

# Science-literacy-based Teaching Materials Training Management Model: Improving the Professional Competence of Middle School Teachers

DOI: <https://doi.org/10.47175/rielsj.v5i1.915>

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## ABSTRACT

This research aims to (1) determine the effectiveness of the Scientific Literacy-Based Teaching Materials Training Management Model based on material experts, learning design experts, and teacher responses. (2) determine the effectiveness of the scientific literacy-based teaching materials training management model. This research was conducted at SMP N 11 Medan in June–October 2023, using descriptive data analysis techniques. The development of the training model was carried out using the Thiagarajan Four-D (4-D) development model, which consists of four stages, namely definition, design, development, and dissemination. The resulting product is a training model that will be used by teachers at SMP N 11 Medan. The feasibility of the model was assessed by validation experts. The results of the material expert assessment show that it is in the very good category, with an average percentage of 90.05% (very good), design experts at 90.50% (very good), and teacher respondents at 91.6% (very good). Test the effectiveness of the model with the results of the known value  $t_{count} = 3.263$  while  $t_{table} = 2.042$ , which means that there is an influence of using a model based on scientific literacy in the ecosystem in increasing students' grades in class, so it can be concluded that the research product for the development of scientific literacy-based teaching material training management is a training model that is suitable for use as a training model for teachers.

## KEYWORDS

training models; teaching materials; scientific literacy.

## INTRODUCTION

The main problem in the field of education today is the low quality of teachers and the relevance of teacher competence. The low quality of educators is reflected in the large number of teachers who do not meet the basic requirements as educators. The problem of the relevance of educators' competence to the needs of the world of education is characterized by the large number of teachers whose teaching does not match their educational background (mismatch). According to Kazu and Erten (2016), improving the quality and relevance of educators' competencies can be achieved through education and training programs (Diklat). Quality training can produce teachers who are superior, tough, have high technology, and have sufficient competence so they are able to compete and excel. How well an instructor instructs depends on inspiration, capabilities, involvement, preparing, ability, and other components. Likewise, Shukla (2014) believes that teacher

competence also depends on the training they receive. So training has a big impact on the development of teacher resources.

Teachers can be said to be central figures in instruction since of their part in driving and encouraging learning. Instructors ought to too have parts as scholastics, analysts, and deep rooted learners. This can be related to the educational field, so it requires educational aptitudes and other information that underpins its part in managing the instructing and learning handle viably. Instructors are too facilitators who plan how a learning prepare applies adaptable techniques, straightforward appraisal strategies, and exercises that can persuade understudies to be effectively included. Separated from that, the driving educator too gets understudy criticism approximately the learning handle that happens. So that it is conceivable to create a climate of basic considering, collaboration, communication, and inventiveness in understanding with the character required by the RI 4.0 period (Hoesny & Darmayanti, 2021).

One of the factors supporting activities to improve the quality of human resources, especially for teachers, is training. Training acts as a basic reference that can direct teachers' teaching activities appropriately so that teachers will become more focused and learning objectives can be achieved optimally. The existence of training makes it easier for teachers to understand concepts thoroughly so that they can be more innovative in their learning.

Teachers must proceed to memorize, taking portion in logical exercises such as preparing, workshops, and workshops to broaden their skylines, increment their experience, and apply them within the educating and learning exercises carried out by instructors (Wenno, 2016). So one of the foremost critical things approximately expanding competence is that instructors got to take portion in preparing exercises. Through training, it can influence teacher professionalism in teaching. Training between teachers can exchange problems and solutions regarding learning activities, as well as facilities and infrastructure for learning activities (Pratama & Lestari, 2020).

In the Regulation of the Minister of State for PAN and RB Number 16 of 2009, there are three elements of teacher activities in PKB for which credit scores can be assessed, namely: self-development, scientific publications, and innovative work. Specifically related to self-development, it is basically an effort to improve teachers' abilities and skills, including through educational activities and functional training (functional training), which can increase teacher competence and/or professionalism. Functional training is included in the category of in-service training, which is carried out to realize competency necessities in agreement with the sort and level of each useful position (Government Direction Number 101 of 2000 concerning Instruction and Preparing for Gracious Worker Positions).

