

Developing of The Demography Teaching Book Based on KKNI-Curriculum and High Order Thinking Skills

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Abstract—The idea of this research is from the background of several problems in the Demographic subject, including a). The material lecture has not optimally examined the reality of population phenomena in Indonesia, b). Most learning resources focus on the presentation of the material to increase the ability to remember, memorize and apply formulas (LOTS) without problem-solving, decision making, critical thinking, and creative thinking (HOTS) which are the demands of the KKNI-oriented curriculum and 2013 curriculum, c). No textbook has all of the material teachings that are relevant to the learning outcomes of IQF. To overcome this problem, the researcher develops textbooks based on curriculum and oriented to the level of high order thinking skills —Benjamin Bloom's Taxonomy refined by Anderson and Krathwohl (2001). This research is educational research and development, focused on teaching supporting material in the textbook form. The textbook material analysis based on HOT, and the analysis of high-level thinking skills in student demographics, Department of Geography Education. The results of this study include: 1) 12 learning objectives have been formulated, and 39 indicators/material consisting of 56, 41% with low level of thinking ability (LOTS) and 43.59% with high level of thinking ability (HOTS); 2) the average high-level students are classified as beginner.

Keywords—*Demography, Textbooks, High Order Thinking Skills*

I. INTRODUCTION

In theory, thinking skills can be divided into two, namely Lower Order Thinking Skills (LOTS) and Higher Order Thinking Skills (HOTS). LOTS is defined as a type of thinking ability that is related to receptive skills[1]. Conversely, HOTS is defined as the ability to think about productive skills related to the transformation of information and ideas by combining facts, synthesizing, generalizing, explaining, hypothesizing, and interpreting. Furthermore, HOTS or high-level thinking skills are divided into four groups, namely problem solving, making decisions, critical thinking, and creative thinking [2].

Higher Order Thinking Skills (HOTS) includes critical, logical, reflective, metacognitive, and creative thinking. This

ability to think can be activated when students can solve problems, uncertainties, questions, or dilemmas. The result of this thought is explanation, decision, performance, this product is related to the context by using the knowledge and experience that has been mastered by students, and will improve their thinking and intellectual abilities[3]. Furthermore, HOTS can be evaluated through the use of knowledge and skills that have been mastered in a novel situation[2].

In its development, HOTS development research focused on three aspects, namely: teaching strategy (including methods, models, lesson design), supporting teaching materials (media, modules, books), and assessment. Applied research concentrates on applying fixed methods, models and assessments[4]. This study focuses on developing research supporting teaching material in the form of textbooks where the substance of the material and its evaluation material are oriented to the dimensions of HOTS Bloom's cognitive processes which are defined by Anderson and Krathwohl[5].

Given that modern learning is paradigm oriented towards students (student-centered instruction) and is no longer lecturing on lecturers (teacher-centered instruction)[6], students should be in a learning practice situation, they must be temporary players lecturers act more as learning designers, facilitators, trainers and learning managers[7]. As a learning designer, lecturers are required to be able to develop useful strategies and teaching materials, one of them in the form of textbooks.

The development of teaching materials is carried out by a lecturer to solve learning problems by paying attention to the target or students and also adjusting to the competencies that must be achieved[8]. Teaching materials are prepared with the aim of providing materials for learning that are by the demands of the appropriate curriculum taking into account the needs of students which cover the characteristics and environment of students[9]. Teaching materials can help students obtain alternative learning materials in addition to lesson textbooks that are sometimes difficult to obtain. Furthermore, in developing developer teaching materials must refer to good teaching material indicators.

Renandya [10] said that good teaching materials must meet what is needed by learners who will use them. Furthermore, he said that the teaching materials motivate learners to master the target language learned efficiently and effectively. Hutchhinson and Waters (1987)[11] offer several criteria for good teaching materials. First, teaching materials developed not only function as learned material but also encourage learners to have learning independence. For this reason, the instructional materials developed must contain interesting texts, fun activities that can foster thinking skills, opportunities to practice language skills both micro and macro, and content that can be digested by teachers and students. Second, teaching materials developed can facilitate the occurrence of teaching and learning activities by organizing the structure of interrelated teaching materials, Third, teaching materials developed contain language learning developed. Fourth, the learning materials developed are oriented towards activities that challenge students to think. Fifth, teaching materials developed have a function to broaden material horizons. Sixth, the teaching material presents a model for the use of contextual language.

