Development of a Nutrition Education Textbook for Improving Knowledge Mastery of Nutrition Students

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Abstract. Nutrition Education is a basic course to support the achievement of community nutrition skill competencies for prospective nutritionists. Course achievements expect students to be able to plan, implement, and evaluate nutrition education so they need textbooks as a reference for student lectures. The aim of the study was to determine the feasibility, practicality and mastery of Nutrition Education knowledge. This type of research is development research. The development model uses ADDIE (Analyze, Design, Develop, Implementation and Evaluation). The trial was conducted on 33 students. Feasibility and practicality data collection uses a questionnaire instrument, and is analyzed descriptively. Data on mastery of knowledge was obtained from pretest-posttest, and analyzed by paired sample t-test. The feasibility of the Nutrition Education textbook was assessed from the components of content, language, presentation, and graphics with an average score of 86.88%, including in the very feasible category. The practicality of textbooks is assessed from the presentation, teaching materials, language, and the benefits of obtaining an average of 95.41% or very practical. Textbooks were also considered very effective because they increased students' mastery of knowledge by 31.91 (p<0.000).

Keywords: Nutrition Education, Textbooks, Nutrition Skill Competencies.

1 Introduction

Textbooks are mandatory references used at the primary and secondary education levels or tertiary institutions. The textbook contains learning materials for increasing faith, piety, noble character, and personality, mastery of science and technology, increasing sensitivity and aesthetic abilities, increasing kinesthetic abilities, and health, which are compiled based on national education standards. Peraturan Pemerintah Nomor 19 Tahun 2005 pasal 20, confirms that teachers/lecturers are expected to be able to develop material referring to subject competencies. The textbooks allow students to solve problems without having to demand the presence of teachers in class so that student learning motivation in learning contributes to improving learning outcomes because there is a shift from teacher teaching learning to student center learning [1].

Nutrition Education is one of the subjects that must be taken by students of the Undergraduate Program in Nutrition to support the achievement of competence in community nutrition skills. The achievements of this course expect students to be able to plan nutrition education, implement and evaluate nutrition education to address

community nutrition problems. Based on these achievements, the scope of Nutrition Education material is very broad, starting from educational concepts, changing behavior, identifying problems and target characteristics, planning education to evaluating them. Besides being in the form of textbooks, student learning resources are also media presentations, but this has not provided satisfactory learning outcomes. The evaluation results of the Nutrition Education lectures showed that students who got a final score of <75 were still high, namely 46.7% or 35 people. The results of the lecture evaluation showed that students who got a UAS score of <70 were still high, namely 55.6% or 40 people. This shows that if the teaching materials that have been provided so far have not been effective, lecturers need to develop other teaching materials in the form of textbooks that can help students understand study materials or lecture material well. The use of textbooks is proven to be effective in increasing student learning outcomes and motivation. This positive influence is given because this textbook is able to facilitate student independent learning activities [2].

The availability of textbooks is expected to have a positive impact on students or lecturers. First, textbooks are useful as lecturer documentation. If the content of the textbook is considered to be incongruent with scientific developments, the lecturer can revise it according to his needs. In other words, lecturers do not need to spend a lot of time creating a learning framework or curriculum from scratch because they already have their own textbooks as guidance for revamping content. Second, textbooks will support students in the process of transferring knowledge outside the classroom. In other words, textbooks can be a reference for students to deepen scientific studies independently, including sharpening their academic abilities. This cannot be separated from the content of the textbook itself which provides feedback or practice questions from previously studied material.

It is important to develop Nutrition Education textbooks that utilize text books and other references. Textbooks have various advantages, namely the material content is arranged according to the lesson plan designed by the lecturer so that it is different from textbooks or other references. The introductory section mainly contains: (1) research problems; (2) insights and problem solving plans; (3) formulation of research objectives; (4) a summary of the theoretical studies related to the problem under study. This section sometimes also includes expectations for the results and benefits of the research. The length of the introductory section is around 2-3 pages and is typed with 1.5 spaces (or following the provisions of writing in the scientific journal where the article is to be published). This study aims to: 1) determine the feasibility of a Nutrition Education textbook, 2) find out the practicality of a Nutrition Education textbook, 3) determine students' mastery of knowledge from the implementation of a Nutrition Education textbook.

2   Method

The research conducted includes the type of development research. The development stages refer to the ADDIE model. The ADDIE design model was developed by the Center for Educational Technology at Florida State University, consisting of five main phases or stages namely Analyze, Design, Develop, Implement and Evaluate.

The location of the research was carried out at the Undergraduate Program of Nutrition, Faculty of Engineering, Surabaya State University. The subjects of this study were 36 undergraduate students of Nutrition who took the Nutrition Education course. Textbook feasibility data was obtained from the assessment of two validators, practicality data was obtained from student questionnaires, and knowledge mastery data was obtained from pre-test and post-test results.

