectiveness and relevance for teachers in Indonesia. The involvement of experts in testing and refining the system ensures that the developed materials are both practical and aligned with teachers' real-world needs. This training system, once fully implemented, has the potential to significantly improve teachers' research skills, fostering a culture of research within the educational community and encouraging teachers to actively contribute to the body of scholarly knowledge.

The expected outcomes of this study are not only the enhancement of teachers' research abilities but also a broader impact on the overall quality of education in Indonesia. As teachers develop stronger research skills, they will be better equipped to improve their teaching practices, support student learning, and engage in continuous professional development. In conclusion, this research provides a solid foundation for future efforts to strengthen the research capacity of teachers, and it is hoped that the developed training system will serve as a valuable resource for educators across Indonesia.

REFERENCES

- Aeni, A. N. (2015). Menjadi guru SD yang memiliki kompetensi personal-religius melalui program one day one juz (ODOJ). *Mimbar Sekolah Dasar*, 2(2), 212-223.
- Alawiyah, F. (2013). Peran guru dalam kurikulum 2013. *Jurnal Aspirasi*, 4(1), 65-74.
- Allen, J., & Shockley, B. B. (1998). Potential engagements: Dialogue among school and university research communities. In B. S. Bisplinghoff & J. Allen (Eds.), *Engaging teachers: Creating teaching/researching relationships* (pp. 61-71). Portsmouth, NH: Heinemann.
- Ardiansyah, J. (2013). Peningkatan kompetensi guru bidang pendidikan di Kabupaten Tana Tidung. *EJournal Pemerintahan Integratif*, 1(1), 38-50.
- Borko, H., & Whitcomb, J. A. (2008). Teachers, teaching, and teacher education: Comments on the national mathematics advisory panel's report. *Educational Researcher*, 37(9), 565-572. <https://doi.org/10.3102/0013189X08328877>
- Bullough, R. V., & Pinnegar, S. (2001). Guidelines for quality in autobiographical forms of self-study research. *Educational Researcher*, 30(3), 13-21. <https://doi.org/10.3102/0013189X030003013>
- Burgener, L. & Barth, M. (2018). Sustainability competencies in teacher education: Making teacher education count in everyday school practice. *Journal of Cleaner Production*, 174, 821-826. <https://doi.org/10.1016/j.jclepro.2017.10.263>
- Chatib, M. (2014). *Gurunya Manusia*. Bandung: Mizan Pustaka.
- Cheruvu, R. (2014). Focus on teacher as researcher: Teacher educators as teacher researchers: Practicing what we teach. *Childhood Education*, 90(3), 225-228. <https://doi.org/10.1080/00094056.2014.911636>
- Clayton (Missouri) Research Review Team: Beck, C., Dupont, L, Geismar-Ryan, L, Henke, L, Pierce, K. M., & Von Hatten, C. (2001). Who owns the story? Ethical issues in the conduct of practitioner research. In J. Zeni (Ed.), *Ethical issues in practitioner research* (pp. 45-58). New York: Teachers College Press.
- Cochran-Smith, M., & Lytle, S. L. (2009). *Inquiry as stance: Practitioner research for the next generation*. New York: Teachers College Press.
- Farjon, D., Smits, A., & Voogt, J. (2019). Technology integration of pre-service teachers explained by attitudes and beliefs, competency, access, and experience. *Computer & Education*, 130, 81-93. <https://doi.org/10.1016/j.compedu.2018.11.010>
- Hammack, F. M. (1997). Ethical issues in teacher research. *Teachers College Record*, 99(2), 247-265.
- Hammer, D., & Schifter, D. (2001). Practices of inquiry in teaching and research. *Cognition and Instruction*, 19(4), 441-478. https://doi.org/10.1207/S1532690XCI1904_2
- Hammersley, M. (1993). On the teacher as researcher. *Educational Action Research*, 1(3), 425-445. <http://doi.org/10.1080/0965079930010308>