Bloom's taxonomy (1956)[12] has placed HOTS as a cognitive level that covers analysis, evaluation, and creation. In detail, Benjamin Bloom's Taxonomy refined again by Anderson and Krathwohl (2001)[13] with LOTS differentiate into two categories, namely remembering (Remembering) and understanding (understanding). Conversely, HOTS includes four main aspects, namely (1) applying, (2) analyzing, (3) evaluating, and (4) creating. Each of these aspects is broken down into sub-skills.

Facing the development of science and technology and the global era, the world of education is required to be anticipatory to prepare workers who can compete in the future, as well as overcome the problems it faces in life. Learning is not only required to develop skills aspects but also to develop other aspects such as adaptability, easy re-training, multiple skills (multi-skilling), problem-solving skills and the ability to communicate[14]. It is time for reorientation of learning from model teaching to a learning model by empowering students[6][7]. As a result of the development of science and technology also causes the learning paradigm shift to be learning to know, learning to do, learning to be, and learning to live together[15]. Also, the most fundamental change is the change in mindset related to changes in emphasis on thinking skills from lower order thinking skills (LOTS) to higher order thinking skills (HOTS).

By RI Minister of Education and Culture Regulation No. 148 of 2014 concerning Organization and Work Procedure of UniversitasNegeri Medan, in order to adjust to the learning paradigm shift, UniversitasNegeri Medan has made improvements to the implementation of the KKNI-oriented curriculum which began in 2016. The application of the KKNI-oriented curriculum certainly has the effect of changing the curriculum and its management. Presidential Regulation No. 8 of 2012 concerning the Indonesian National Qualifications Framework (KKNI) explains that the curriculum which initially only refers to the achievement of competency has now become a reference to learning outcomes.

In the process, the achievement of competencies that refers to the achievement of learning (learning outcomes) does not necessarily materialize. Lecturers as the main motor of change need to improve the quality of learning so that the mandate of the KKNI-oriented curriculum can be realized optimally[16]. In order to improve the quality of learning in higher education, various strategies, power, and efforts need to be optimized, one of the alternatives that can be pursued is through the development of teaching materials based on learning outcomes according to the IQF but presented nicely to improve the quality of student thinking. Teaching materials are all forms of material used by teachers, lecturers or instructors in carrying out teaching and learning activities in the classroom[17].

One form of teaching material that can be developed is printed teaching materials in the form of textbooks. The use of teaching books in the learning process does not only look at teacher activities but also involves students actively in learning. Using textbooks also creates an independent learning process[18]. In learning using textbooks, students learn individually in the sense that they can adjust the speed of learning with their respective abilities. Students whose learning abilities will quickly complete their learning first from their friends without any obstacles from their friends who are slower.

Based on the final reflection of the semester, a team of lecturers had conducted that in the implementation of demographic subject learning in the Department of Geography Education, the Faculty of Social Sciences, UniversitasNegeri Medan found several problems. These problems include: a). Lecture material has not optimally examined the reality of population phenomena in Indonesia, b). Most learning resources focus on the presentation of population material to increase the ability to remember, memorize and apply formulas (LOTS) without problem-solving, making decisions, critical thinking, and creative thinking (HOTS) which are demands of the KKNI-oriented curriculum and 2013 curriculum, c). Textbooks are not yet available, all of which are relevant to the achievements of demographic learning in the IQF curriculum.

At present more and more studies on HOTS are carried out by specific fields of expertise or subjects[19][20][21]. Fundamental research in the HOTS field seeks to define HOTS, establish HOTS criteria based on student education levels, HOTS conceptions, and mapping human thought patterns that are thought to be influenced by cultural, belief, religious, and thinking patterns. While HOTS's development research focused on three aspects, namely: teaching strategy (covering methods, models, lesson design), supporting material teaching (media, modules, books), and assessment, applied research concentrates on applying the methods, models, and assessments that have been fixed[4].

Based on the above considerations, this research was conducted with the aim of obtaining textbooks that can be used as a guide/reference for students in Demographic courses in the Department of Geography Education, Faculty of Social Sciences, UniversitasNegeri Medan.

II. METHODS

This research was designed in the form of educational research and development (Educational Research and

Development) which was analyzed qualitatively. The population of this study is all students who use textbooks Population Geography / Demography courses consisting of 6 classes or 137 students in the fifth semester of the 2018/2019 academic year. Classes determined as research samples are estimated based on the highest level of thinking ability or the lowest student High Order Thinking Skills (HOTS) as a decision on the results of the researchers' preliminary study. This sampling technique is known as a nonrandom technique in the form of purposive sampling. In purposive sampling, researcher samples must be tied to their objectives, what they want to accomplish and what they want to know. Furthermore, this sampling technique was chosen because the purposive sampling technique is very synonymous with descriptive research[22].

