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# The Development of Learning Devices Using Inquiry Learning Model to Increase the Students' Creative Thinking

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## ABSTRACT

This research aims to produce models and learning tools that are valid, effective, and practical to improve students' creative thinking abilities. The research method used is development research adopted from the 4-D Model, which is modified through four stages, namely the defining stage, the design stage, the development stage, and the disseminate stage. This research is designed to take place in two stages, namely: the first stage produces an initial prototype design of learning devices. The second phase aims to develop valid, effective and practical models and learning tools. The development activities are carried out with the following steps: development of draft devices and models, validation, and trials. The trial was conducted on 30 students majoring in family welfare education department in the second semester of 2017/2018 academic year and simultaneously became the subject of this study. The results showed that the inquiry learning model obtained to be valid, effective, and practical. The implementation of the Inquiry Learning model was responded positively by students with an average of 90.66%. The learning modules that were used as supporting tools in learning obtained 87.33% and instruments for learning achievement tests by 86.8%. Overall positive responses given by students amounted to 92.64% with a good category, so it can be said that these models and devices are practically used.

**Keywords:** *Development, learning devices, inquiry learning, creative thinking*

## 1. INTRODUCTION

Students are an important part of the learning process, not only when learning takes place but also when learning is designed and evaluated. Therefore, students become one of the significant points in classroom management and need intense attention from a teacher. Involving students in learning bring out many benefits. The first thing should be in the beginning of learning process that the children must be educated to be responsible so that they can make use all of available learning resources wisely. This is important so that the energy in the child can grow and develop because they are accustomed to use it. Secondly, the teachers do not need to spend too much time, energy, and thoughts to teach if they can divert the available resources to other development activities. Third, students become more active as they are happy and passionate in the learning process. The fourth is to build the seeds of democratic in learning so that when they become leaders, they do not become authoritarian; They are accustomed to share and foster social solidarity.

Those expectations which have been mentioned above are very relevant to inquiry learning models to improve student creative thinking. Creative thinking is something that is obtained through experience, and this can only be done through habituation, practice, and, of course, through a planned and systematic learning process.

As it is known that humans are born with the tools of life to grow and develop. These living tools are Create, Sense, and Will. All three are immersed in humans, and each has a function and role so that humans can grow and develop for the better quality, and can create something called culture.

Create resides in the head and function to create the brilliant thoughts. Sense resides in the heart and heart that has the function of refining, beautifying, guiding, and controlling the will of the human brain and mind as well as the hand which symbolized as the will to do something. Therefore Create, Sense and Will are three human potentials, then give birth to culture, and can

become superior if educated, fostered, and developed as good as possible [1].

One effort that can be done in developing the potential of Create, Sense, and Will while at the same time increasing the creative potential of students' thinking is through education using inquiry learning models. Eventually, it can encourage students to play an active and constructive role in the process of bonding to improve students' thinking abilities [2]. This is justified by Rod Judkins [3] that the inquiry learning model will give birth to the ability to think creatively for students. The ability to think creatively is the ability to solve problems that allow individuals to create original ideas/adaptive functions in full use for development.

One of the characteristics of inquiry model learning is to allow students to challenge situations to solve problems, and this feature will gradually give birth to students' creative potential. The inquiry is an education way that prepares situations for students to conduct their experiments, ask questions and find answers themselves to the questions they ask [4]. In this way, the inquiry model is a series of learning activities that maximally involves all students' abilities to search and investigate systematically, critically, logically, and analytically so that they can formulate their findings with confidence.

Creativity itself is the ability to determine new relationships, see the subject from a new perspective, and determine new combinations of two or more concepts that have been printed in mind. Thinking creatively, certainly not only about ideas or ideas, but also related to efforts to solve the problem. Therefore, creativity can be interpreted as an effort to think or take action aimed at finding solutions to a condition or problem intelligently, different (out of the box), original, and bring the right and useful results [5].

Through inquiry learning models, students are trained to use all the potential that exists in themselves such as cognitive, affective, and psychomotor potential. By these potentials, students will be involved and will be accustomed to think creatively, decide something different, and choose the best from various choices. That is why creativity is also interpreted as the ability to determine new relationships, see the subject from a new perspective, and determine new combinations of two or more concepts that have been printed in mind [6], [7].