Education is one of the key factors in advancing a nation. In the context of education at the junior high school level, the role of teachers is very important in shaping students' competencies and skills. Middle school teachers need to have a strong understanding of scientific literacy in order to teach effectively and help students develop a good understanding of science. One of the things that needs to be considered in developing the competence of junior high school teachers is training in teaching materials based on scientific literacy. Scientific literacy involves understanding, knowledge, and skills in science and technology that can be applied in everyday life. By having a good understanding of scientific literacy, junior high school teachers can convey lesson material more clearly and interestingly, as well as develop students' critical thinking and problem-solving skills. However, there are still several challenges in developing a scientific literacy-based training management model for teaching materials for junior high school teachers.

Many junior high school teachers do not have an adequate understanding of scientific literacy and how to integrate it into learning. Therefore, an appropriate training approach is needed to increase teachers' understanding and knowledge of scientific literacy. Limited resources: Sometimes schools and junior high school teachers face limited resources, both in terms of funds and facilities. This can be a challenge in organizing effective scientific literacy-based teaching materials and training. Therefore, there is a need for careful planning and the efficient use of resources to maximize the benefits of training. Curriculum changes and new demands: Educational curricula can change over time, and middle school teachers need to keep up with new demands that arise. In developing a training management model, it is necessary to pay attention to changes in the curriculum and new demands in education so that training remains relevant and effective.

This research was conducted to produce a training management model that is appropriate for use by teachers, especially junior high school teachers, so that teachers are interested in taking part in training because of the training and it is easy to understand the training material. This is important for evaluating teacher performance in the future in policy. The government's new Minister of State PAN and RB Regulation Number 16 of 2009 states that in the future, all teachers who wish to advance their professional careers must have physical evidence of having attended functional training. Another urgency is that currently many teachers are less innovative in creating teaching materials, one of which is scientific literacy-based teaching materials, so training is a way for teachers to fulfill this policy.

The type of training designed to develop human resources, including the competence of junior high school teachers, must ultimately be managed appropriately and professionally so that it has real meaning and has an impact on improving the quality of the human resources produced. This is related to training management, which according to Kamil (2010) can be done through 10 steps, namely: recruitment of training participants; identification of learning needs, learning resources, and possible barriers; determining and formulating training objectives; preparing initial and final evaluation tools; arranging the sequence of training activities; training for trainers; carrying out evaluations for participants; implementing training and final evaluation; and evaluating training programs.

Literacy actually comes from the word education, which suggests the literacy/illiteracy annihilation development (Echols & Shadily, 2007). Education is the least level of perusing and composing aptitudes required to take an interest in and communicate in community life. In other words, in case a student has the capacity to get and utilize the data given, as well as the capacity to contend (both master and con), it implies that the understudy has tall education aptitudes (Cigdemoglu & Geban, 2015). Logical proficiency can be characterized as logical information and abilities to be able to distinguish questions, get modern information, clarify logical marvels and draw conclusions based on actualities, get it the characteristics of science, be mindful of how science and innovation shape the common, mental, and social environment, and be willing to be included. and care almost science-related issues.

The concept of logical education anticipates students to have a tall sense of concern for themselves and their environment when confronting everyday life issues and making choices based on their logical information. Based on the 2012 International Student Assessment Program (PISA) framework, there are several dimensions or aspects that are of concern in the implementation of the International Student Assessment Program (PISA) on scientific literacy. These aspects consist of context aspects, content aspects (knowledge), competency aspects, and attitude aspects, which will be explained in detail as follows: (Wulandari, 2016).

