The Development of Mind-Mapping-Based Textbook for Assessment and Evaluation Subject

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Abstract: This study aims to develop Textbook in assessment and evaluation courses by implementing mind mapping as a stimulus for constructing student knowledge. Mind mapping is seen as being able to provide a big picture of a conceptual framework with various linkages with other pieces of knowledge so that it can describe the full construction of knowledge systematically. It is important considering that evaluation and evaluation are systemic parts of teaching and learning activities that will be conducted by prospective teachers in the classroom. The result shows that the Textbook which developed had a good value of validity, practicality, and effectiveness. It can be observed from the expert appraisal and student responses. Further improvements that are concerned in this study are linguistic reviews. The results of this study can be a reference for lecturers to use mind-mapping in constructing a conceptual framework of Textbook. Furthermore, the results of this study will be further tested at the disseminate stage to ensure general acceptance of teacher education students.

1 INTRODUCTION

The State University of Medan is one of the Teacher Education Institutions which produces qualified teachers over the years. Furthermore, the Faculty of Economics as an integral part of Unimed contributed to the success of Unimed's mission to answer challenges, opportunities, community demands, and prepare competitive teachers. To solve these challenges, the development of learning needs to be a concern especially in developing learning to improve the mastery of Learning Outcomes.

Based on pre-study observations, the student has a constraint to mastery the framework of assessment and evaluation courses because of the lack of literature or references of assessment and evaluation which available at the library. Students are only guided by the dictates or module that have been used by lecturers without any other learning resources. To address this problem, efforts are needed to optimize the development of learning media, especially the development of textbooks as the instructional material. One of the optimization efforts that can be done is by developing mind map-based textbook. This method is considered adequate to help the student in mastering Learning Outcomes in assessment and evaluation courses. Mind maps are designed to enable students to map all knowledge comprehensively. Mind maps are one of the easiest ways to put information into the brain and take information out of the brain.

Mind maps can help students learn to compile and store as much information as they want and how to classify it naturally, that is, by giving easy and direct access to something desired. With various advantages, mind maps are predicted to facilitate students in mastering the Learning Outcomes Evaluation material. Based on the above reality, it is essential to develop a mind map based textbook among students in the Faculty of Economics Unimed. Textbooks are developed using language that is simple and easily understood by students, and equipped with colorful images that can attract students' attention. This textbook is different from other books that are developed with a mind map and are expected to provide solutions for students who have difficulty mastering assessment and evaluation. Therefore this study aims to 1) Describe the process of developing mind map-based textbooks for assessment and evaluation courses; 2) Assessing the validity and practicality of the textbooks.

This study will contribute in 1) producing a mind map-based assessment and evaluation textbook which can facilitate students to mastering the assessment and evaluation material; 2) adding a reference for other lecturers to improve the quality of learning; 3) produce comparison material to solve specific problems in instructional activity.

2 THEORICAL FRAMEWORK

Teaching materials placed a critical position in achieving learning goals. It is in line with the opinion of Prastowo (2015) which states "teaching materials are all materials (both information, tools, and texts) that are arranged systematically and displays the complete figure of the competencies that students will master and use in the learning process with the aim planning and reviewing learning implementation.

Textbooks consist of knowledge, skills, and attitudes that students must learn which are systematically arranged so that accumulatively can achieve predetermined learning outcomes. The teaching standard functions for lecturers are to direct student activities in the learning process as well as the substance must be explained to students, while for students, teaching material serves as a guide in the learning process and is a learning achievement that must be achieved.

Prastowo (2015), argues that according to its form, teaching materials can be divided into four types, namely (1) printed documents, namely some teaching materials prepared in the paper, which can function for learning or information delivery. Example: handouts, books, modules, worksheets, brochures, leaflets, wall charts, photos/drawings, methods, and models; (2) hearing teaching materials or audio programs are all systems that use a direct radio system that can be played or heard by a person or group of people. Examples of cassettes, radios, LPs and audio compact disks; (3) hearing teaching material is anything that allows audio light to be combined with moving images sequentially. Examples of videos and films; and (4) interactive teaching materials namely a combination of two or more media (audio, text, graphics, images, animation, and video) which the user manipulated or treated to control command and or natural behavior of the presentation. For examples on the interactive compact disks.

Textbooks are the development of instructional designs that emphasize the principles adopted from the theory and findings of research on learning. The orientation of teaching materials is to optimize learning activities to achieve learning outcomes.

Therefore, teaching materials must be able to present learning material that is meaningful for students as subjects who are learning.