A. Research Design

This research will be conducted for 6 months from May-October 2018. This research was designed in the form of education research and development (Educational Research and Development). Research and development methods or Research and Development are research methods used to produce specific products[22]. The initial stage of the research in the form of developing textbooks refers to the Thiagarajan and Semmel&Semmel models which consist of four stages, namely: define , design, develop, and disseminate[23][24][9]. In this study model 4-D is modified into 3-D, define phase (definition), stage design (design), and the stages develop (development).

Textbooks that have been developed will then be validated by 2 expert validators, namely material experts and media experts. Material experts will measure the feasibility of construction and material content while media experts will measure the feasibility of language, presentation, and graphics textbook[24][25]. The final stage in this study is to conduct a limited test on the study sample so that it can be measured to increase HOTS students through the application of the pretest and posttest and measure the response of students regarding textbooks using questionnaires.

B. Collection and Analysis Techniques Data

1. Assessment of the feasibility of textbooks. The feasibility assessment of teaching books is based on the ability of the textbook to facilitate students in improving *High Order Thinking Skills* and pay attention to the completeness of the textbook. The teaching book component consists of: a). Learning Instructions; b). Competencies to be achieved; c). Supporting information; d). Exercises; e). Work instructions or worksheets; and f). Evaluation [26].

Feasibility assessment of teaching materials is assessed based on the following components: (a) Feasibility of content, (b) Language, (c) presentation, and (d) graphic. This feasibility assessment will be carried out by 2 material validators and media twice using a questionnaire. The assessment of teaching materials is done using a scale with a score of 1 to 4, where the score 1 is categorized as not good, the score 2 is categorized as not good, the score 3 is categorized good and the score 4 is categorized very well. The score is then processed using the Sugiyono formula (2012) and interpreted into four categories as in Table 1.

TABLE I. GRID VALIDATION OF MATERIAL INSTRUMENTS

No.	Statement	No. Sort by
1	QUALITY ASPECT OF MATERIALS	
1.	The accuracy of content with competencies to be achieved	
2.	Completeness of Material	
3.	Material Weakness	
4.	Compatibility of Materials with HOTS	
B	ASPECT OF THE UTILIZATION OF MATERIALS	
1.	Use of Material	
2.	Motivating Quality	

TABLE II. MEDIA VALIDATION GRID

No.	Statement	No. Sort by
A	MEDIA QUALITY ASPECT	
1	Quality of Textbook Shown	
2	Ease of Use	
3	Text Clarity / Readability	
B	LANGUAGE USE ASPECT	
1	Quality of Language Usage	
2	Sentence Position Suitability	
C	LAYOUT MEDIA ASPECT	
1	Presentation of textbooks	
2	Layout	

TABLE III . VALIDATION PERCENTAGE SCALE

No.	Percentage of Achievement	Interpretation
1	76 - 100%	very decent
2	56 - 75%	Worthy
3	40 - 55%	Enough
4	0 - 39%	less feasible

2. Effectiveness of using textbooks for increasing HOTS students. Measurements were made using *one-shot case study*, namely through the pretest and posttest in the form of a *paper-based test* by testing the HOTS of students according to the material in the textbook. Based on the value of the pre-test and post-test, the effectiveness of the N_{gain} equation is tested as follows:

$$g \% \text{ Score} = \frac{\text{Score of } A_{21} - \text{Minimum}}{\text{Maximum}} (1)$$

Information :
 g = gain coefficient value
 Xm = value of post-test
 Xn = pre-test value

To interpret the value of N_{g} used the guide in Table 4.

TABLE IV. INTERPRETATION OF VALUE N_{g}

N_{gain} value	Interpretation
$g \geq 0.7$	High
$0.7 > g \geq 0.3$	Is being
$g < 0.3$	Low

3. Data on student responses were evaluated using a questionnaire. This test is carried out by students after studying and using textbooks in Demographic subjects. The questionnaire of student responses to tutorial textbooks can be seen in table 5 below.

