

# Developing Teaching Materials for Three Dimensional Basic Fine Arts Subjects

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**Abstract**—As the growing demands on the quality of nationally standardized graduates, the curriculum needs to be aligned with Department of Design KKNI concept. The curriculum changes consider the profile of graduates, learning achievement, and the study material. The curriculum changes have not been implemented optimally in the Design Department, due to the lack of appropriate teaching materials available. Some courses do not even have teaching material, so the learning materials received by students are not in line with the curriculum being developed. This study aims to develop a Three Dimensional Basic Visual Teaching Material, which is the process of developing teaching materials and describing the quality of teaching materials that developed based on the results of trials. This research method is based on the 4D development model or Four-D Model by Thiagarajan, (1974). The expected result of this research is the product of Basic Three Dimensional Visual Material teaching materials, namely in the form of a textbook. Based on the results of trials conducted on students in the Department of Design, it was concluded that the textbooks developed were very feasible with an average of above 90% of the trial participants stated that textbooks were very good.

**Keywords**—developing teaching material; Basic Three Dimensional Forms; four D model

## I. INTRODUCTION

The Indonesian National Qualification Curriculum (KKNI) is seen as very important as the basis for national standardization of learning in the Design Department [1], [2]. The design curriculum was prepared on the basis of the issuance of Government Regulation of the Republic of Indonesia Number 17 of 2010 concerning Management and Implementation of Education, Presidential Regulation No. 8/2012 Indonesian National Qualification Framework (KKNI) - Indonesian Qualification Framework (IQF), Law of the Republic of Indonesia Number 12 of 2012 concerning Higher Education.

The implementation of Indonesian National Qualification Curriculum (KKNI) in the Design Department was not optimally running yet. Since the curriculum was implemented in 2015, there are still many lecturers who do not have teaching materials. A number of problems arise, especially when applying learning in Classroom. The material received by students from several different classes is not the same, both the learning outcomes and the content of the material delivered. Students were not given the material, such as handouts, modules, or textbooks. From the above description, it can be concluded that one reason is the lack of teaching materials that

is agreed between the lecturer of the course. On the other hand, this curriculum is expected to provide solutions to learning problems in the design field, not only standards at the department/study program level, but national standards [3], [4].

Teaching material is a set of material that systematically arranged, both written and unwritten, so it is created an environment or atmosphere that allows students to learn [5]. Teaching materials are materials or subject matter that are systematically arranged, which are used by the teachers and students in the learning process [6]. While in the context of learning on campus, teaching materials are interpreted as a set of learning materials that are systematically arranged for the lectures in the classroom or in the practice studio.

Teaching material is part of the learning resource. According to the understanding of learning resources from AECT and Banks [7], stated that one component of learning resources is material. Material is software containing learning messages, which are usually presented using certain equipment. Examples of such teaching materials include textbooks, modules, films, transparency, audio cassette programs, and video programs. Teaching materials are equated with teaching materials as they are based on the literal meaning of materials and materials in English [8], [9]. Material in English means material, so does material in English also mean material. As quoted from Kim, (instructional materials) generally consist of knowledge, skills and attitudes, which students must learn in order to achieve predetermined competency standards. Whereas in Minister of Education Regulation no. 41 of 2007 stated teaching material contains facts, concepts, principles and procedures that are relevant, and written in the form of items in accordance with the formulation of indicators of competency achievement.

Development of teaching materials is a form of developing learning strategies that are in accordance with certain principles which are adapted from learning theories [10]. Furthermore, Syahid explained that the development of teaching materials was not only based on the interests of the developer, but was an alternative problem solving learning [10]. Students not only interact with lecturers, but can also interact with learning resources that are used to achieve the desired results. While the development of teaching materials has planned objectives, namely (1) preparing learning activities in various situations so that they can take place optimally, (2) increasing teacher motivation to manage teaching and learning activities, and (3) preparing teaching and learning activities by filling in the

materials which is always new, displayed in new ways and implemented with new learning strategies as well.