Scientific literacy is the main key to facing challenges in the current era of globalization. Scientific literacy can help students face increasingly complex science and technology problems (Hidayati & Julianto, 2018). With the application of scientific literacy in education, students are anticipated to have an understanding of logical concepts and logical forms required to support student participation in social life. Students' scientific literacy can also help them identify and solve problems in everyday life.

Each student has different scientific literacy abilities. Regarding scientific literacy abilities, there are several factors that can influence students' scientific literacy abilities, both individual and social. There are several factors that can influence scientific literacy abilities, including internal and external factors.

Competence is characterized as a set of viable behaviors related to investigation and examination, analyzing and considering, as well as paying consideration and seeing, which lead somebody to discover ways to realize certain objectives viably and effectively. Concurring to Mulyasa (2011) proposes that competency is judicious execution that palatably meets the objective for a wanted condition.

Charles's opinion means that competence is levelheaded behavior to realize the specified objectives in agreement with the anticipated conditions. Concurring to C. Lynn in Rusdiana (2015: 82), competencies extend from review and understanding of real concepts to progressed engine abilities to educating behavior and professional values. Lynn accepts that competency can incorporate rehashing realities and ideas, from progressed motor skills to learning behavior and proficient values. Agreeing to Mulyasa (2004), competence may be a combination of information, abilities, values, and demeanors that are reflected in propensities of considering and acting.

Teacher competency means a person's ability to carry out commitments dependably and fittingly, or the teacher's capacity and specialist in carrying out his teaching profession (Purba & Wau, 2021). The success of the learning process depends on the teacher's performance in teaching. Teaching and learning activities can be carried out well and correctly by people who have undergone certain education according to their profession. Teachers are people who play an important role in designing and carrying out the learning process. Teachers are professional workers; therefore, every professional worker must have certain abilities or competencies in order to carry out their proficient obligations. The definition of teacher agreeing to Law No. 14 of 2005 concerning Teachers and Lecturers, specifically as expressed in Chapter I Common Arrangements Article 1 Section (1) as takes after: instructors are proficient teachers with the most assignment of teaching, educating, directing, coordinating, preparing, surveying, and assessing understudies in basic and middle of the road instruction.

Administration could be a way or craftsmanship of overseeing something to be done by other individuals. To realize certain objectives viably and effectively that are gigantic, complex, and of tall esteem, administration is certainly required. Human resources are an organization's wealth (assets) that must be utilized optimally, so management is needed to organize human resources in such a way as to achieve the goals that have been set from the start. The definition of administration cited by Hasibuan (2013) states, "Administration is the science and craftsmanship of overseeing the method of utilizing human assets and other resources effectively and productively to realize a certain objective."

Administration, agreeing to Massie, cited by Arsyad (2002), states, "Administration could be a handle where groups collaboratively mobilize activity or work to attain common objectives. This handle incorporates procedures utilized by supervisors to facilitate the exercises of other people towards achieving common objectives. In the interim, concurring to Terry (2010), "administration could be a commonplace prepare comprising of arranging,

organizing, actuating, and controlling activities to decide and accomplish objectives through the utilize of human assets and other assets.”

Preparing is an exertion to prepare somebody with information, aptitudes, and demeanor so that they have the capacity to carry out assignments and exercises (Daryanto et al., 2022). Concurring to Eko (2015), preparing could be a arrangement of person exercises pointed at efficiently making strides aptitudes and information so that people are able to perform professionally in their field. Preparing could be a learning handle that empowers workers to carry out current work concurring to benchmarks. Concurring to Rachmawati (2008), preparing is an natural gathering for workers where they obtain or learn particular demeanors, capacities, skills, knowledge, and behaviors related to work. Concurring to Rivai and Sagala (2011), preparing may be a prepare of methodically changing representative behavior to attain organizational objectives. Preparing is related to the employee's aptitudes and capacities to carry out the current work.

