

# A Training Model Based on Collaborative Research to Develop Teachers' Research Competence

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Indonesian teachers' competence is very poor, especially in relation to action research. Whereas, the research competence has too many effects to increase instructional quality. It is because there is no particular training to develop the teacher's competence, especially in relation to undertaking training to develop the teacher's competence for research. The developing model to advance teacher competency training is too poor. The standard model often used to develop training is the ADDIE model. However, we need to pay attention to some components because the audience of the training is teachers, so we need to consider many aspects such as the audience involvement, the provision of motivation, and so on. We need to develop the modified model to accommodate the model that has previously existed, which uses the ARCS developing model principal in motivation, the principal ASSURE model in audience involvement, and collaborative research to reach the training goals. The aim is for this model to guide the developer in creating a training system to increase teachers' competence in research.

**Keywords:** *Developing model, Research competence, Teachers, Collaborative research.*

## Introduction

Nowadays, the Indonesian education system is always straightening up and tries to establish quality and human resources through the education program. The Indonesian stakeholders of education have realised it, the fact that advancing a nation has to be reached through education. A substantial number of changes have already occurred in the Indonesian education system. It began from changes in the curriculum to changes in the allocation of the education budget, among others. However, such changes are never seen as a satisfying result because the changes

undertaken do not touch the important aspects in education, which arguably, are the teachers (Leonard & Wibawa, 2020). Why teachers? Silander (2011) said, "the high quality of teachers and teacher education is often considered to be the main reason for the success of finish students in the program for International Student Assessment (PISA)". This opinion shows that, when we develop a teacher's quality and competence, sooner or later we can be developing the education quality in the country (Bouguen, 2016).

The teachers have to able to use the important competence, which is doing research competence. Hammersley (1993) writes "educational research should be an integral part of the work of teachers in schools rather than an activity carried out on schools by outsiders". Further, Cheruvu (2014) said, "Yet teacher research-systematic data collection and analysis of a problem of practice is helpful for improving one's practice, gaining a deeper understanding of students' perspectives and needs, and ultimately, improving students' learning". From the opinions, we can say that by doing research, the teacher will able to develop instructional quality which they applied in the class. However, the fact remains that there is too low a level of teachers' competence in the research activities. This fact is evidenced from the study result researchers had conducted before. Of the 60 teachers that were surveyed, almost 70 per cent of the teachers did not have the right knowledge of the concepts of problem and research. Furthermore, almost 90 per cent of teachers never undertake research activity, and almost 100 per cent of teachers never publish their research result.

The lack of teachers' competence for research implementation, in general, can be caused by the lack of connection and cooperation that teachers have. Actually, this connection and cooperation can help teachers in undertaking collaborative research. The collaborative research project will be easy research, completed more quickly and the research can be better implemented towards individual research.

The principal and teachers are the people who never stop to learn. Although they had passed a formal education to become a teacher, they must develop their competence continuously and adjust their ability in the era of development. Silander (2011) said, "teacher is expected to continuously and systematically develop their own teaching methods and to refresh their professional skills". However, these wishes were unsupported with the real program by the schools, education authorities and maybe the government. It means the teacher didn't get a good training program to develop their competence continuously for the implementation of their duties as an educator. Whereas, the training will answer the teacher's need. According to Adams (2009), it "will help them enhance their knowledge and develop new instructional practices".

The training to develop teachers' competence is still widely performed in Indonesia. Although performed, the training isn't done in the correct way and fills the teachers' need to develop their capacity and competency. The implemented training is very simple and does not have the right



developing program. Nowadays, there are so many instructional training models but the development models focussed on training are very limited. The only model with a focus on it is the ADDIE (analysis, design, develop, implement, evaluate) model. However, because the training is for the teacher, the model needs to be modified. We have to incorporate the teacher's need, including the application of the andragogy in the training, collaborative learning strategy and collaborative research in the research, and the ARCS (attention, relevance, confidence, satisfaction) model based on motivation in the instructional developing strategy.

## **Discussion**

### ***Education and Training***

The underlying factor of important training is change. According to Schechty and Crowell (Musfah, 2012), "The changes can be classified into 2 types, there are technology changing and structural changing. The technology changing is about ways and strategy in task execution, while structural change is the changing person in the connection with others."