One of the relevant subjects used in the inquiry learning model is the Kitchen Tools course because this course is a prerequisite course for selecting advanced courses. During this time, the Kitchen Tools course is taught with conventional learning, which is more on the teacher-oriented learning model so that it has not maximally contributed positively to the development of learners' creativity. The results of this study will be a solution to the problems as mentioned above. The research will expected to produce valid, effective, and practical learning models and tools which include the Handbook Based Inquiry Learning (BBIL)), the Lesson Plan Based Inquiry Learning (LPBIL), Modul Based

Inquiry Learning (MBIL) and assessment tools. This urgency is relevant and is part of the effort to improve quality which is seen from the aspects of soft skills, especially the students' ability to think creatively.

## **2. RESEARCH METHOD**

The method is research and development. In its implementation, several approaches will be used based on the needs of certain phases. In the preliminary phase, for example, a study of the needs and field characteristics of materials for the development of learning tools will use both quantitative and qualitative research approaches. By combining the two designs, it is expected to increase the scope, depth, and strength of research. Based on the needs of the development of this learning tool, the subject is students majoring in family welfare education in the second semester of the academic year 2017/2018. There were thirty students were involved in this study.

### **2.1. Research Design**

Research and development procedures are carried out using the 4D of the Thiagarajan models through four stages: the defining stage, the design stage, the development stage, and the disseminate stage [8]. The first stage is the defining phase. The purpose of this stage is to determine and define learning requirements. In this phase, requirements begin with an analysis of the the developed material objectives by using specific instruments. This stage includes 5 main steps, namely (a) front end analysis; (b) student analysis; (c) concept analysis; (d) task analysis, and (e) formulation of learning objectives.

The second stages is designing phase. The purpose of this stage is to prepare a prototype of learning tools. This stage consists of 3 steps, namely: 1) Preparation of concepts related to the lesson plan, modules, and teaching method that will be developed. It is the initial step that connects between the define and design stage. The outlines of learning material, as well as the steps for implementing the practice, are made based on the results of the formulation of specific learning objectives. 2) Selection of references and media that are appropriate to convey the subject matter. 3) Format selection; In selecting this format, for example, it can be done by examining formats of the tools that already exist and that have been developed at the University.

The next stage is the development stage. Thiagarajan divides the development stage into two activities, namely: (1) expert appraisal; this is a technique to validate the feasibility of product design. In this activity, evaluation is carried out by experts in their fields. The suggestions given are used to improve the learning material and design that has been prepared. (2) Developmental testing is an activity of testing product design on the actual target subject. At the time of this trial, the response data, reactions and comments of the model from target user were sought. The trial results are

used to improve the product. After the product is repaired, it is then tested again until it gets effective results.

In the context of developing learning models in this research, the activities are carried out with the following steps: development of tools and models followed by model validation by experts, and trials. The steps in this development are the preparation of the draft of learning tools, validation, and revision. The validation of learning tools include a review step by the expert and tools testing using one class. Data from the review of learning tools were analyzed descriptively to see its validity. The tools were considered to be valid if the average score of each measured aspect/indicator is minimum in good category. The result analysis of the review is also directed to examine aspects that require attention in order to repair or revise the tools. The validity of the tools is consulted with the standard index of validity according to the Gregory Index. This development phase aims to produce learning tools that have been revised and validated based on expert input.

**2.2. Research Instruments and Data Collection Techniques**

**Table 1.** Test results for the validity of the IL model book and the device (prototype 1)

No	Type tested	Score	Results
1	Book Based Inquiry Learning (BBIL)	3.37	Valid
2	Lesson Plan Based Inquiry Learning (LPBIL)	3.5	Valid
3	Module Based Inquiry Learning Kitchen Tools (MBILKT)	3.38	Valid
4	Assessment Tool	3.42	Valid
Average		3.42	Valid

Table 1 above shows that the validity test results of Book Based Inquiry Learning (BBIL) and its tools, from three experts are valid, where BBIL gets a value = 3.37; The Lesson Plan Based Inquiry Learning (LPBIL) scores = 3.5; Module Based Inquiry Learning Kitchen Tools (MBILKT) obtained a value = 3.38 and the assessment