The problem formulation for developing a training management model for teaching materials based on scientific literacy to improve the professional competence of junior high school teachers can be described as follows: (1) What are the results of material expert validation of the training management module being developed? (2) What are the results of the layout design and learning design experts' validation of the training management modules being developed? (3) How do lecturers in educational administration courses respond to the training management modules being developed? (4) What are the results of the effectiveness test of human body anatomy and physiology teaching materials on the teaching materials developed?

## RESEARCH METHODS

This inquire about is improvement inquire about utilizing the Four-D (4-D) gadget advancement show created by Thiagarajan (Trianto, 2010). The Four-D show is the foremost nonexclusive item improvement demonstrate and is created efficiently and based on the hypothetical premise of the item being created. This improvement demonstrate comprises of four stages: characterize, plan, improvement, and dispersal. This model also does not require a relatively long time because the stages are relatively simple. This model provides the opportunity to carry out evaluations at the end of the product so as to minimize the error rate at the end of the activity.

This research was conducted at SMPN throughout the West Medan District. The subjects of this research were all teachers at SMPN 11 Medan. Developing training tools that are in accordance with the design requires initial investigation and analysis or identification of current conditions or training models that have been followed by teachers. These conditions include (1) participants, (2) instructors or facilitators, and (3) training locations. Operationally, the training tools referred to at this stage include: (1) training implementation guidelines; (2) training modules containing training materials; and (3) participant activity sheets (LKP).

**Table 1.** Description of the Definition Stage

Preliminary Analysis	Description	Indicator	Instruments
Potential Analysis	Field research to determine the potential that teachers have that can be developed, as well as the problems faced in	1. Mastering competency benchmarks and fundamental subject competencies 2. Master learning hypothesis and instructive learning standards 3. Develop professionalism continuously by carrying out reflective actions	Questionnaire

<b>Preliminary Analysis</b>	<b>Description</b>	<b>Indicator</b>	<b>Instruments</b>
	developing this potential.	4. Utilize information technology and Communication to develop yourself 5. Develop a curriculum related to the subject/field of subject development being taught 6. Act in accordance with religious, legal, social and cultural norms	
Training Model Analysis	Investigation and analysis of current conditions related to the training model that teachers have followed	1. Training Efficiency 2. Relevance of Training 3. Using new skills and knowledge 4. Confidence in mastering new skills and knowledge 5. Use in difficult situations 6. Skills and 7. New knowledge as a solution 8. Clear understanding Questionnaire	Questionnaire
Needs Analysis	Identify current conditions or training models that teachers have followed. These conditions include (1) participants, (2) instructor/facilitator, (3) training location	1. Whether or not the teacher has ever attended training 2. Suitability of the training undertaken 3. Impact of training on performance 4. Disadvantages and advantages of training 5. Training methods used during training 6. Suitability of the training materials used 7. Use of media/devices during training	Questionnaire

At the planning stage, what is carried out is designing a training model. The activity carried out in this second stage is designing a training model. At this stage, prototype-1 (initial) is produced as a realization of the model design results. Activities carried out at this stage include design, determining competencies, materials, designing devices and instruments.

**Table 2.** Description of the Design Stage

<b>Activity</b>	<b>Description</b>	<b>Product</b>
Designing Training Models	Design and set targets for training models, namely teachers who have the potential to provide training experience and knowledge skills in classroom learning that can be developed..	The ideal model and target for junior high schools in Medan City
Training achievements	Determine the competency results to be achieved from the training training process. Competencies to be achieved in implementing the training model developed	Participants have the ability or knowledge about scientific literacy teaching materials, Participants have the ability to create scientific literacy-based teaching materials and Participants are creative and innovative in making teaching materials in class
Training materials	Determine material related to the achievement of training participants' competencies. Material related to the achievement of competencies created.	Training model module, scientific literacy based teaching material module

Designing Devices	Designing training tools such as training implementation guidelines, training modules, participant activity sheets, and and training evaluation tools	Developed model prototype
Instrument	Design data collection instruments about models and devices that are being developed	validity instruments, practicality instruments, and effectiveness instruments

Data collection techniques using questionnaires. There are four types of questionnaires used to collect information and data needed in developing training models, which are prepared based on the needs and suitability of information for teachers in training, namely: questionnaires for material experts, design experts and teacher respondents.