Admodiwirio (1993) said that "the goals of learning and training are to develop the knowledge, attitude, and personality to fulfill the job in the office". It shows that education and training gave the complete effect for the audience, which is knowledge and attitude. Gagne, Wager, Golas, and Keller (2005) said, "what is the difference between education and training? Often it is the purpose or specificity of the desired outcomes. Whereas education develops potential capabilities and dispositions, effective training depends upon the acceptable performance of the task being taught".

The materials or curriculum and training must be designed by the right plan so they can reach the goals that have been set. However, to design and implement the curriculum in all the training activities isn't easy. Bailie et al. (2011) were of the opinion that "designing and implementing effective curricula in the professionally applied disciplines is difficult in part because of the many extrinsic drivers of such curricula". Therefore, many extrinsic factors give the effect for curriculum and training, so we have to give any attention to the factors so that the curriculum and training can be increased and have a good quality, the same as that which has been planned.

Many teachers were not aware of the significant and direct effect of the training programs on the student's study achievement. Tillema and Inments (Adams, 2009) said "that teachers are often not aware of needed areas of improvement that have a direct effect on student learning. This fact gave the effect of the success of educational activity and training was executed by the teachers, because the teacher felt that the training effect is good and qualified for the student."



### ***Teachers' Research Competence***

Selvi (2010) stated that "teachers' competencies affect their values, behaviors, communications, aims, and practices in schools and also they support professional development and curricular studies. Thus, the discussion on teachers' competencies to improve the teaching-learning process in school is of great importance". This means the teachers' competence is the most important thing because it gives the effect for professionalism, especially to increase instructional quality in the classroom.

Referring to the benefits of the research implementation, we can say that through the implementation of the research, the teachers will obtain a new knowledge which can be used to improve the instructional quality in the classroom. Cheruvu (2014) posited, "this notion of teacher research in teacher education has significantly shaped my work as a teacher educator. It shapes my teaching and my research as well, in terms of how I understand my role as a teacher educator on an individual and collective level". It shows that in research implementation, the teacher can increase the pedagogic and professional competence directly. Chin-Ling Lee and Cheng-Jian Lin (Lee & Lin, 2013) said "the curriculum design, on the one hand, is cause for problems of inefficient teaching, which include the shortage of teaching hours, hard-achieving instructional goals, and textbooks selection".

Adam (2009) also discussed the importance of competence by carrying out research, noting "that research by teachers about their own classroom practices not only contributes to the knowledge base in education (Masingila, 2006) but can also function as a powerful means of professional development (DeMulder & Rigsby, 2003; Koutselini, 2008; Rathgen, 2006; Watkins, 2006)". It is as the researcher experiences; we do routine experience. It is not only effective for improving the quality of learning day by day, but also improving the teachers' individual capacity and capability. Cochran-Smith and Lytle (Adams, 2009) note "content that research enables educators to pose problems, identify discrepancies between their theories and their practice, challenge common routine, and attempt to make visible much of what is taken for granted about teaching and learning".

Cheruvu (2014) shared his experience, "from where I stand now on my continuing journey as a teacher educator-researcher, I see that my research has worked toward transforming the self, curriculum, and the larger field of early childhood teacher education. My research has forced me to interrogate the knowledge, assumptions, and positionalities that govern my teaching. This interrogation has led to a transformation of self. Engaging in teacher research has also improved my teaching practice in small, practical ways, such as how I structure discussions, assignments, and interacts with preservice students. It has also had more conceptual influences on my view of my role as a teacher educator, my pedagogical approaches, and my perspective on the preservice curriculum. These changes to my teaching have in essence led to a



transformation of the curriculum". This experience is supported by Cochran-Smith and Lytle (Adams, 2009) who stated that "teacher research as a systematic process of teachers working to pursue a research interest either individually, in inquiry teams, or with university researchers". The definition shows that teachers who did research in substance based it upon experimenting with their interests as either an individual, in partners, or as a researcher from the universities. In other ways, the research which is systematically and well planned and consistent, achieves a satisfactory result and is useful for education.

