Development of Indonesian National Qualification Framework-Based teaching models and materials for learning instructional media design Department of building Engineering education faculty of engineering state University of Medan

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Abstract— The learning model developed in this study is a whole series of presentation of teaching material that covers all aspects before being and after learning conducted by lecturers by including teaching materials in the teaching and learning process. The learning model developed is called QI MODELS with the syntax: Goals, Observation, Project, Discussion, Task, Practice, Meaningful, Justification, and Evaluation. Teaching material contains a set of material from the course "Instructional Media Design" that is arranged systematically so that lecturers and students can use it in the learning process in an atmosphere and a comfortable environment for learning.

To see the effectiveness of the product an analysis of the learning outcomes of the 26 students taught using the Instructional Media Design textbook developed, and compared with the learning outcomes of students in the class taught with presentation material. Based on the analysis, the average value of basic competencies using instructional materials for Indonesian National Qualification Framework (INQF)-based Instructional Media Design is higher than the average value of students who use presentation materials. Testing the hypothesis used is a different test. From the calculation results obtained $t_{count} = 7.63$ while $t_{table} = 2.01$. Because $t_{count} = 7.63 > t_{table} = 2.01$, it was concluded that there was a significant difference in students' learning achievement using Instructional Media Design textbooks and using presentation material. The effectiveness of the use of Instructional Media Design textbooks is 79.09%.

Keywords— Learning Model, Indonesian National Qualification Framework, Teaching Materials.

I. INTRODUCTION

In fact, giving direct experience to students is not something easy, because not all experiences can be directly learned by students. For example, if you want to explain the conditions on the surface of the moon, then it is not possible that the experience is gained directly by students. important in a teaching and learning activity.

Implementation is a process of applying ideas, concepts, policies, or innovations in the form of practical actions so as to have an impact, both in the form of changes in knowledge, skills, and values and attitudes. The implementation of the curriculum can be interpreted as actualizing the written curriculum in the formlearning, according to what Miller and Seller (1985) disclosed: "In some cases, implementation has been identified with instruction". The implementation of the curriculum is an attempt to transfer curriculum planning into operational action. In other words the implementation of the curriculum is an application, ideas, concepts, programs, or order of the curriculum into learning practices or various new activities, so that changes are expected.

Some of the results of research conducted over the last two decades have provided evidence of the impact of technology on student performance and the learning

environment. Cotton (1991), for example, has conducted a study of 59 research results regarding computer-assisted learning and learning outcomes. Studies that focus on technology are apparently better than studies that discuss the impact of technology on the overall learning environment and student learning outcomes. The findings of this study also showed that researchers who tried to find answers directly to student learning problems, the results were not satisfactory. However, lecturers who understand the complexity of learning and teaching, the results of the research show encouraging things and show that new technology has proven to be effective. In addition, technology has shown a very positive impact based on research studies. Innovative learning techniques (for example, question techniques included in texts, advance organizers, and media) specifically show the average progress of learning outcomes for students by 15.20 points or more. This means that the average student score reaches the 50th percentile in conventional learning, and the 65th percentile in groups that are learned with technology (Heinich, Molenda, Russel, & Smaldino, 2002).

Virvou, Katsionis and Manos (2005) in their research results entitled "Combining software games with education: evaluation of its educational effectiveness" with the evaluation results showing that virtual games in learning are very motivating and have an effect on improving student learning outcomes. "Some extensions for the current contextualised media were given on the basis of a reference model that was the result of earlier research in the field" (De Jong, Specth, & Koper, 2008).

II. DEVELOPMENT OF MODELS AND TEACHING MATERIALS BASED ON THE INDONESIAN NATIONAL QUALIFICATION FRAMEWORK

INQF is regulated in Presidential Regulation No. 8/2012. INQF is an embodiment of the quality and identity of the Indonesian people in relation to the national education system, the national work training system and the national equality assessment system, which is owned by Indonesia to produce human resources from learning achievements, which are owned every Indonesian worker in creating quality work and contributing in their respective fields of work.