**Table 3.** Validation Research Instrument Grid by Material Experts

Component	Indicator	Amount Items
Construct Validation	- Training Activity Design	9
	- Training Materials	7
Content Validation	- Training Material Design	9
	- Material	9
Model Implementability	- Syntax implementation	2
	- Obstacle	1
Effectiveness	- Performance	1
<b>Total Statements</b>		<b>38</b>

**Tabel 4.** Validation Research Instrument Grid by Design Experts

Component	Indicator	Amount Items
Content Design Validation	- Model development needs	4
	- Update	5
Construct Design Validation	- ICAS Model Rationale	4
	- ICAS Model 4 Syntax	4
<b>Total Statements</b>		<b>17</b>

**Tabel 5.** Validation Research Instrument Grid by Lecturers

Criteria	Number of Items
Material Coverage	3
Presentation	4
Language	5
Effect on learning	4
Product assessment	5
Icas	5
<b>Total Statements</b>	<b>26</b>

The data processed is data from material validation questionnaires, media validation, teacher and student response questionnaires. These data are media and material suitability data (Sugiyono, 2015). The scale utilized could be a Likert scale which points to degree people's states of mind, suppositions and discernments. With a Likert scale, the factors to be measured are interpreted into variable markers, at that point these markers are utilized as a starting point for compiling instrument things within the shape of questions.

**Table 6.** Likert Scale Criteria

Criteria	Score
Very Good	5
Good	4
Good enough	3
Not Good	2
Not Good	1

*(Sugiyono, 2015)*

The data obtained was analyzed quantitatively by calculating the percentage of each indicator, which was then classified and interpreted in the form of qualitative sentences. Then, data in the form of suggestions, responses, and improvements is described qualitatively.

The data analysis technique is carried out by means of qualitative analysis. The following is a description of the following analysis technique:

Qualitative analysis is intended to explain the quality of training models that have been developed, validated, tested, revised, and implemented in the training process to determine the effectiveness of materials based on scientific literacy. Data testing after getting the teacher's pretest and posttest results is used:

The typicality test is utilized to decide whether the information is ordinarily dispersed or not. The test tool uses the SPSS 26 number processing application.

a homogeneity test to determine whether the two data are homogeneous or not by comparing the two variants. The homogeneity test is carried out if both data are normally distributed by testing both variants. The test tool uses the SPSS 26 number processing application.

To test the hypothesis of the effectiveness of the training model, the t-test is used for normally distributed data. To test the effectiveness of the training model where the research data is normally distributed, the t-test is used with the condition that  $H_a$  is accepted if the tcount value is greater than ttable and  $H_o$  is rejected.

## RESULTS AND DISCUSSION

The assessment of the science literacy-based teaching material training management model by teachers is carried out to obtain information that will be used to improve the quality of the training model that will be developed. The component that will be assessed by the teacher is how much influence the training model developed has on learning activities during training.

**Table 7.** Results of Group Trials by Teachers

Individual Assessment	Teachers (9 people)								
	1	2	3	4	5	6	7	8	9
Total Score	80	82	80	79	82	78	81	82	82
% assessment	90,9	93,2	90,9	89,8	93,2	88,6	92,0	93,2	93,2
Average rating	91,66								
Criteria	Very good								

From the results of small group trials, it can be concluded that the Scientific Literacy-Based Teaching Material Training Management Model in Scientific Literacy-Based Material meets very good criteria with an average percentage of 91.66%.

To measure normality, the Kolmogrov-Smirnov test was used in the SPSS v.21 program. Meanwhile, to test data homogeneity, the Levene test in SPSS v.21 was used.

Program that involves pretest result data and posttest data. Compared with the table for normality and homogeneity of data at the significance level  $\alpha=0.05$ , if the results of normality and homogeneity of data are above 0.05, then the data is normal and homogeneous.