### ***Collaborative Research***

For the Indonesian educational world, research in collaboration still sounds foreign. It shows the lack of results based on collaborative research. Lieberman (1996) said, "collaborative research can indeed be accomplished in a variety of contexts". The opinion confirmed that collaborative research can be done in various contexts. Collaborative research projects can be done by the teachers, especially the teacher who understands that the research is an important activity to develop the instructional quality. Christianakis (2010) said that collaboration offers not only the potential breakdown of historical divisions between universities and public schools, but also offers future teachers useful models for participation in educational research.

Christianakis (2010) said collaboration amongst teachers can help build and strengthen solidarity. By collaborating, it allows the teachers to have a connection with the external community, especially the public society or another researcher from another university. It can also directly provide the empowerment of solidarity for the researcher. Otherwise, without collaboration, it can be difficult to achieve the instructional development because each researcher (can be teacher or academic researcher, as well as the public society) never collaborates to further develop an initial idea. Christianakis (2010) said without collaboration, academic resources run the risk of developing ideas only through their data, while practitioners risk developing ideas only through interactions with students (Fox, 2003). Through collaborative work and dialogue, practitioners and researchers can build more robust educational theories and practices.

Why can doing the research increase the instructional quality? The National Research Council (NRC) (Roulston et al. 2005) instructs that there are six principles of scientific research and recommends that the educational researchers use them, as follows: 1) pose significant questions that can be investigated empirically; 2) link research to relevant theory; 3) use a method that permits direct investigation of the questions; 4) provide a coherent and explicit chain of reasoning; 5) replicate and generalise across studies; and 6) disclose research to encourage professional security and critique. These principles ensure that completing the research begins from the trouble in the instructional process, looking for the theory, developing a method to solve the problem and then developing the best solution to repair the instructional process.

Power and Kunhlein (2008) said collaborative (or participatory) research can be defined as researchers working together to achieve the common goal of producing new scientific knowledge. Collaborative research is researchers actively working together to achieve the goals, which is to develop scientific knowledge. It shows that collaborative research is important to arouse enthusiasm to create, synthesise, and work in the public. Christianakis (2010) said that "collaborative teacher research provides a way for the teacher to participate in the examination of classrooms and schools in order to shapes policies, as well as bridge the divide between teachers, academics, and statehouse (Rust & Meyers, 2003). Research collaboration can take on many forms: teacher and teacher (Keffer, Wood, Carr, Mattison & Lanier, 1998; Mohr, Rogers, Nocera, MacLean, & Clawson, 2004; Ritchie & Wilson, 2000); academic and teacher (Allen & Shockley, 1998; Kapunscinki, 1997; Rust & Meyers, 2003; Wells, 2001); and community practitioner collaboration (Cochran-Smith & Lytle, 2009)".

As already discussed above, collaborative research is working together to solve the problem. Therefore, the participation from the researchers is important to ensure the quality of the research result. Frumkin (Chen, Wang, & Chen, 2014) indicated that if users can leave comments or annotations, this practice would open the door for sharing research experiences, facilitate collaborative research, and make it easy for future researchers to find materials they need in a particular collection. The Frumkin opinion shows that each researcher or authorised person has to provide input so that they can be open to the discussion room to increase research experience, giving facilities for the collaborative research implementation. Finally, it will be easy for the researcher to get access and materials as needed because it is connected to the research result before.

Subsequently, Christianakis (2010) said "collaborative teacher research has the power to disrupt hierarchy. First, collaboration can protect teachers from exploitation, since the researchers share and interpret data together (Shockley, 2001). Second, collaboration ensures that teachers' view is represented in the literature and that knowledge production is not unidirectional (Zeni, 2001; wells, 2001). Third, collaborative research facilities publication for teachers, who would otherwise have much less access to research tools, journals, conferences, and research networks (Minarik, 2001)".

## **Instructional Developing Models**

### ***Dick & Carey Model***

Dick and Carey's model is developed based on the system approach which integrates several separate parts to reach the goals together. In the similar opinion of Hall and Fagan (Richey, Klien, & Tracey, 2000), they said the system is a set of objects together with the relationship between the objects and between their attributes. This opinion is supported by Brown and

Green (2011) who stated that the Dick and Carey system approach model is a classic example of performing an instructional design task systematically.

Dick and Carey's model is an easy developing system to understand because the steps are very simple and the sequence is clear from the beginning to end. Every step works systematically and is tiered and interconnected, which means each step is the base for the following step, and so on.