The basic principle developed in INQF is to assess a person's performance in scientific aspects, expertise and skills in accordance with the learning outcomes obtained through the process of education, training or experience that has been exceeded, which is equivalent to the qualification descriptors for a certain level. INQF implementation is expected to: (a) improve the quality of

national education and training; (b) increase the recognition of the international community on the results of national education and training; (c) increase recognition of non-formal and informal education outcomes by the formal education system; and (d) increasing stakeholder confidence in the quality and relevance of the workforce generated by the national education and training system.

INQF contains descriptors that explain the ability in the field of work, the scope of work based on knowledge that is mastered and manjerial ability. A description of the parameters forming each of the IQF descriptors is as follows: a. Ability in the field of work. This component describes the ability of someone who is in accordance with the relevant work field, is able to use methods / methods that are appropriate and achieve results with the appropriate quality level and understand the conditions or standards of the process of carrying out the work. b. The scope of work is based on the knowledge that is mastered, it is intended that the qualifier descriptor must explain the scientific branch that is controlled by someone and be able to demonstrate the ability based on the branch of knowledge that he masters. c. Managerial ability, shows that the qualification descriptor must explain the scope of a person's responsibilities and the standard of attitude he has to carry out the work under his responsibility.

III. DEVELOPMENT OF LEARNING MODELS

The model as explained by Richey (1986) is a picture that arises from the fact that it has an arrangement of a certain order. According to him, the model can be used to organize knowledge from various sources and then be used as a stimulus to develop hypotheses and build theories into concrete terms / conditions to apply them to practice or test theories. Gustafson (1984) which emphasizes the practical function of the model: means to facilitate communication, or regular instructions (algorithms) that are prescriptive in order to make decisions, or planning instructions for management activities. Furthermore, Nadler (1988) explained that a good model is a model that can help the user to understand what the overall process is fundamentally. (Arends, 1997: 7); Joyce (1992: 4) The development of learning models is strongly influenced by the nature of the material to be taught, also influenced by the objectives to be achieved in the teaching and the level of student ability. In addition, the development of learning models always has stages (syntax). There is a difference between one syntax and the other, the difference mainly takes place between the opening and closing of learning, which must be understood by the closing lecturer of learning, so that these models can be implemented successfully. Learning Model Components: a. Syntax, b.

Reaction Principle, c. Social System, d. Support System: Syntax of steps, phases, or sequence of learning activities. So the syntax is the description of the model in action. Each model has a different syntax or model structure; Principle of Reaction is the lecturer's reaction to student activities. In the example of Model B, maybe during phase II (two) the lecturer gives an example of how to construct concepts, and students compare their concepts.

The connection with learning models of learning serves to direct us to design learning that is used as a guide in organizing learning in order to achieve effective, efficient, attractive, and humanistic learning. Joice (1992) explains the learning model is a plan or a pattern that is used as a guide in planning learning in class or learning in tutorials and to determine learning tools and direct us in designing learning to help students so that learning objectives are achieved.

IV. LEARNING MEDIA AND TEACHING MATERIALS

Lecturers as good learning managers in the learning process must certainly have high creativity in managing their class, one of which is in terms of the selection and use of media and learning resources for the benefit of the learning process. The media literally means "intermediary" or "introduction". AECT (Association for Educational Communication and Technology) defines media as all forms used for the process of channeling information. Robert Hanick and colleagues (1986) define media as something that carries information between the source and receiver of information. Still in the same angle Kemp and Dayton put forward the role of media in the communication process as a style of sender (transfer) which transmits messages from the sender (sender) to the recipient of the message or information (receiver). Latuheru (1993) explained that learning media is a learning aid that is based on a curriculum that is tailored to the competencies that must be achieved by students. Learning media are used to channel or convey messages with educational and learning goals. Learning media are materials, tools, or methods or techniques used in teaching and learning activities, with the intention that the process of educative communication information between educators and students can take place in an effective and efficient manner. Rudy Bretz in Sadiman (2014) divides the media into three main elements, namely sound, visual and motion. Bretz also classified the media into 8 (eight) types namely motion visual audio media, silent audio visual media, semi-motion audio media, motion visual media, silent visual media, semi-motion media, audio media and print media. The practical benefits of learning media are that learning media can clarify the presentation of messages / information, facilitate and improve the process and learning outcomes, increase and direct student attention, increase learning motivation, and learning media can overcome the limitations of the senses, space and time.