Second, the pretest and posttest were taken from two different classes, namely the control and experimental classes. Pretest data achieved by the teacher before the teaching process means the teacher has not received any teaching. Meanwhile, posttest data was found after teachers were taught by researchers in each class. Posttest data illustrates the increase in teacher improvement in subject learning. The following is the teacher's description of the pretest and posttest for the experimental class and control class from the research location, which is shown in Table 8.

**Table 8.** Description of teacher average scores (X) and standard deviation (SD), for control and experimental classes

Class	Pretest $\pm$ (SD)	Posttest $\pm$ (SD)
Control	39.86 $\pm$ 14.422	57.50 $\pm$ 15.228
Experiment	40.27 $\pm$ 15.542	70.13 $\pm$ 16.523

Based on the description of the teacher's results above in Table 7, it was found that the learning results within the exploratory lesson were higher than the control course. Basically, the teaching and learning process in the experimental class uses the standard scientific literacy-based teaching material training management model, while the control class only uses the scientific literacy-based teaching material training management model. Then, the teachers were given pretest and posttest treatments, and the results appeared that the exploratory lesson was higher than the control course. The control class pretest results were lower (39.86  $\pm$  14.422) than the experimental class pretest (40.27  $\pm$  15.542). Likewise, the posttest results for the control class were lower (57.50  $\pm$  15.228) than the posttest for the experimental class (70.13  $\pm$  16.523). Thus, it can be concluded that the scores in the experimental class are better than those in the control class.

The N-Gain test is utilized to decide the adequacy of the preparing show. The N-gain score test is carried out by calculating the contrast between the pretest score and the posttest score. The comes about of the n-gain score test in this think about can be seen in Table 9.

**Table 9.** N-Gain Score Test Results Data

Class	N-Gain Score
Eksperiment	0.49
Control	0.29

From the table above, it can be seen that the N-Gain value for the experimental class has an average percentage of 0.49, which means the score is in the medium category. Meanwhile, the N-Gain value for the control class has an average percentage of 0.29, which means the score is in the low category. From these data, it can be concluded that the use of the ICAS-based training model is effective for training.

### **Discussion**

The scientific literacy model is a model with a problem-solving approach that consists of four components: science as the body, science as a way to examine, science as a way of considering, and science as social and technological interaction. The Science Literacy-Based Teaching Material Training Management Model is applied to learning. The material

can be applied to contextual learning. Contextual learning, according to Rifa'i and Anni (2009), is a teaching and learning process that motivates teachers to understand the material by relating the material they study to real-world situations. Learning material using the Scientific Literacy-Based Teaching Material Training Management Model can make it easier for teachers to understand because it can be found in the surrounding environment. The training model specification contains teacher activities based on scientific literacy. This activity is designed to involve teachers playing an active role in learning and being able to discover material concepts. This is supported by Widjajanti's (2008) statement that the material in the training model is presented concisely. Activities in the scientific literacy-based training model can develop thinking skills, emphasize the process of discovering concepts, and involve teachers actively, for example through discussions, practice questions, observations, and simple experiments.

The feasibility aspect regarding the presentation of material in the training model is in accordance with the training model criteria according to BSNP. This is indicated by an average score of 92 from material experts on the feasibility aspect regarding material presentation. Prastowo (2014) states that teaching materials contain three aspects, namely knowledge, skills, and attitudes. A good training model can increase knowledge and involve teachers in developing skills and a scientific attitude. In preparing the training model, it is necessary to pay attention to the suitability of the material with the basic competencies described in the core competencies.

The Science Literacy-Based Teaching Materials Training Management Model presents activities that are appropriate to the teacher's conditions and environment. This is in line with what Hidayati (2018) stated: that learning resources that present knowledge and activities oriented towards nature and the surrounding environment can effectively support learning, motivate teachers, and involve teachers in meaningful learning experiences. This is supported by Devi's (2009) statement that the material in the training model includes concepts, laws, and theories presented systematically, logically, simply, clearly, and accurately. This is because the work steps in the training model are not clear, the language is not easy to understand, and it is not appropriate to the level of development of the class child. The training model needs to be improved based on assessments and input from material experts.