The feasibility instrument used adopts of the previous research [3]. The eligibility instrument for textbooks is done by placing a tick (√) on each aspect of the assessment 1=very poor, 2=poor, 3=fair 4=good. The practicality instrument in the form of a questionnaire with a Guttman scale was given a score of 1 but not scored 0. Mastery of knowledge used test questions of 15 questions. This qualitative descriptive analysis technique was used to process validation data in the form of suggestions and comments regarding the improvement of the Nutrition education textbook. Quantitative descriptive analysis techniques are used to assess the feasibility and practicality of the textbook. Analysis of paired sample t-test is used to determine mastery of knowledge.

3   Result and Discussion

3.1   Feasibility of Nutrition Education Textbooks

The eligibility of textbooks was assessed by two validators. The components assessed include content feasibility, language, presentation, and graphics. The feasibility of content or material in textbooks is assessed from nine aspects, including suitability of material content with titles, suitability of content with competence, conformity with scientific principles and student abilities, presentation of references, following scientific developments, and broadening student insights.

Based on the results of the assessment of the two validators, the material contained in this textbook is categorized as valid with a validation value of 84.70% or it can be concluded that the textbook is very appropriate and relevant for use in Nutrition Education lectures.

The feasibility of the linguistic component is determined from an assessment of five aspects, namely the correct use of Indonesian language rules, the use of effective and efficient sentences, the use of effective sentences, and language capable of motivating students to learn. In the following, the results of the language validation of textbooks are presented.

Table 1. Results of textbook content validation.

No	Aspects	V.1	V.2
1.	The content of the textbook material according to the title of each topic/chapter	3	4

2.	The contents of the textbook material are in accordance with the basic competencies that students will achieve	3	3
3.	Textbook learning materials are in accordance with scientific principles	4	3
4.	The contents of the material in textbooks are in accordance with the abilities of students	4	3
5.	The exercises tested are in accordance with the material in the textbook	3	3
6.	The material in the textbook contains complete information	3	4
7.	Textbooks include clear references	4	4
8.	Source material is the development of other books, scientific papers and actual research results	3	3
9.	Material in textbooks can add insight into knowledge	4	3
	Number of ratings	31	30
	Score (%)	86,11	83,30

Table 2. Results of the textbook language validation.

No	Aspects	V.1	V.2
1.	The language used is in accordance with good and correct Indonesian writing rules	4	3
2.	Language writing uses effective and efficient sentences	3	4
3.	The information is clear	4	4
4.	The language used is a communicative language for students	4	3
5.	The language used motivates students to learn	4	3
	Number of ratings	19	78
	Score (%)	95,00	85,00

The validation results regarding the language of textbooks have an average score of 90.00% or are categorized as valid, so it can be concluded that the use of language in textbooks is declared very feasible.

The feasibility of presenting a textbook is assessed from its systematic aspects, sequential structure, suitability of concept maps in the description of the material, and suitability of the sample illustrations with the material. The assessment of the feasibility of presenting a Nutrition Education textbook from two validators is as follows.

Based on the results of the assessment of the two validators, the material contained in this textbook is categorized as valid with a validation score of 93.75% or it can be concluded that the textbook is very feasible in terms of its graphics.

Table 3. Results of validating the presentation of the textbook.

No	Aspects	V.1	V.2
1.	Illustrations, graphics, pictures, photos according to learning materials	3	4
2.	Textbooks use clear and legible fonts	4	4
	Number of ratings	7	8
	Score (%)	87,50	100,00

The results of the textbook feasibility test got an average score of 86.88% which means it is very feasible. However, there are several suggestions put forward by the

validator. The suggestions given include improving the presentation of pictures, completing the structure of the book presentation with table and figure descriptions, equalizing the writing margins, completing the contents of chapter 1, chapter 4, table of contents, list of tables, and list of figures. This indicates that the Nutrition Education textbook can be used in learning but still needs improvement even though its validity value is high enough to achieve the requirements of a good textbook, which is presented in an attractive appearance and describes the characteristics of textbooks, ease of reading and use, and quality. good physical book [4]. Based on the suggestions from the validator, improvements were made to the textbook before testing was carried out on students.

3.2   Practicality of Nutrition Education Textbooks

The practicality of textbooks was obtained from filling out student response questionnaires as textbook users in textbook testing activities in Nutrition Education lectures. The trial was conducted on 33 students. The practicality assessment component consists of presentation, teaching materials, language, and benefits.

The presentation of textbooks is measured from two aspects, namely the inclusion of chapter titles and the inclusion of learning objectives. The distribution of presentation ratings shows that there are five students who do not rate the aspect of including learning objectives. Presentation of textbooks by 95.5% of students was declared good or very practical.