TABLE IV. STUDENT RESPONSE QUESTIONNAIRE
TEXTBOOK USERS

No.	Statement
ASPECT OF DISPLAY	
1	Presentation of textbooks by the material taught
2	Clarity in textbooks/images can be seen
3	The use of language in teaching books is easy to understand
4	The use of language in textbooks is firm and clear
5	The use of foreign languages in textbooks is understandable
6	The use of fonts in the text in this textbook is clear
7	Readability of the letters used
8	The font color selection contrasts with the background, so the text can be read
MATERIAL ASPECT	
9	The ease of this textbook media to be understood
10	The presentation of this textbook has been straightforward from easy material to difficult material
ASPECT OF UTILIZATION	
11	The presentation of this textbook can facilitate student independent learning
12	The presentation of this textbook can attract my attention to provide stimulation for learning
13	The presentation of this textbook can evoke learning capacity

Student responses are then calculated using the formula:

$$\% \text{ Score} = \frac{\text{Score of As}}{\text{Maximum}} (3)$$

TABLE VI. CATEGORY OF STUDENT RESPONSE TO
TEXTBOOKS

Average Score Percentage	Category
≤ 10	Very bad
10-13	Bad
14-17	Enough
18-21	Well
≥ 22	Very good

III. RESULT AND DISCUSSION

Results of the studies focused to achieve the goal of research is to develop a textbook course Demographics / Geography Population-based KKNi and oriented *High Order Thinking Skills* (HOTS) through five stages of research are: 1) Determination and Defining Terms preparation of textbooks (*define*), 2) preparation of draft textbooks (*designs*), 3) Development of textbooks (*develop*), 4) Test the effectiveness of the use of textbooks, and 5) test responses of textbook users.

The results of the research that is currently achieved have only reached the second stage of the research, namely *defining* and *designing* textbooks. At the *define* stage, further analysis is carried out regarding the formulation of course learning outcomes in accordance with SKKNI, and describes characteristics based on *High Order Thinking Skills* for geography education students, especially in Population Demography / Geography, while at the *design* stage, development design of cover pages, design of content or book content, design *layout* and layout and design of research instruments. The description of the research findings is as follows:

A. Determination and Definition of Requirements for Preparing Textbooks (*Define*)

The *define* stage is the first stage in the preparation of textbooks by the development model of Thiagarajan and Semmel&Semmel. The description of the determination stage includes:

B. Revitalizing Learning Outcomes and Basic Competencies in Population Demography / Geography

The Department of Geography Education (JPG) is one of four study programs in the Faculty of Social Sciences, Universitas Negeri Medan. JPG focuses on producing graduates who are capable of competitiveness at regional and national levels, both as a teacher and a researcher. As a teacher, graduates must be equipped with a number of knowledge, skills, and attitudes that reflect the four teacher competencies, namely social, personal, professional and pedagogic skills. As a researcher, graduates must have skills in analyzing problems, collecting data, processing and analyzing data, and formulating appropriate and accurate alternative solutions. To achieve these competencies, especially professional competencies, JPG graduates must be provided with knowledge relevant to the times, community development, and employment needs. Especially with the development of the curriculum from the KBK block to become the Indonesian National Qualifications Framework (KKNi) oriented curriculum at Universitas Negeri Medan, it clearly demands a dominant change in both the structure and content of the courses in each study program.

Population Demography / Geography is one of the subjects that must be taken by each student in the JPG. As one of the subjects in the humanities / social field, this course is expected to be able to improve student competence in understanding, analyzing various population phenomena, evaluating population policies, and formulating solutions to population problems in the era of industrial revolution 4.0. To achieve these competencies, revitalization of lecture material is significant. The stages in revitalizing lecture material begin with analyzing the relevance of the objectives of the course with the achievement of graduates of the JPG study program and learning outcomes in the KKNi-oriented curriculum.

The objectives of the subjects formulated above are still general. The goal *breakdown* is the learning goal at each meeting, study material, and indicators of success. The objectives, study materials, and indicators are the primary references to the substance of the textbook material developed. Table 8 illustrates the relevance of the objectives of the course, with learning objectives, study materials and indicators of success.

To achieve the objectives of the course, 12 learning objectives were formulated to train students' thinking skills, from *Low Order Thinking Skills* (LOTS) levels to *High Order Thinking Skills* (HOTS). *Low Order Thinking Skills* (LOTS) is achieved at the level of remembering (C1), understanding (C2) and applying (C3), while *High Order Thinking Skills* (HOTS) are designed from the level of analyzing (C4), evaluating (C5) and creating (C6). The percentage of learning achievement indicators included in LOTS and HOTS levels is illustrated in table 9 below.

TABLE VII. DISTRIBUTION OF LEARNING ACHIEVEMENT INDICATORS AT LOTS AND HOTS LEVELS

Level of thinking total	Low Order Thinking Skills (LOTS)			High Order Thinking Skills (HOTS)		
	C1	C2	C3	C4	C5	C6
(F) = 39	9	8	5	10	1	6
(%) = 100%	23,08	20,51	12,82	25,64	2,57	15,38
Total	56,41			43,59		

Source: processing of research data, 2018

Of the 12 learning objectives, 39 indicators were formulated consisting of 56, 41% with low level of thinking ability (LOTS) and 43.59% with a high level of thinking ability (HOTS). Based on the material category formulated in the textbook relevant to the data, that the distribution of material formulated at both thinking levels according to the Bloom Taxonomy the total percentage is almost the same, although the distribution of the numbers at each level is still not balanced. More details can be seen in the following diagram.