Prastowo (2012) says that the size of teaching materials can be accommodated according to learning needs. According to the design expert, the results of the media validation aspect of the training model cover design do not yet show an image, so the training model cover design needs to be improved. Improve the cover design by changing the cover background and adding images and environments so that the cover is easy for teachers to understand. Prastowo (2014) and Widjajanti (2008) argue that a training model as teaching material that is attractive to teachers and uses language that is appropriate to the child's level of development will motivate them to study hard and study smart.

Teachers' critical thinking skills can solve learning problems in class, so teachers are called critical thinkers. Teachers behave actively in group discussions, such as by expressing ideas and collaborating with fellow group members. The scientific attitude that can be observed in group discussions is open, objective, cooperative, and caring. This scientific attitude can emerge from activities when working on the Scientific Literacy-Based Teaching Material Training Management Model in learning.

Slavin (2011) states that the strategy for training thinking skills includes four steps, namely stating, searching, evaluating, and describing problems. The four steps stated by Slavin are reflected in the thinking skills indicators that are measured. Each indicator of thinking skills has four aspects that determine the score for measuring thinking skills.

The Science Literacy-Based Teaching Materials Training Management Model presents discourse as a problem. Next, teachers deepen their knowledge about what is known and how to prove theories in groups in order to solve problems. Through discussions with heterogeneous group members, it allows teachers to exchange ideas, express opinions, and involve teachers in playing an active role in learning the material. Teacher learning outcomes are influenced by internal and external factors (Mulyani, 2013). One of the internal factors is the teacher's activities during material learning activities.

Overall data from hypothesis testing is calculated by comparing the comes about of tcount with ttable. Calculation and confirmation of inquire about theories utilizing posttest information. The pretest information within the control and test classes is known to be tcount = 2.349, and the posttest information within the control and exploratory classes is known to be tcount = 3.263 while ttable = 2.042. This means that using the scientific literacy-based teaching material training management model has an influence on increasing teacher grades in the classroom. From the validation and assessment results as described above, it can be concluded that the logical literacy-based preparing demonstrate created by analysts is appropriate for utilize as a companion to the learning handle within the classroom. Based on these results, the development of the training model has a good influence on the success of the teacher's teaching and learning process. This is because the achievement of teacher learning success is supported by the suitability of the training model used by the teacher.

The training model developed certainly has advantages and disadvantages. The advantages of the training model that has been developed are: (1) it is arranged systematically from general to specific; (2) it is prepared from the results of a complete literature study so that teachers get an overview of learning; and (3) it is arranged systematically in accordance with the training model writing format with course descriptions, background, materials, practical examples, and exercises. (4) The training model developed was carried out by the author himself, and (6) the training model has been validated for its suitability and quality by 2 validators, namely 1 material expert, 1 design expert. The weaknesses of this research-based training model are: (1) the material described is not very extensive; (2) the images presented are from other sources, not personal collections.

## **CONCLUSION**

Based on the comes about of the investigate and dialog that have been depicted, it can be concluded that: (1) the feasibility of the material for the ICAS-based training model developed as a whole is included in the very good category with an average percentage of 90.05%; (2) the suitability of design experts for the presentation of the developed ICAS-based training model overall is in the very good category with an average percentage of 90.50%; (3) the training lecturer's assessment questionnaire regarding the ICAS-based training model is in the very good category with an average percentage of 91.66%; (4) Test the effectiveness of the standard ICAS-based training model. Calculation and verification of research hypotheses using posttest data. The posttest data in the control and experimental classes is known to be tcount = 3.263 and ttable = 2.042. From the calculations, it can be concluded that there is an increase in teacher scores based on science literacy training models.

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