According to BSNP (2007), the feasibility of textbooks can be observed by four dimensions, namely: (1) the usefulness of the content means that a good textbook should contain material that supports learning achievement and has indicators namely the breadth of material, depth of material, completeness of material, and accuracy of content; (2) presentation feasibility means that the presentation of textbooks can be assessed from several sub-components and/or indicators such as presentation techniques, supporting presentation, consistency of performance, and presentation of learning materials; (3) language feasibility means that textbooks are written with rules and terminology that are correct, clear, and in accordance with the development conditions of the readers. The indicator is the use of proper and correct Indonesian language rules, following the improved spelling rules, terminology in accordance with the concepts that are the subject, the explanation for difficult or uncommon terminology, the language used is simple, straightforward and easy to understand by students, and the language is adjusted with the stages of student development and communicative and developing students' thinking skills; and (4) the feasibility of graphics implies that textbooks can be seen from the aspect of book size, book skin design, and book content design.

In the preparation of textbooks, there are principles that must be considered, namely (1) the principle of relevance is the learning material should be relevant which means that there is a relationship between learning outcomes as an embodiment of the curriculum. At learning outcomes implied concepts that must be taught and the characteristics of the idea; (2) the principle of consistency, namely the conformity between learning outcomes that students must master with textbooks, (3) the principle of sufficiency, namely the material taught should be sufficient enough to help students to master the learning outcomes explained.

Evaluation and Assessment Courses

Assessment and evaluation are courses in semester 5th and should be given to all students at Unimed including at the Faculty of Economics. The primary consideration of the distribution of courses in the Indonesian Qualification Framework (IQF) includes courses on assessment and evaluation in semester 5th so that students as prospective teachers are equipped with knowledge on how to provide an assessment and evaluation at the end of learning with a thorough understanding.

The course of assessment and evaluation is an educational subject in a graduate education program with a weight of 3 credits. The discussion of assessment and evaluation courses covers the basic concepts of testing, measuring, evaluating, and evaluating. The next chapter discusses the principles and strategies for assessing learning outcomes, then presents the assessment parameters, techniques for preparing and evaluating learning outcomes, processing techniques, and final grades, and at the end of the discussion about proper test requirements.

Mind Mapping

Mindmap was first discovered by Tony Buzan in the 1970s. This technique is known as Radiant Thinking. A mindmap has a central idea or central image; there are 5 to 10 other ideas that come out of the central idea. According to Buzan (2009), the mindmap is a powerful graphic technique that provides a universal key to unlocking the full potential of the human brain so that it can use all the capabilities in both hemispheres of the brain such as words, images, numbers, logic, rhythm, color in a unique way.

Using mind maps means using concepts contained in the brain, formed in such a way with interesting and colorful ideas. The results of the concepts created in the form of mind maps will help students to assemble thoughts into an interesting discourse. So, this mindmap helps to conceptualize existing knowledge. Dryden (2013) argues as a substitute for making a linear note making mind maps based on several principles, namely (a) the central theme printed in the middle; (b) there are main branches in each sub-theme; (c) single words are used for each concept; and (d) if possible each idea has an image. The principle of making a mind map is a way that can be done to help create their concepts on a topic.

DePorter and Hernacki (2012: 157), the steps to make a mind map are as follows. (1) make a circle in which there is the main idea in the middle of hard; (2) from the ring add a branch for each key point; (3) write keywords for each chapter; (4) add symbols or illustrations; (5) use capital letters; (6) essential ideas are written in capital letters; (7) turn on the mind map by highlighting the words were written; (8) be creative; (9) use random forms and make mind maps horizontally; (10) use images in each part of the mind map.

Mind Mapping and The Development of Teaching Material

Assessment and evaluation courses are important courses that must be mastered by the teacher. Knowledge and understanding of the correct lecturers about the characteristics of the material

Assessment and evaluation will guide the lecturer to make the right textbook for students. The right textbook will produce meaningful and quality learning so that the transfer of knowledge carried out by the lecturer can run optimally and the learning objectives can be achieved.

Learning Assessment and evaluation using mindmap methods can be done by lecturers by helping to create a pleasant classroom atmosphere, giving students the freedom to actively and creatively explore, discuss with fellow friends and teachers so that students practice expressing opinions, statements and questions. In that learning, the lecturer also provides media that can support learning in the form of books/articles, markers or colored pencils.

The use of images and colors applied to this method will have a positive impact that can activate creativity and memory. The reason why picture language is used to compose, develop and remember is that the brain has natural abilities for visual recognition. It is why many mind maps use images as a presentation because they are believed to help retain information.