### ***ADDIE Model***

The instructional model is more generic than the ADDIE (analysis, design, develop, implement, evaluate) model. The ADDIE model was developed by Reiser and Mollenda in the nineteen-nineties. Samsudin (2016) wrote one of the ADDIE functions to be a guide to build a device and infrastructure an effective training program, which is dynamic and supports the performance of training itself. Why is the ADDIE model suitable to develop the training program? It depends on the developing model with a circular (cycle) shape that is uninterrupted, so it is available to be revised as a result of the continuing evaluation. Although, the steps were in implementation and evaluation steps. Gagne, Wager, Golas, and Keller (2005) wrote the summary of the ADDIE model components and subcomponents, as follows: 1) analysis, including: a) first determine the needs for which instruction is the solution; b) conduct an instructional analysis to determine the target cognitive, affective, and motor skill goals for the course; c) determine what skills the entering students are expected to have, and which will impact learning in the course; and d) analyse the time available and how much might be accomplished in that period of time. Some authors also recommend a context or resources analysis, as follows: 2) design, including: a) translate course goals into performance outcomes and major course objectives (unit objectives); b) determine the instructional topics or units to be covered and how much time will be spent on each; c) sequence the unit with regard to the course objectives; d) flesh out the unit instruction, identifying the major objectives to be achieved during each unit; e) define lessons and learning activities for each unit; and f) develop specifications for assessment of what students have learned; 3) Development, including: a) make the decision regarding the types of learning activities and materials; b) prepare draft materials and/or activities; c) try out materials and activities with target audience members; d) revise, refine, and produce materials and activities; and e) produce teacher training or adjunct materials; 4) Implementation, including: a) market materials for adoption by teachers or students; and b) provide help or support as needed; 5) Evaluation, including: a) implement plans for student evaluation; b) implement plans for program evaluation; and c) implement plans for course maintenance and revision.



### ***ARCS Model***

The ARCS (attention, relevance, confidence, satisfaction) model is the instructional model developed by Keller and Kopp. Particularly, the ARCS model is focussed on motivation and learning environment aspects to increase the student's spirit in studying activity. Keller (2000) wrote that the ARCS model is the systematic design process that assists you in creating motivational tactics that match student characteristics and needs.

The first part of this ARCS model is attention. It means the instructional plan hopefully can get the student's attention to attend to the instructional materials that are given. The second part is relevance. In this part, the instructional planned should be relevant to the student's need; it can be from the materials, languages, contexts, and so on. The third is confidence. It shows that the instructional plan should be able to evoke the student's confidence, especially to face that unfairness in life will come and you can be successful with knowledge. The fourth part is satisfaction. It shows that all the instructional process that was developed should be satisfied for the students. Satisfaction means the students can show they will learn the materials continuously, either the resource from the teacher or another resource which can be accessed by the students. In addition, the student's awareness to do the assignment which is given by the teacher to the students individually.

### ***ASSURE Model***

Smaldino, et al. (2006) wrote that the ASSURE model consists of six steps of activity, as follows: analyse learner; state objectives (states standard and goals); select methods, media and materials; utilise media and materials; require learner participation; and evaluate and revise. From the explanation of the steps of the ASSURE model development, we can conclude that all the development models are generally same. They all begin from the need analysis, design, and conclude in the evaluation. However, there is a specific context in this model — there is the student's involvement in the instructional process.

This is shown specifically in the ASSURE model because it is based on the awareness that the student's involvement in the instructional process is the important component to reach the instructional goals. Samsudin (2006) noted that the student's involvement is in the effort for the effective instructional process. Providing the students' the opportunity to do their activity and apply their knowledge and ability is one way to involve them in the instructional process.