There are four objectives, namely (1) the acquisition of teaching materials that are in accordance with institutional goals, curricular goals, and learning objectives, (2) instructional materials are arranged according to the structure of subject content with their respective characteristics, (3) synthesized and ordered subject topics systematically and logically, and (4) opportunities for the continuous development of teaching materials are available, referring to the development of science and technology [11]. Meanwhile in the Ministry of National Education three objectives of teaching materials were formulated, namely (1) clarifying and facilitating the presentation of messages so that they are not too verbal, (2) overcoming the limitations of time, space, and senses, both students and instructors, and (3) can be used appropriately and varied.

The requirements for the preparation of teaching materials were also conveyed by Tjipto Utomo and Kees Ruijter [11]. These requirements are (1) giving orientation to theory, theory reasoning, and ways of applying theory in practice, (2) provide training on the use of theory and its application, (3) provide feedback on the correctness of the exercise, (4) adjust the information and tasks according to the initial level of each student, (5) arousing students' interest, (6) explaining the learning objectives to students, (7) increasing students' motivation, and (8) showing other sources of information.

The types of teaching materials are distinguished based on the subject consisting of two types including: (a) teaching materials that are deliberately designed for learning, such as books, handouts, worksheets and modules; (b) teaching materials that are not designed but can be used for learning, for example clippings, newspapers, films, advertisements or news [12]. Koesnandar also stated that if it is viewed from its function, so the instructional material that was designed consisted of three groups namely presentation material, reference material, and independent learning material.

Based on the technology used, the Directorate of High School Development [13], groups the teaching materials into four categories, namely printed teaching materials such as handouts, books, modules, student activity sheets, brochures, leaflets, wallcharts, photos/drawings, and models/mockups, listening materials (audio) such as cassettes, radios, vinyl records, and audio compact disks, learning visual material (audio visual) such as compact disk video and film, the teaching material of interactive multimedia (interactive teaching material) such as CAI (Computer Assisted Instruction), interactive learning multimedia compact disk (CD) and web-based teaching material (web-based learning material). Thus, the development of teaching materials, in this case on campus, needs to pay attention to the characteristics of students and the needs of students according to the curriculum, which requires more student participation and activities in learning. In developing the learning materials, it is important to consider development models to ensure the development of teaching systematically and in accordance with theory so as to ensure the quality of the content of learning materials [14]. These models include the ADDIE, ASSURE, Hannafin and

Peck models, Gagne and Briggs, Dick and Carry, and the Four D Model by Thiagarajan [15], [16].

The development model is defined as a conceptual design process in an effort to improve the function of the existing model, through the addition of learning components that are considered to be able to improve the quality of achieving goals [17]. Development of the model can be interpreted as an effort of expanding in order to bring a situation or situation in stages to a situation that is more perfect or more complete or better conditions. Development in this paper means directed at a program that has been or is being implemented into a better program. This is in accordance with the opinion expressed by Hikmat [17], that "development involves activating resources, expanding opportunities, acknowledging success, and integrating progress". The development of new models is based on the experience of implementing new programs, the needs of individuals or groups, and adjusted to the development and changes in the learning environment of learning citizens.

One of the courses that cannot be maximally implemented due to the lack of available teaching materials is a cluster of basic design courses, namely the Three Dimensional Basic Fine Subjects. Visual Basic Three Dimensions or often known as Nirmana Three Dimensions as a science of grammar is the basis and methods or ways of creating design work especially for students of the Department of Design, Visual Communication Design Study Program. One of the easiest ways to create design work is to learn the methods of creating design work. For designers, it is necessary to learn the method of creating design work because the design work will be intended for others, so it must be understood and comprehended by others. This has led to many perceptions among different lecturers as there are no standard teaching materials that is agreed upon together.