Learning process in this Assessment and evaluation course, students begin their learning with the introduction of the concept of mind maps, their functions, and benefits. From the introduction stage, the students then discuss and then get the motivation from the lecturer to complete the task, namely making a book summary with the mind map method. Students create mind maps in advance to make it easier for students to focus on the subject matter. Students get special attention in choosing images and giving color to mind maps. Based on the mind map created, the student continues at the stage of making a book summary. Students will get special attention when students feel difficulties in completing tasks.

The number of words or length of a book summary must also be considered so that the original work and review are different. Making outlines is best done after carefully reading certain parts to be summarized. Taking the essence of reading can save words or sentences in summary. And this can distinguish between original works and summary results.

3 RESEARCH METHOD

This study uses the 4D (four-D models) model. 4D models are implemented with four main stages, namely: 1) define, 2) design, 3) develop, and 4) disseminate (Thiagarajan, Semmel, & Semmel, 1974). In this research, it is only done until the

develop stage. In the define phase, researchers conduct a needs analysis related to the objectives of the course in the curriculum, conceptual analysis, and analysis of student characteristics. Curriculum analysis is carried out by analyzing the suitability of learning outcomes based on the IQF. The theoretical study aims to develop the Textbooks based on the main concepts of topic Assessment and evaluation. While the analysis of student characteristics to find out the characteristics of students includes age, motivation, knowledge, and skills tendencies.

Furthermore, at the design stage (construction) Textbook construction refers to various criteria that have been obtained in previous times. Textbooks that are developed will integrate multiple mind mapping charts. This serves to strengthen the conceptual framework that students must understand. Thus students will have a big picture of the concept of assessment and evaluation they learned.

Finally, at the develop stage, expert appraisal and initial developmental testing are carried out. Expert appraisal serves to test whether the developed teaching material meets the content standards, while the initial development testing serves to verify the acceptance of the instructional material that has been formed in a limited sample so that feedback is known regarding the effectiveness of Textbooks from its target trainees (Thiagarajan, Semmel, & Semmel, 1974).

4 RESULT

This research has successfully developed a prototype 1 of Textbooks for assessment and evaluation courses. Textbooks are developed using mind mapping as a form of novelty rather than books in general. Integrating mind mapping in Textbooks can stimulate students to get the full concept of assessment and evaluation material.

In the define phase, there is 1) adjusting learning objectives based on research findings and the Indonesian national qualification framework so that standardized learning outcomes are achieved in accordance with the development of global knowledge and national education goals; 2) Development of a conceptual framework related to Textbooks in accordance with scientific literature and the results of the latest research so as to obtain generally accepted material standards; 3) Analysis of student characteristics so that the delivery style of the material in the Textbooks is developed so that

students can easily digest it into a comprehensive understanding.

The define phase has produced the initial framework for the development of Textbooks. The structure is then used as the basis for the design process. The design process through a series of Textbooks development processes to become a draft. The components that become concentrated in the design stage are the suitability of the format and systematic delivery of the material with the stages of achieving the learning objectives, the suitability of the content with learning achievement, the readability of the language used, the suitability of the delivery model and strategy of the material with the characteristics and needs of students, the truth and completeness of the material content, suitability of mind mapping that is presented with learning objectives, and suitability of questions or bills with learning objectives. Assessment of these indicators is then carried out in the next stage, namely, develop. The developing phase is the actual development stage because there is a scientific process in it. The output of the scientific method is the improvement and refinement of the draft (results from the design stage) to prototype one which is ready to be disseminated. The scientific process is the expert appraisal and initial development testing (Thiagarajan, Semmel, & Semmel, 1974).

To guarantee the validity of the draft Textbooks that have been designed, validation is assessed by expert opinion. The expert appraisal is carried out by evaluation and assessment experts and curriculum experts at Medan State University. The expert appraisal process produces several recommendations for improvement. Quantitatively the results of the expert appraisal are described in table 1 below. Furthermore, after an increase based on the expert appraisal, initial development testing is also carried out. Initial development testing is done by reviewing student responses as target users of the textbook. Initial development testing was carried out on a limited sample of 36 people who joined in one class. Initial development testing is used as a basis for improvement to achieve acceptable Textbooks in the population. This process is not to guarantee acceptance but to get an overview of student expectations so that further approval can be tested at the dissemination stage. Student responses in limited samples are used as references for further improvements to the expectations of Textbooks that are suitable for student characteristics. So that, the output from this development stage is the prototype I which must then be re-tested for its acceptance in the dissemination stage to get prototype 2. The results of

the initial development testing are also summarized in Table 1 below.