Table 4. Results of textbook presentation assessment.

No	Aspects	Yes	No
1.	Illustrations, graphics, pictures, photos according to learning materials	100%	0%
2.	Textbooks use clear and legible fonts	91%	9%
Mean		95,50%	

The ease of using textbooks related to teaching materials is measured from four aspects, namely the systematic presentation of the material, the suitability of the material for the purpose, the summary at the end of the chapter, and the evaluation to measure understanding of the material. From student assessments of teaching materials, it was obtained by 95.08% of students who were considered existing or considered very practical.

Table 5. Results of the assessment of the ease of use of textbooks.

No	Aspects	Yes	No
1.	The systematic presentation of material in textbooks makes it easy to understand the overall material	94,6%	17,0%
2.	The material presented is in accordance with the learning objectives	100%	17,0%
3.	The summary at the end of the chapter is able to increase understanding of the material presented	87,5%	12,5%
4.	Include evaluation that help in measuring understanding of the material being studied	98,2%	1,8%
Mean		95,08%	

Assessment of the use of language in textbooks is based on aspects: the ease of understanding the language and the suitability of the language structure with the EYD rules. Students' assessment of language in textbooks is as follows.

Table 6. Results of language assessment in textbooks.

No	Aspects	Yes	No
1.	The language used in textbooks is easy to understand and communicative	96,4%	3,6%
2.	The language used is in accordance with the student's ability level and criteria for EYD	85,7%	14,3%
Mean		91,05%	

The benefits of the developed textbooks are measured from two aspects, namely helping students in the learning process and adding to students' insights. All aspects of the useful components of the textbook were assessed as yes by the students, which means that the Nutrition Education textbook was very practical for the students. Students give a positive response to the Nutrition Education textbook that has been developed and students hope that all courses in the study program will also have textbooks to facilitate their lecture activities.

3.3   Mastery of Students Knowledge

Mastery of student knowledge is measured from the ability of students to answer pretest-posttest questions correctly. The results of the student pretest showed that the scores achieved ranged from 13 to 53, with an average score of 30.7. While the results of the student posttest showed the lowest score was 40 and the highest score was 86, with an average score of 60.7. Based on the pretest-posttest assessment, it was found that there was an increase in student knowledge scores by 30 points.
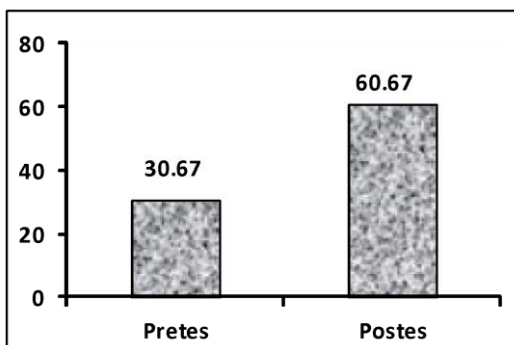

Fig. 1. Mean pretest and posttest knowledge scores.

The results of statistical tests using paired sample t-test proved that the use of nutrition education textbooks significantly increased students' knowledge or it could be

concluded that the nutrition education textbooks that had been developed were effective in increasing students' knowledge.

Table 7. Paired sample T-Test for students knowledge.

	Paired Differences					t	df	Sig. (2-tailed)
	Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
				Lower	Upper			
Pretest - Postest	-2.99697E1	9.20762	1.60284	-33.23458	-26.70482	-18.698	32	.000

These results showed that the use of textbooks is effective in increasing student learning outcomes compared to textbooks [5]. The development textbooks provide very significant benefits and added value to students, especially for independent learning [6]. The advantages of textbooks are that they contain descriptions of material about certain subjects or fields of study, which are arranged systematically and have been selected based on specific goals, learning orientation and student development, to be assimilated [7][8]. Nutrition Education Textbook in this research are applied in learning activities for nutrition students to support competency achievement in community nutrition skills.

4   Conclusion

The feasibility of the Nutrition Textbook in Cycles was assessed from the content component with a score of 84.70%; the linguistic component gets a score of 90.00%; the presentation component got a score of 84.38%; and the graphical component scored 93.75%. Obtaining an average score of 86.88% from the validator, the Nutrition Education Textbook is in the very proper category. The practicality of the Nutrition Education Textbook is assessed from the presentation component with a score of 95.5%; the teaching material component obtained a score of 95.08%; and the language component scored 91.05%; and the benefit component gets a score of 100%. The average score obtained was 95.41%, the Nutrition Education Textbook was stated to be very practical. The nutrition education textbooks that have been developed effectively increase students' knowledge with a significance level of $p < 0.000$.

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