The development of the Three Dimensional Basic Fine Arts Material teaching model is an effort to realize a teaching material model that can be implemented in classroom learning, especially for lecturers who are in charge of the Three Dimensional Basic Visual courses. The teaching material products developed are in the form of textbook products and equipped with instructional media. Based on the background above, this research is focused on the process of developing a model of teaching materials for three-dimensional basic subjects in the Design Department and describing the quality of developing three-dimensional basic instructional materials in the Design Department

## II. METHODS

The teaching material development model in this study is based on the Four-D Model developed by Thiagarajan [15], [16], [18]. This model consists of 4 stages of development, namely Define, Design, Develop, and Disseminate or adapted into a 4-D model. The selection of the Thiagarajan model (Four-D Model) is based on the consideration that this model can be modified according to the characteristics of development research.

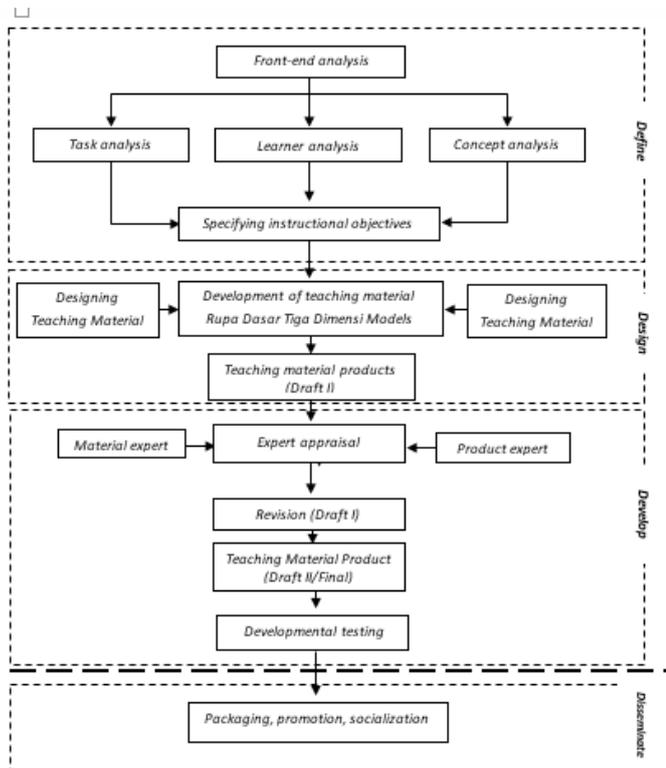


Fig. 1. The Four-D Development Model by Thiagarajan (1974)

### III. RESULTS AND DISCUSSION

#### A. Defining Stage

##### Front-end analysis results

Nowadays, the Three Dimensional Basic Visual learning encounter several problems. Based on the observations' result made by researchers of the learning of the Three Dimensional Basic Visuals within the last two semesters, found several factors/constraints that have an impact on the lack of material understanding by students [19]. Some of these factors include; first is teaching material's factor. Two-dimensional Basic Fine Teaching Material in the form of written or printed material so far does not exist yet. There are only teaching materials in the form of pictures of basic three-dimensional examples. Even then, it is very limited and not well classified yet. Second, factors related to the weaknesses of lecturers who are in charge of courses are those related to the readiness of lecturers in preparing learning tools. Because there are not many books that are referred to, each lecturer makes a learning plan according to what they know. *Third*, the factor of students who are less enthusiastic in participating in learning basic forms of three dimensions. Most students, about 70%, get less than the maximum score.

#### Learner Analysis Result

First, an analysis of the level of creativity / cognitive and psychomotor development in general. At this stage students have entered the second semester and have taken basic courses such as drawing, decoration, and also two-dimensional basic subjects and have sat in the second semester or at least one semester. Specifically, these students are already understand the basic design principles, such as recognizing visual elements such as shape, expression, size, direction, texture, color, value, and space, as well as composition principles such as rhythm, unity, dominance, balance, proportion, simplicity, and clarity.