Table 1: Expert Appraisal and Initial Development Testing

No	Aspect		Expert 1	Expert 2	Students
1	**Format**			**Score**	
	a.	Clarity in the distribution of material	4	4	4.35
	b.	Layout setting	4	3	4.15
	c.	Suitable type and font size	4	4	4.35
2	**Language**				
	a.	The materials are delivered with straightforward and simple sentences	4	3	4.43
	b.	The materials are delivered with communicative and interactive sentences	3	3	4.15
	c.	Spelling is delivered with acceptable structure and grammar in Bahasa Indonesia	4	4	4.15
	d.	Spelling is using the sentences which following Indonesian Language Rules	4	4	4.15
	e.	using effective sentences	4	3	4.63
	f.	using efficient sentences	3	3	4.35
3	**Content**				
	a.	The truth of the material	5	5	4.86
	b.	Material and competence adequacy	4	4	4.86
	c.	Suitability with learning objectives and learning outcomes	4	5	5
	d.	Suitability with problem-based learning	3	4	4.46
	e.	Suitability of mind mapping	4	4	4.86
	f.	Feasibility and completeness of resources	4	4	4.66
	g.	Suitability of content regarding allocation of time	3	4	4.86
	h.	Suitability of material to stakeholders' needs	3	3	4.86
	i.	Compatibility of assignment and evaluation tests with the learning objective and learning outcomes	4	5	4.93

The results of expert appraisal and initial development testing indicate that some minor improvements to the Textbook have been made. Generally, improvements that need to be made on the aspect of legibility and selection of sentences that are effective and efficient. The development will then be consulted with linguistic experts to produce sentences that have good readability so that they are easily understood by students and following the Indonesian language rules. Furthermore, improvements are concentrated on the suitability of the material weight with the available time allocation. Submission of teaching material is ideally by the credit weight possible for the course, namely assessment and evaluation. Therefore the extraction of the material is adjusted again referring to the key elements to achieve the learning objectives. Finally, improvements are concentrated on the suitability of the content with the needs of stakeholders. This aspect does have its difficulties because of the broad scope of assessment and evaluation material and the specificity of stakeholder needs. So that, the extraction of material previously carried out must still pay attention to the specificities of stakeholder needs. So improvements are focused on clarifying the practical implications of the evaluation concepts that are taught so that they are following the functional requirements of the evaluation and assessment of stakeholders.

Furthermore, limited testing of students on Textbooks that have been improved based on expert opinion has a reasonably good response. With a mean response above 4 with a scale of 5 indicates that Textbooks has a reasonably good level of acceptability. Student recommendations based on the results of the draft still refer to readability/easy to read level and the use of sentences in Textbooks. So that the improvement by involving linguistic experts is a step that will be done next before dissemination.

5 CONCLUSION

According to the results of the research and discussion above, this study produces several conclusions as follows:

1. This study has successfully developed Textbooks in the form of mind mapping based assessment and evaluation courses.
2. Mind mapping-based textbooks developed in this study have been through the process of expert appraisal and initial development testing.
3. The concentration of further improvements is focused on linguistic aspects
4. The next step that must be done from the results of this research is dissemination includes 1) summative test; 2) final packaging; and 3) diffusion (see: (Thiagarajan, Semmel, & Semmel, 1974).

Based on the above conclusions, this study produces the following recommendations.

1. This study has practical suggestions for educators on instructional design updates on assessment and evaluation lessons that are oriented to the use of mind mapping. The use of mind mapping in the delivery of learning material can provide a complete picture to students regarding the conceptual framework to be taught. The big picture conveyed in mind mapping will stimulate students to fully understand the concept of assessment and evaluation to avoid missing links between theory and practice.
2. For stakeholders, can review the Textbook that has been developed, re-validated, and further developed so that it can be generally accepted and used in a standard manner both at the study and faculty level.
3. For further research can empirically test the implementation of the Textbook that has been developed, empirical testing is critical to get evidence of the performance of the Textbook. In the research phase of developing Thiagarajan, Semmel, & Semmel (1974) Textbook, this stage is incorporated in the disseminated stage. This stage will ensure the feasibility of the Textbook developed by 1) summative test; 2) final packaging, and 3) diffusion.

The limitation of this research lies in the stages of research that are still reaching the stage of developing. The limitations of achievement are due to limited costs and time. The next stage will be carried out by the researcher as further research. So that, the further research will be a series of continuous research in a research roadmap.

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