V. DEVELOPMENT RESEARCH APPROACH

This research approach uses the Borg & Gall (1983) development model combined with Dick & Carey's learning design model (2009). In accordance with the Research and Development approach model, the implementation of this research follows the steps: a preliminary survey, design of the textbook model, testing of the textbook model, validation of the textbook and dissemination. This research was conducted at the Department of Building Engineering Education Faculty of Engineering Unimed in 2019. The flow of model development can be explained as fig-1.
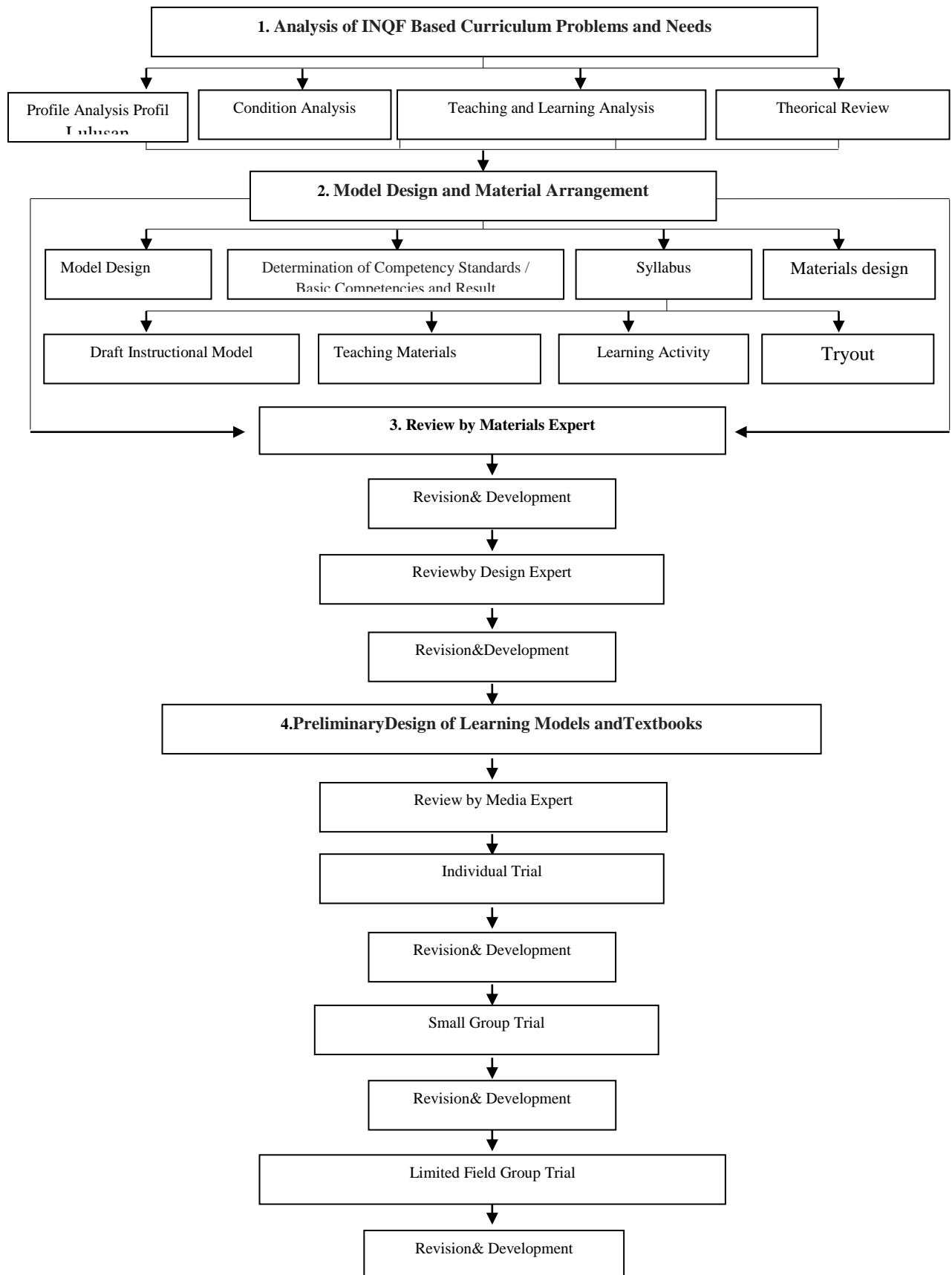
Fig.1. Flow of Development and Research Learning Model Based on INQF