The instruments of this study are intended to measure the validity, effectiveness, and practicality of the learning device. The instrument used to measure the validity of the learning device is the validation sheet; To measure practicality of the learning management and the learning plan implementation, the observation sheets were used. Furthermore, to measure the effectiveness of the tools, it is used questionnaire responses from students and lecturers of the kitchen equipment class. Data collection is done by filling out the review/validation sheet of the lesson plan and student and lecturer responses to the learning tools. This research data will be processed and analyzed descriptively. The validity criteria of the device refer to the Gregory index standard [9] with a 50% effectiveness of the device from a minimum of 70% of the observed aspects, and the effectiveness of the device refers to the reliability coefficient  $x \geq 0.75$ .

**3. RESULTS**

The results showed that the inquiry learning model obtained valid, effective, and practical results. The results of these tests can be seen in the tables below.

obtained a value = 3.42). Thus the total average validity test obtained a score of 3.42 with the coefficient index of the judgment of experts equal to valid category. Some revisions were made based on the advice of experts to produce a model book and the tools that were ready to be tested in the field.

**Table 2.** Model practicality test results and IL model devices

No	Response	Score	Results
1	Book Based Inquiry Learning (BBIL)	93.34	Very good
2	Lesson Plan Based Inquiry Learning (LPBIL)	93.34	Very good
3	Module Based Inquiry Learning Kitchen Tools (MBILKT)	93.34	Very good
4	Assessment Instrument	86.7	Very good
Average		91.68	Very good

Table 2 above shows that the results of the practicality test model and the Inquiry Learning model are very good. This can be seen from the positive responses from three food lecturers as users in the S-1 Department. For the Inquiry Learning (ILM) model, the average score was 93.34%. The scores were Lesson Plan Based Inquiry

Learning (LPBIL) of 93.34%, Module Based Inquiry Learning Kitchen Tools (MBILKT) of 93.34, and assessment instruments of 86.7% All four aspects or components were responded very well by users with an average of 91 68%.

**Table 3.** Model practicality test results and model IL devices

No	Response	Score	Results
1	Learning device (module)	87.33	Positive responses
2	Learning achievement test instruments	86.8	Positive responses
3	Overall positive response	92.64	Positive responses
Average		90.66	Positive responses

The table shows that the implementation of the inquiry learning model (IL) was responded positively by students with an average of 90.66%, the learning tools (modules) that were used as support in learning by 87.33%, and the learning achievement test instrument by 86.8%. Overall positive responses given by students amounted to 92.64% with a good category, so it can be said that these models and devices are practically used.

#### 4. DISCUSSION

The results showed that the inquiry learning model is proved to be valid, effective, and practical and could improve students' creative thinking skills. It means that after students learn by using inquiry learning, they are not only good at finding problems but are also good at finding solutions because of creative thinking is the process of finding solutions to various problems. The creativity occurs in the form of ideas, original and adaptive ideas, or maybe also in the form of any objects that can be used to solve various problems. It can also be said that creativity is an ability to solve problems that allow individuals to create original ideas/adaptive functions in full use for development [10].

Inquiry learning is one of the problem-based learning models, meaning that this model is intentionally created so that learners are accustomed to facing problems. That is why inquiry learning fosters a mental effort that is resistant to various challenges and obstacles. It is undoubtedly relevant to the kitchen appliance course which one of its aims is to create outputs that can find out about the types of tools, benefits, specifications in order to facilitate all process in kitchen.

The Inquiry learning model is one of the learning models that not only presents problems to be solved. Moreover, this model develops the potential of learners in the learning process, started from plan, implementation until the evaluation so that students have a great responsibility to solve all tasks which have been given to them. This gives them experience to take initiative in doing their job in real world of work rather than wait for the orders from their to do regular tasks. Therefore, this learning model gives birth to creativity and perhaps innovations at work.