**Table 1:** The Difference Between Instructional Models

Instructional Developing Model	Advantages	Disadvantages
Dick & Carey	<ul style="list-style-type: none"> <li>- Steps of development are clear, complete and systematic.</li> <li>- Steps of try out are complete and coherent.</li> <li>- The expert evaluation for the validity is clear.</li> <li>- The revised process is continuing in all developing processes.</li> <li>- Can be used to plan micro instructional and for training.</li> </ul>	<ul style="list-style-type: none"> <li>- Need analysis reveals for instructional goals, not task analysis.</li> <li>- The instructional strategy did not clearly analyse. Including the unclear expert evaluation.</li> <li>- The developing result is not implemented first before being evaluated (either formative or summative).</li> </ul>
ADDIE	<ul style="list-style-type: none"> <li>- Focus as a training development model.</li> <li>- Developing model is circular and uninterrupted, so the revised process can be done in every developing step.</li> <li>- Needs analysis is completed by the task analysis.</li> <li>- Developing result is implemented and evaluated directly.</li> </ul>	<ul style="list-style-type: none"> <li>- The steps of developing are too simple and connect some steps that should be disconnected (similar to formulating the specific goals, designing test, and strategy, including the design step).</li> </ul>
ASSURE	<ul style="list-style-type: none"> <li>- Focus is on the student's involvement in the instructional process.</li> <li>- Make sure that the instructional media and materials are good.</li> </ul>	<ul style="list-style-type: none"> <li>- The revised process is only at the end of the instructional process.</li> <li>- Based on the instructional goals that were not clearly explained.</li> </ul>
ARCS	<ul style="list-style-type: none"> <li>- Is suitable for an instructional developing strategy based on students.</li> <li>- It can be the developer's guide to increasing the instructional quality in the classroom.</li> </ul>	<ul style="list-style-type: none"> <li>- Is not an instructional developing model to do the need analysis, materials design, and so on.</li> </ul>

According to the analysis result, some developing instructional models have been explained above in Table 1. It can be said that every model has different characteristics depending on what is going to be designed and developed. The conclusion is there is not one model that can be used to develop everything. Therefore, modification and even consolidation of some of the developing models is required to accommodate the needs in the developing process.

The developing model, as explained above, has the advantage and disadvantages of each. This includes the advantages and disadvantages of being a reason for the instructional developer to choose the developing model which will be used. The good developing model will be good or effective if the model can be used efficiently and successfully to reach the goals which were previously planned.

To see an effectiveness application from the instructional model, analysis and deep evaluation of the performance models are needed to analyse. However, generally, the effective model can be shown from the output after the implementation of developing results in the group. It means, if the students' scores with applying this developing model were good, the developing model could be effective. An effective instructional developing model will produce an effective instructional process too. Miarso (2011) said an effective instructional produces functional learning and has purpose for the students of the university through the right procedure, when the effects can be known from the students' score.

According to the theoretical analysis of some instructional developing models, there is a need to undertake modification of those models. This modification is to produce the developing model according to the need of this developing research. The modification process can be like a consolidation of the developing model which already exists or can provide input of a part of the model to another model. Hopefully, the modification can be produced as an effective and efficient developing model, so the developing result is optimal.

### ***Training Developing Model Based on Collaborative Research***

Education and training with developing the teachers' research competence as the goals are priorities that cannot be bargained. It shows that the implementation of education and training must be implemented systematically and continuously. Thus, educational design and training must be prepared perfectly according to the teacher's needs. Only by the right design can the purpose of the implementation and training be reached well, and moreover, should be reached perfectly.

Christianakis (2010) said, "While recent development in teacher research has led to more teacher-conducted studies, the following criticisms from within academia have reinforced the

hierarchical divide between teachers and university academics: (1) teachers do not have the research skills needed for rigorous inquiry (Huberman, 1996); (2) teacher research is too idiosyncratic, self-referential, and ungeneralizable (Bullough & Pinnegar, 2001); and (3) the teacher role conflicts with or is distinct from the researcher role (Hammack, 1997); Hammer & Schifter, 2001)". The fact shows specifically, teachers (especially in Indonesia) are not directed to have researcher competence, so it is not a significant problem when the teacher did not have research competence. It is contrary to the fact that the teacher who does the research will be a creative teacher and have incredible variety in instructional activity.

The purpose of this developing training system is to produce a system that can pave a way for the teachers to have research competence. Too many people have said that teachers get less attention regarding research. As Christianakis (2010) has stated, "such critiques assume that teachers do not have research training". After the analysis process, the advantages and disadvantages are found and show the suitability and effectiveness of each model, so the researcher tries to develop the modification developing model, as shown in Figure 1.