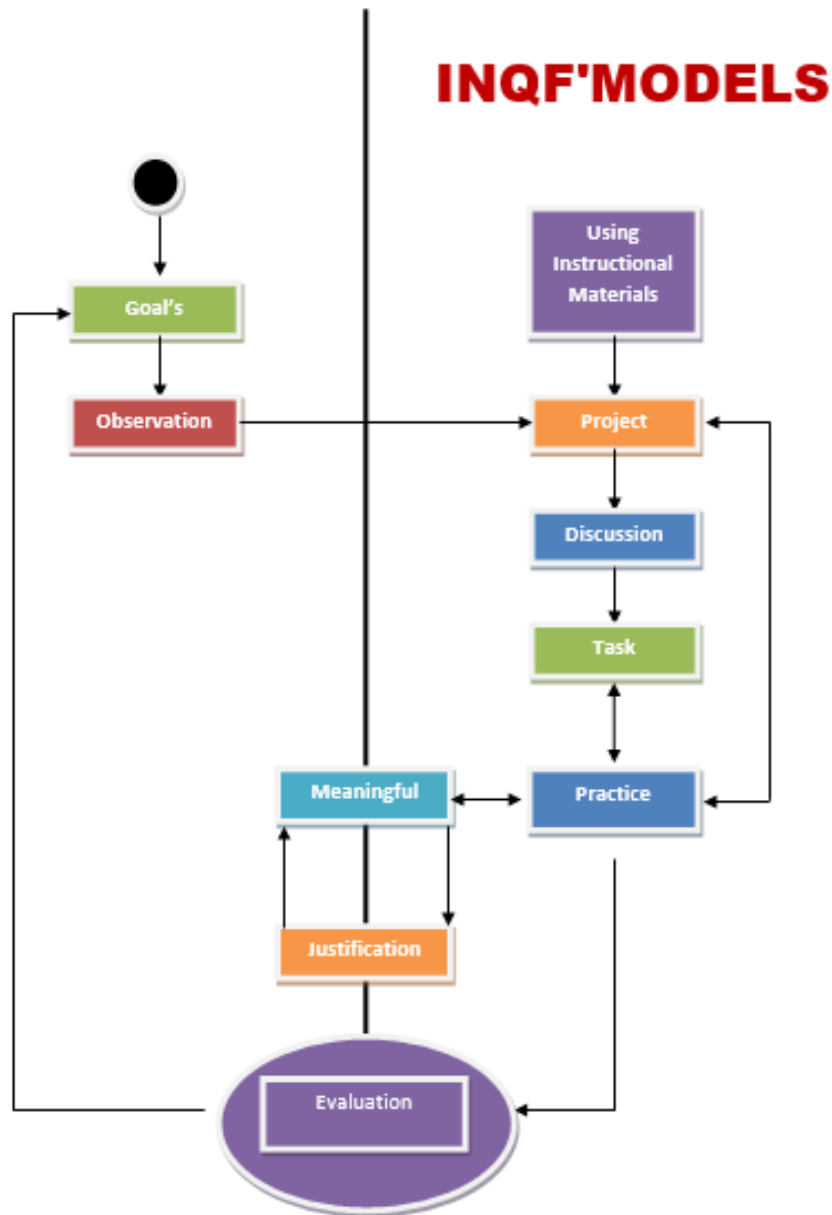## VI.　　RESULTS OF INQF-BASED LEARNING MODEL DEVELOPMENT

Fig.2: INQF-Based Instructional Model

LEARNING STEPS OF INQF'MODELS

STEPS 1:	PRELIMINARY ACTIVITIES :
GOALS	1. explain the graduate profile, objectives and competencies to be achieved both general and supporting competencies. 2. mention the facilities or supporting tools needed. 3. Form small groups and motivate students to engage in selected learning activities.
STEPS 2:	**CORE ACTIVITIES :**
OBSERVATION	1. shows learning media to be observed by students related to learning topics 2. helping students define and organize observations related to the project to be worked on (setting

	topics, assignments, schedules, etc.) 3. encouraging students to gather information through observation to get explanations, data collection, hypotheses, and problem solving.
PROJECT	1. explain the form of projects to be undertaken by students 2. motivating students to engage in project work activities. 3. assist students in planning / preparing appropriate work such as reports and helping them share assignments with their friends. 4. analyzing projects assisted with teaching materials
DISCUSSION	1. students share assignments with their friends to reflect on or evaluate experiments and the processes they use. 2. students discuss the form of assignments according to the project bill that will be done
TASK	1. explain the work bills according to the assignments to be carried out by students 2. explain the procedures for carrying out the task in doing the work / project. 3. students make work agreements in the implementation of the task.
PRACTICE	1. students compile the task implementation procedures in doing the work / project. 2. students carry out assignments for project completion
MEANINGFUL	Re-explore the procedures for carrying out the tasks in doing the work / project. Helping students understand about projects that are done with their friends Students reflect or evaluate the work they use. Students prove the hypothesis Students compile reports