- Hattie, J. A. C. (2009). *Visible Learning: A Synthesis of Over 800 Meta-Analyses Relating to Achievement*. London: Routledge.
- Hiebert, J., Gallimore, R., & Stigler, J. W. (2002). A knowledge base for the teaching profession: What would it look like and how can we get one? *Educational Researcher*, 31(5), 3–15. <https://doi.org/10.3102/0013189X031005003>
- Kapuscinski, P. (1997). The collaborative lens: A new look at an old research study. In H. Christiansen, L. Goulet, C. Krentz, & H. Maeers (Eds.), *Recreating relationships: Collaboration and educational reform* (pp. 3-12). Albany, NY: State University of New York Press.
- Karababa, Z. C. & Caliskan, G. (2013). Teacher competencies in teaching Turkish as a foreign language. *Procedia Social and Behavioral Sciences*, 70, 1545-1551. <https://doi.org/10.1016/j.sbspro.2013.01.222>
- Keffer, A., Wood, D., Carr, S., Mattison, L., & Lanier, B. (1998). Ownership and the well-planned study. In B. S. Bisplinghoff & J. Allen (Eds.), *Engaging teachers: Creating teaching/researching relationships* (pp. 27-34). Portsmouth, NH: Heinemann.
- Kim, M. K., Xie, K., & Cheng, S. L. (2017). Building teacher competency for digital content evaluation. *Teaching and Teacher Education*, 66, 309-324. <https://doi.org/10.1016/j.tate.2017.05.006>
- Leonard. (2018). Task and forced instructional strategy: Instructional strategy based on character and culture of Indonesia nation. *Formatif: Jurnal Ilmiah Pendidikan MIPA*, 8(1), 51–56. <http://dx.doi.org/10.30998/formatif.v8il.2408>
- Marti, A. D. (2012). Pendidikan inklusif di sekolah dasar Kota Padang. *Jurnal Penelitian Pendidikan Khusus*, 1(3).
- Marzano, R. J. (2003). *What works in schools: Translating research into action?* Alexandria, Virginia: Association for Supervision and Curriculum Development.
- Musfah. (2012). *Peningkatan Kompetensi Guru*. Jakarta: Kencana.
- Nasongkhla, J. & Sujiva, S. (2015). Teacher competency development: Teaching with tablet technology through Classroom Innovative Action Research (CIAR) coaching process. *Procedia Social and Behavioral Sciences*, 174, 992-999. <https://doi.org/10.1016/j.sbspro.2015.01.723>
- Nousiainen, T., Kangas, M., Rikala, J., & Vesisenaho, M. (2018). Teacher competencies in game-based pedagogy. *Teaching and Teacher Education*, 74, 85-97. <https://doi.org/10.1016/j.tate.2018.04.012>
- Peiris, S. (2013). Environmental education program goals and growth: The role of funding, administrative capacity, target population, and program structure. *Waste Management Education Programs*, Spring, 1-13. Retrieved from: https://nature.berkeley.edu/classes/es196/projects/2013final/PeirisS_2013.pdf
- Richey, R.C. & Nelson, W.A. (2000). *Handbook of Research for Educational Communication and Technology*. New York: Macmillan Library.
- Ritchie, J. S., & Wilson, D. E. (2000). *Teacher narrative as critical inquiry: Rewriting the script*. New York: Teachers College Press.

- Rust, F., & Meyers, E. (2003). Introduction. In E. Meyers & F. Rust (Eds.), *Taking action with teacher research* (pp. 1-16). Portsmouth, NH: Heinemann.
- Samsudin, M. (2016). Pengembangan Model Desain Program Pelatihan Manajemen dan Kepemimpinan Pimpinan Perguruan Tinggi Muhammadiyah. Unpublished Dissertation. Jakarta State University.
- Senese, J. C. (2001). The action research laboratory as a vehicle for school change. In G. Burnaford, J. Fischer, & D. Hobson (Eds.), *Teachers doing research: The power of action through inquiry* (pp. 307-325). Mahwah, NJ: Lawrence Erlbaum Associates.
- Silander, T. (2013). Pedagogical environments – Case Finland. *Formazione & Insegnamento*, 11(4), 51–62. http://doi.org/10746/-fei-XI-03-13_02
- Suryani, C. (2015). Implementasi supervisi pendidikan dalam meningkatkan proses pembelajaran di MIN Sukadamai Kota Banda Aceh. *Jurnal Ilmiah Didaktika: Media Ilmiah Pendidikan dan Pengajaran*, 16(1), 23-42.
- Talaia, M., Pisoni, A., & Onetti, A. (2016). Factors influencing the fund-raising process for innovative new ventures: an empirical study. *Journal of Small Business and Enterprise Development*, 23(2), 363-378.
- Tandberg, D. (2010). Interest groups and governmental institutions: The politics of state funding of public higher education. *Educational Policy*, 24(5), 735-778.
- Varghese, C., Vernon-Feagans, L., & Bratsch-Hines, M. (2019). Associations between teacher-child relationships, children’s literacy achievement, and social competencies for struggling and non-struggling readers in early elementary school. *Early Childhood Research Quarterly*, 47, 124-133. <https://doi.org/10.1016/j.ecresq.2018.09.005>
- Verner, I., Massarwe, K., & Bshouty, D. (2019). Development of competencies for teaching geometry through an ethnomathematical approach. *Journal of Mathematical Behavior*, 56, 100708. <https://doi.org/10.1016/j.jmathb.2019.05.002>
- Walberg, H. J. (2006). Improving educational productivity: An assessment of extant research. In R. F Subotnik & H. J. Walberg (Eds.), *The scientific basis of educational productivity* (pp. 103–160). Greenwich, Co: IAP
- Wells, G. (2001). The development of a community of inquirers. In G. Wells (Ed.), *Action, talk, & text: Learning and teaching through inquiry* (pp. 1-22). New York: Teachers College Press.
- Zeichner, K. (2003). Teacher research as professional development for P-12 educators in the USA. *Educational Action Research*, 11(2), h. 301-326.