The development and approach of the Inquiry Learning model are more oriented towards efforts to engage students, mainly after they have obtained theories. It is expected for them to explore theoretical aspects further as well as reflecting the praxis they have done so far. From various studies on lecture strategies and training for practitioners, it was found that one approach that approached the conception of students' creative thinking skills was the problem-based approach. This Inquiry Learning Model is referred to by many experts as effective and efficient learning,

The inquiry approach is one of learning methods that prepares situations for students to conduct their experiments, ask questions, and find answers to the questions they ask. Thus the inquiry model is a series of learning activities that involve the maximum ability of all students to search and investigate in a systematic, critical, logical, and analytical way so that they can formulate their findings with confidence [4]. The inquiry learning model, according to Rod Judkins [3] in turn, gives birth to the ability to think creatively for students. The ability to think creatively is an ability to solve problems that allow individuals to create original ideas / adaptive functions in full use for development. Besides, creativity is also interpreted as the ability to determine new relationships, see the subject from a new perspective, and determine new combinations of two or more concepts that have been printed in mind.

One of learning models that is currently receiving serious attention from education activists is the inquiry learning model. This model is a model that emphasizes the process of thinking critically and analyzing to find and find answers to an issue. So, the inquiry model provides plenty of room for learners to take part in the learning process. Therefore, this model is expected to bring out independent education outcomes, to be more creative. It is similar that the inquiry learning model prepares students in situations to carry out their extensive experiments to see what is happening, want to do something, ask questions, and find their own answers, correlates one finding with another, and compare what their findings with others [5].

When explored further, inquiry learning has much influence from various streams, for example, cognitive learning. According to this flow learning, it is essentially

a mental process and thought process by utilizing all the potential possessed by everyone optimally. Another flow is the constructivist learning theory. According to Piaget, knowledge can be meaningful when students look for it and find it by themselves [11]. Each individual tries and is able to develop his own knowledge through the existing schemes in his cognitive structure. The scheme is continuously being updated and changed through the process of assimilation and accommodation.

Optimizing the role of students in inquiry learning makes the teacher's role relatively few and limited. Conversely, the role of students becomes more significant so that the knowledge and abilities obtained by students are expected not to be the result of remembering the facts, but the results of finding themselves. Thus the teacher's job is to design activities that refer to discovering activities, whatever the material is taught. They are also expected to encourage students to develop schemes that are formed through the process of assimilation and accommodation [12].

The inquiry learning model is oriented towards students who aim to develop the ability to think systematically, logically, and critically. They develop their intellectual abilities as part of mental processes. Thus, in inquiry learning, students are not only required to master the subject matter but how they can use their potential optimally. In this way, the inquiry learning model can improve students' thinking abilities to find and discover material for themselves, train their self-sensitivity, foster self-confidence, increase motivation, and participate in learning, increase positive behavior, improve achievement, and learning outcomes [2], [4].

## 5. CONCLUSION

The inquiry learning model learning tools are valid, effective, and practical results. The validity test results of Book Based Inquiry Learning (BBIL) and the tools of three experts are valid, where Book Based Inquiry Learning (BBIL) score is 3.37; The Lesson Plan Based Inquiry Learning (LPBIL) scores is 3.5; Module Based Inquiry Learning Kitchen Tools (MBILKT) obtained a value about 3.38 and the assessment device obtained a value about 3.42. Thus the total average validity test obtained a score of 3.42 with the coefficient index of the judgment of experts equal to valid category. The results of the practicality test model and the Inquiry Learning model are very good, and this can be seen from the positive responses from three food lecturers in the department. For the Book Based Inquiry Learning (BBIL), the average score was 93.34%. Lesson Plan Based Inquiry Learning (LPBIL) of 93.34%, Module Based Inquiry Learning Kitchen Tools (MBILKT) of 93.34, and assessment instruments of 86.7% All four aspects or components were responded very well by users with an average of 91.68%. The application of the Inquiry Learning model was responded positively by students with an average of 90.66%, the learning tools (modules), which were used as support in learning by 87.33%, the

instrument of learning achievement test was 86.8%. Overall positive responses given by students amounted to 92.64% with a good category, so it can be said that these models and devices are practically used.

## ACKNOWLEDGMENT

This work was supported by the Ministry of Research, Technology, and Higher Education, through the National grant, the Rector of Universitas Negeri Makassar who has provided the infrastructure of the research and The Head of Research Institution which facilitated this research from the preparation of the proposal until the completion of this research.

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