JUSTIFICATION	1. Showing back the work of students 2. Add basic knowledge about the advantages and limitations of the project that is done by students. 3. Correcting reports prepared by a number of students in the class.
STEPS 3:	CLOSING ACTIVITIES
EVALUATION	1. Discuss the results of observations and answer the questions on the activity sheet based on observation data and related concepts in the source book, recording all the answers to the existing questions. 2. Provide an explanation of the questions raised by students 3. Provide conclusions 4. Students are reminded to refine the report on the results of group work on answers to questions that have been formulated to be given an assessment.

VII. EFFECTIVENESS OF THE LEARNING MODEL

Learning design experts assess the developed Instructional Media Design textbooks have a feasibility with the percentage of assessment on the feasibility aspects of the presentation with an average score of 84.69%. This means that Instructional Media Design textbooks that have been developed can meet the demands of learning needs seen from the assessment indicators of presentation techniques, supporting presentation, presentation of learning, and the coherence and ruttering of the criterion flow line is very good.

Learning media experts assess the textbook of Instructional Media Design of the Department of Building Engineering Education Faculty of Engineering Unimed that was developed already has a feasibility with a percentage assessment of the feasibility component of graphic with an average score of 86.00%. This means that the Instructional Media Design textbooks that have been developed can meet the demands of learning needs.

The results of the expert material assessment of the Instructional Media Design textbooks show an average percentage of 78.42% including a good category, which means the presentation of the material in the Instructional Media Design textbooks is very good on aspects of content eligibility, language aspects, and contextual material and can be used in the learning process of the Department of Building Engineering Education Faculty of Engineering Unimed.