In the outline, the grand design of this developing model is the modification from two main developing models, the ADDIE and ARCS models. It then inserts several elements and important opinions from the ASSURE and Dick and Carey models. The emphasis from this model is in the training implementation strategies. That is, the implementation of collaborative learning and collaborative research in the instructional implementation, modified with considering the element of ARCS (attention, relevance, confidence, satisfaction) developing the strategy in the instructional process, as well as the audience involvement as the adult students.

The first step that must be completed is analysis. The analysis step is the most important step because it is the main base to develop an instructional system. In this step, it includes the needs analysis activity, assignment analysis, program and rational training materials, and the students' analysis. All the analysis steps will be a guide to design the instructional goals. Generally, it will be the last purpose of some developing instructional systems. The purpose of a needs analysis is to have input from the expert, graduate users, the teachers, and other elements, related to the urgency of the teacher competence in the research activity. The aim of the assignment analysis is also to get the input related to the duty in the teachers' professional work and keep doing the research. For the program and rational training materials analysis, it's generally to get the overview of the training focus, such as the information and knowledge or the tools to reach the goals. It will determine the strategy and step which will be used in this training activity. Next, the students' analysis, includes demography (pedagogic or andragogy), the general characteristic, entry skill level, motivation profile, and so on. It is not like the Dick and Carey model which inserts the students' characteristic in a step of its own. This model inserts the students' analysis of the first step.

The second step is design. This part includes determining the general instructional goals, specific goals, format, and the delivery, activity, exercise, and trick that must be prepared for this training activity. All parts of the design are based on the ARCS principle, the collaborative research concept, and the students' involvement. It means there is no part of the design that is without the ARCS concept, collaborative research, and student involvement. The general instructional goals are designed based on the analysis results that have been done before. The goals, in the form of the end of the target, must be owned by all the audience in the training program. The next step after designing the general instructional goal is to explain the map competence that the students must reach to get the general instructional goals. This activity is more recognised to determine the specific instructional goals. The analysis of the competence map must be explained specifically regarding the based competencies to reach the main competence, according to the general instructional goals. The determination of the delivery training format is the activity to choose and design media, methods and the training strategy which will be used in the training activity. Determining the activities, exercise, and the trick that will be prepared for the training activity will occur continuously from the beginning, during the activity, and until the end of the training activity.

The third step is to develop. This step includes the activity or designing the tools of scoring standards, designing materials, and formative evaluation. Designing the tools of the scoring standard is based on the needs of the ability of the evaluated training activity. The effectiveness and efficiency of the training activity can be shown by itself because the designing model is for the training, and the developing scoring tools are in the form of performance appraisal and assessment. This is to ensure that the students who expressed successfully, are the students who are able to show the performance appraisal product according to the general instructional goals. Designing the materials begins by analysing the materials previously used, then modifying or designing the new materials based on the training audience's needs. The last adopted the formative evaluation in the Dick and Carey model. The researcher used one-to-one evaluation, small groups, and field trials in the implementation of the formative evaluation activity. The purpose of formative evaluation is to receive input from the expert, users, and other competence people, to enable a holistic revision.

The fourth step is implementation. Although too many experts in developing design said that the developing process stops in the formative evaluating process, the researcher tries to do the implementation, so the effectiveness of the training system that had been being developed can be shown. It is not like instructional activity in the formal school or in the university needs the moment, according to the materials or subject. Therefore, the training is flexible enough because it can be done anytime according to the audience's training needs (teachers). This implementation is to be done by showing something. There is training implementation, tools in place, and observation. In general, implementation means to obtain the right view to all the