Second, an analysis of the level of students' technical ability, especially in using tools, processing materials and media, and applying them in designing basic three-dimensional features. In general, students already have good technical skills. There are about 45% of students who technically still get grades less than the average. Their tendency is not really serious in arranging visual elements, especially in the cutting, coloring, construction, and finishing / finishing stages.

#### Concept Analysis Result

In the curriculum of the Indonesian National Qualification Framework (KKNI) S1 Visual Communication Design Study Program, the learning outcomes of study programs (program learning outcome) at least have been formulated in 4 (four) description parameters which include (1) ability in the field of attitude, (2) ability in the field of work, (3) ability in the field of knowledge, and (4) ability in the managerial field.

The mastery of visual elements and their composition with a variety of material characteristics and variations in the technique of making three-dimensional design work, with learning strategies in the form of theory and practice [20]. While the learning outcomes of courses/competencies in the Three Dimensional Basic Forms are formulated as follows: Competencies that are expected after students follow the Three Dimensional Basic Fine Arts Subjects in the field of attitude are: students show an appreciative attitude towards the work of others, ethical and responsible [21]. Competencies that are expected after students follow the Three Dimensional Basic Fine Arts Subjects in the field of knowledge are: (1) able to explain theories and concepts in the design of basic three-dimensional images, (2) able to explain the methodology and procedures in the design of basic three-dimensional forms [22].

Competencies expected after students take the Three Dimensional Basic Fine Arts Subjects in the field of work are: (1) able to prepare tools and materials for designing three-dimensional basic works, (2) able to organize visual elements in the basic three-dimensional form to design works by applying the principles of construction and composition in the design. Whereas the competencies expected after students take

the Three Dimensional Basic Fine Arts course in managerial are: (1) able to take responsibility for his work in the form of individual or group work, (2) able to communicate three-dimensional basic visual works based on concepts and ideas/ ideas, (3) able to work together in working on three-dimensional basic visual works, (4 ) is able to document the results of his work in the form of a portfolio of works.

*Task Analysis Result*

Assignments developed in the Three Dimensional Basic Fine Arts course are based on the learning outcomes of courses or competencies that are expected to be as stipulated in the KKNi curriculum. The assignments given aim to train students 'sensitivity in creating and visualizing concepts, students' abilities in technical mastery, perseverance and patience training, and responsibilities and appreciative attitudes towards the work they have designed [23], [24]. Next, these tasks are described in the Semester Lesson Plan. Whereas the formulation of Assignments for the Midterm Examination and Final Examination is designed in the form of assignments.

**B. Designing Stage**

Based on the learning outcomes of the courses described based on the learning achievements of the study program, the results of this analysis are based on 4 (four) things related to student abilities, namely: 1) abilities related to attitudes, 2) abilities related to knowledge, 3) abilities related to the field of work, 4) capabilities related to managerial aspects.

Based on the results of the analysis of the learning material requirements described above, then the learning material is then formulated in a number of chapters presented in a Basic Three Dimensional Textbook. In general, the material designed is grouped into 4 designing stage that will be presented in the Textbook. The results of the design of learning materials are presented in "table 1":

TABLE 1. RESULTS OF TEXTBOOK MATERIAL DESIGN

Chapter	Material Description	Material Title	Material Topic
I	This chapter describes the basic appearance of three dimensions including understanding, characteristics, and basic principles in designing the basic appearance of three dimensions	Three Dimensional Basic Fine Arts	1. The understanding of Three Dimensional Basic Visual 2. The characteristic of Basic Three Dimensional 3. The principles of Designing Three Dimensional Basic Fine Arts
II	This chapter describes the elements in the basic three-dimensional appearance,	The Element of Three Dimensional Basic Fine Arts	1. The Conceptual Element in Three Dimensional Basic Fine Arts 2. The Fine Elements in Three