The results of giving pretest to students who were taught using the Instructional Media Design textbook obtained the lowest value of 30.58, the highest value of 58.37, an average value of 45.28 and a standard deviation of 7.12. The results of giving posttests to students who were taught using the Instructional Media Design textbooks obtained the lowest value of 65.35, the highest value of 89.75, an average value of 79.35 and a standard deviation of 5.75. The results of giving pretest to students who were taught using presentation materials obtained the lowest value of 35.72, the highest value of 59.63, the average value of 47.24 and the standard deviation of 5.27. Then the results of giving posttest to students who were taught using presentation materials obtained the lowest value of 58.27, the highest value of 79.95, the average value of 67.27 and the standard deviation of 5.67.

Testing the hypothesis used is a different test. From the calculation results obtained tcount = 7.63 while ttable = 2.01. Because tcount = 7.63>ttable = 2.01, it was concluded that there was a significant difference in students' learning achievement using Instructional Media Design textbooks and using presentation material.

VIII. DEVELOPMENT

Research and development is carried out with the aim of producing products in the form of textbooks based on contextual learning as well as testing the effectiveness of products that can be utilized by Unimed Department of Building Engineering students as one of the strategies to improve the quality of learning and learning outcomes. Therefore the research process and this development is carried out and begins with several stages including (1) conducting a preliminary study including observation, interview and literature study. From the observations, it was obtained that students really need teaching materials in the form of Instructional Media Design textbooks that fit the characteristics of students. (2) designing a product to produce an initial product of Instructional Media Design textbooks, these activities include: a) conducting preliminary research which includes identifying needs and learning objectives, determining core competencies, mapping basic competencies, mapping indicators; b)

conduct a learning analysis by determining the more specific skills that must be learned; c) identify the characteristics and initial behavior of students; d) write down basic competencies and indicators; e) compile a benchmark reference test by developing assessment points to measure students' abilities that are estimated within the learning objectives; and f) developing learning strategies. (3) Developing Instructional Media Design textbooks. These activities include: introduction, SK, KD and indicators of learning outcomes, learning activities and bibliography. (4) The design of learning activities include: learning materials, summaries, tests, and answer keys. (5) formative evaluation and revision, this activity includes product evaluation to determine the strengths, weaknesses and weaknesses regarding the quality of content and design carried out by material, design and media experts. From the results of the evaluation will be used as material for product revisions. This is consistent with the steps developed by Borg and Gall (1983) ,; and (Dick & Carry, 2009).

The results of the next revision were tested to students through trials of individuals, small groups, and limited fields. This trial is expected to get feedback to produce Instructional Media Design textbooks that are appropriate to be used in accordance with the characteristics of students as users. After going through a series of trials and getting feedback from students as users, a revision was made based on expert advice and input to produce aInstructional Media Design textbook product that is feasible to use. From the overall validation data the respondents obtained a value with very good criteria. This illustrates that the trial procedure is carried out to adjust the design of the model with the learning needs in the classroom that allow the learning process to be oriented to students and in accordance with the demands of the IQF.

To see the effectiveness of the product an analysis of the learning outcomes of the 26 students taught using the Instructional Media Design textbook developed, and compared with the learning outcomes of students in the class taught with presentation material. Based on the analysis, the average value of basic competencies using the Instructional Media Design textbook based on INQF is higher than the average value of students who use presentation material. So it can be stated that there are differences in learning outcomes between classes using textbooks based on INQF-based Instructional Media Design on learning outcomes using presentation materials. Thus the learning model that is accompanied by INQF-based teaching materials can be used in learning effectively and efficiently.

Textbooks for Instructional Media Design based on Student Center Learning offer learning that has strong potential to improve the quality of learning and student activity. The material presented in the Instructional Media Design textbook is based on Bruner's learning theory and learning events according to Gagne. Bruner's theory is used as a principle of material presentation, which starts from the easy thing in a stepwise direction towards more complex matter. In the Instructional Media Design textbook, this presentation is shown in the formulation of indicators that start from the easy to the difficult. The formulation of indicators as well as being a reference presents the content of Instructional Media Design textbooks. The level of effectiveness of Instructional Media Design textbooks to improve learning outcomes is high, this means that student learning outcomes increase after using the Instructional Media Design textbooks.

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