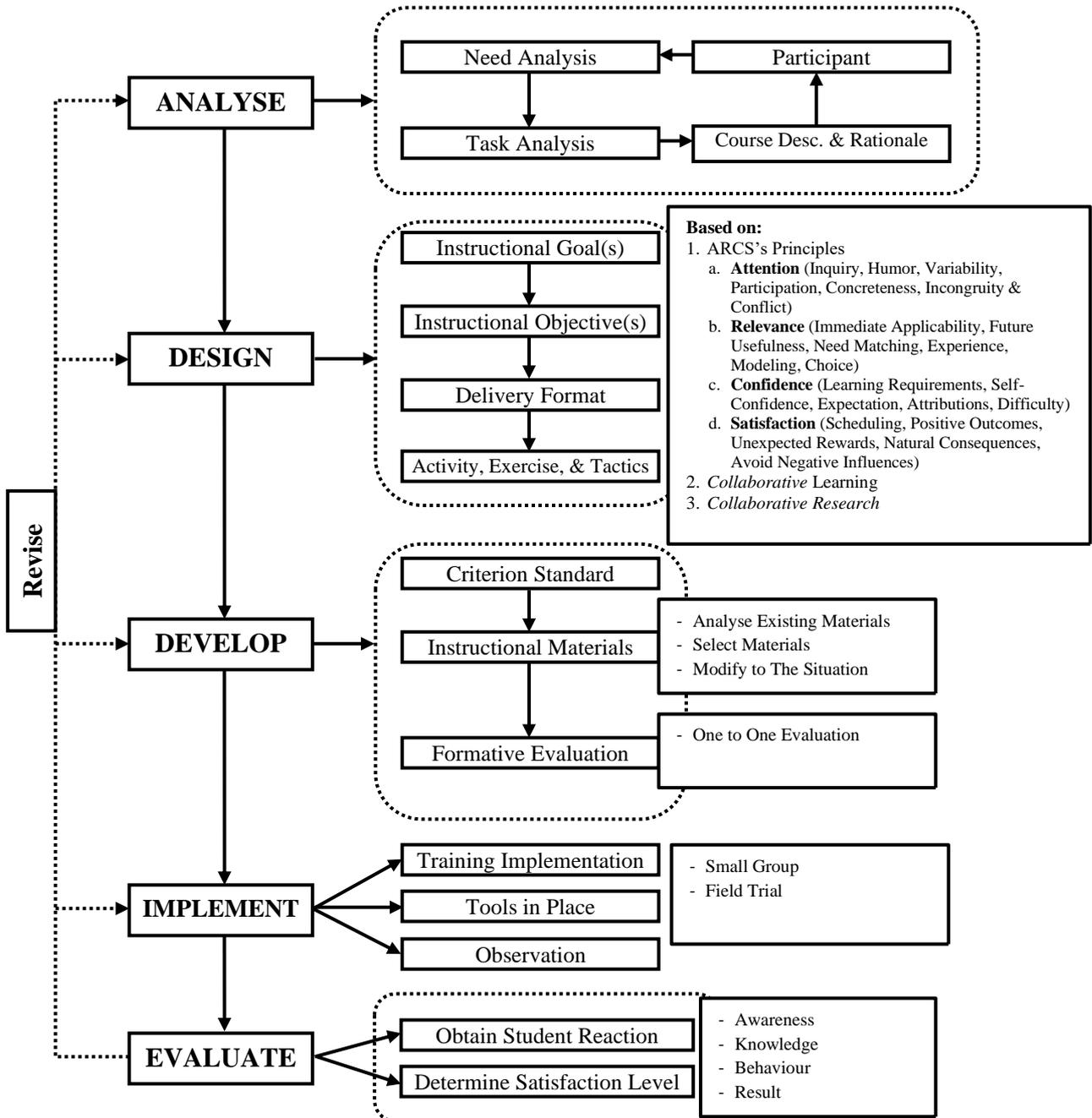


planning that has been prepared and be able to revise it day by day. Aspects that must be attended to are the application of the principle of appropriateness of ARCS, collaborative research, and the audience involvement.

The fifth step or the last step from this model is to evaluate. The purposes of this step are to see the obtained student reaction and determine the satisfaction level, including awareness, knowledge, behaviour, and result. This evaluation is completed to ensure that the training system that was developed is effective and efficient enough to use in the instructional process (the training to increase the teacher's competence in research activity).

In principle, there is no perfect model. However, the model should only be based on the activities needed from the developing activity. It can be for traditional instructional in the classrooms in the educational process for elementary, junior, high school or university, and also the specific instructional, such as training for adults to refresh and increase their knowledge capacity.

**Figure 1.** Modified Training Development Model





## **Conclusion**

Modification developing models can be used to develop the training system to increase teachers' competence in research, especially to obtain a training system based on collaborative research which can provide a positive effect for the teacher directly. Hopefully, this developing model can be a guideline for training developers, so there will be a verification and experimentation from all the training systems that were developed.



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