Chapter	Material Description	Material Title	Material Topic
	including: elements of the concept, visual elements, and linkages		Dimensional Basic Fine Arts Form 3. The Elements of Relation in the Three Dimensional Basic Visual Form
III	This chapter describes the application of the principle of composition in designing three-dimensional basic visual works, including: rhythm, unity, dominance, balance, and proportion.	The Principles of Composition in Three-Dimensional Basic Fine Arts	1. Rhythm in Three Dimensional Basic Fine Arts Form 2. Unity in Three Dimensional Basic Fine Arts Form 3. Domination/Contrast in Three Dimensional Basic Fine Arts Form 4. Balance in Three Dimensional Basic Form 5. Proportion in Three Dimensional Fine Arts Form 6. Simplicity in Three Dimensional Basic Fine Arts Form 7. Clarity in Three Dimensional Fine Arts Form
IV	This chapter describes the Application of Variables and Principles of drafting in a basic three-dimensional manner	The Design of Three Dimensional Basic Fine Arts Works	1. The Understanding of Form, Look, Design, and Gatra 2. Designing Three Dimensional Basic Fine Arts Work of the Bersaf Field 3. Designing Three Dimensional Basic Fine Arts Work by applying the Wall Racana Method 4. Designing Three Dimensional Basic Fine Arts Work by applying the Prism and Tubes Processing Method 5. Designing Three Dimensional Basic Fine Arts Work by applying the Gatra Repeat Method 6. Designing Three Dimensional Basic Fine Arts Work by applying the Racana Bahutira Method 7. Designing Three Dimensional Basic Fine Arts Work by applying the Arrangement of the Framework 8. Designing Three-Dimensional Basic Fine Arts Work by applying the Link Line method

### C. Developing Stage

After a series of validation activities through a study of the Three-Dimensional Basic Visual Textbook and charging instrument based on the rating indicator by a validator including the validation of textbook materials, validation of textbook appearance/textbooks. Furthermore, limited tests on the use of textbooks are conducted to Design Department students by spreading testing instruments. Therefore, the results of the validation of the textbooks can be described as follows:

An expert appraisal by a lecturer of the Design Department who is competence in the basic design material especially the three dimensional basic, is the result of testing through an open questionnaire obtained from material experts who provide some suggestions and input related to learning material in textbooks. Based on the results of validation, it can be concluded that the results of the expert material assessment of the material presented in the textbooks get a score of 3.32. Therefore, the validator gives a recommendation that the material compiled based on the evaluation aspect is suitable to be used, but the validator stated that there are still some improvements there are student more expressive creative process and more spend their attention to class that should be revised about the mistake of some sentences related to the textbook materials.

Thus, the limited testing results which are conducted to 10 students. There are 9 students (90%) declared that teaching materials are useful and helpful in order to make them understand the materials, in contrast, 1 student (10%) is uncertain.

### IV. CONCLUSION

The development of teaching materials in the form of a Three Dimensional Basic Fine Arts Textbook is an implementation of the Design Department's Curriculum based on the Indonesian National Qualification Curriculum (KKNi). The basic problem in the development of teaching materials is due to the need for completeness of teaching materials in the Design Department, especially for learning three basic dimensions.

The development steps refer to the Thiagarajan model, consisting of the first four development stages, the defining stage consisting of 5 (five) analysis activities and the formulation of objectives, the second is stage of producing design, the three is stages of development, and the four is stages of dissemination. The results of this development refer to the quality criteria that teaching materials developed have good quality if they meet aspects of (1) validity, (2) practicality, and (3) effectiveness. The resulting product is a teaching material in the form of a textbook consisting of four (4) chapters namely chapter 1 Three Dimensional Basic Fine Arts Forms, chapter 2 about the Three Dimensional Basic Fine Arts Forms, chapter 3 (three) concerning the Principles of Composition in Three Dimensional Basic Fine Arts Forms, and chapter 4 (four) is the Design of Three Dimensional Basic Fine Arts Work [22], [25].

Based on the results of the trial textbook conducted by 15 Design Department students, in terms of usability, the material

presented, and the appearance of the textbooks get very high ratings with an average of above 90% of students giving good and excellent ratings based on criteria that have been set.

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