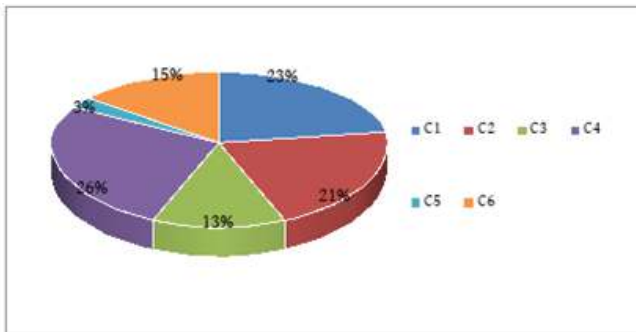


Fig. 1. Comparison of Content Material Seen From Various Thinking Ability Levels According to Bloom's Revised Taxonomy

C. Population demography and geography subject learning tool

Learning tools are one of the essential prerequisites that must be fulfilled by a lecturer before the learning process takes place. In the learning device all objectives, contents, and steps of learning are outlined in a coherent and clear manner and must refer to the National Standards of Higher Education for each Study Program which includes the development of intellectual intelligence, noble character, and skills. The standard curriculum developed by the higher education institution and passed on in the form of more detailed on learning device based on the fact that the target Achievement Learning / CP (*Learning Outcome / LO*) can be met through the content and the learning process. Learning Outcomes (CP) proclaimed in the scope of national education refers to the development of global science, technology and culture that cannot be separated from the development of capacity and potential of human resources.

Planning of the Population Demography / Geography learning process that has been prepared is presented in the form of Semester Learning Plans (RPS) and Lecture Contracts. The semester learning plan (RPS) is established

and developed together with the social / humanities expertise lecturer (KDBK) in JPG.

Components of the semester learning plan (RPS) are adjusted to the IQF book I concerning the academic guidelines of the Geography Education Department. The minimum components that must exist in a learning plan are:

- Name of study program, name and course code, semester, credits, the name of the lecturer
- The achievement of graduate learning is charged to the course
- Final abilities planned at each stage of learning to meet graduate learning outcomes
- The study material that is related to capabilities to be achieved
- Learning methods
- Time provided to achieve ability at each stage of learning
- The student learning experience is realized in the description of the assignments that must be done by students for one semester
- Criteria, indicators, and assessment weights
- List of references used.

D. Student Thinking Ability

The level of thinking ability of students is analyzed from the results of tests conducted at the beginning of the semester. The initial test results show that none of the students were able to answer questions with HOTS level, with the highest score of 50 and the lowest score of 14. The average score of 23 students is only 32. This proves that the average high-level thinking ability of students is classified as lacking. More details can be seen in table 8 below.

TABLE VIII. DATA ON THE INITIAL TEST OF STUDENTS' HIGHER-ORDER THINKING ABILITY

Aspect	Value
Maximum Value	14
Minimum Value	50
Average Value	32
Standard Deviation	11
Students who complete	0
Students who are not complete	23
Percentage of students who complete	0%

Source: Research Data Processing, 2018

Based on the evaluation conducted, it was found several findings, among others: 1) the ability of students to associate various information still needs to be improved, one reason is that students are still confused when the concept is applied to different contexts; 2). A common mistake that occurs is lack of accuracy in analyzing questions; students are less careful in finding the main ideas in the questions given; 3). Students focus on memorizing rather than understanding the meaning of a concept.

E. Development Stage

The development phase is the second stage of the development of textbooks. The development phase includes the design of the cover page (*cover*), content design/content

of teaching materials, *layout* design and layout, and design of research instruments.

The cover page is developed using the Photoshop CS4 application. The cover page was designed in two versions, the first version uses more soft colors, with a more minimalist appearance while the second version uses bright colors with more geographical features in the form of maps in it. Both covers can be seen in figure 4 & 5. The results of the polls on 22 students showed a tendency for 9 students to choose the cover page for the version I, because the colors tend to be soft and the design is simple. The images presented also represent demographic and exciting content. 13 students tended to choose the cover page for version II because the degradation of bright yellow became the main charm on this cover. Also, the picture on the cover also represents the characteristic of geography, namely the map.

The content or contents of the teaching book are developed in 11 chapters according to the learning objectives in this course. The titles of each chapter include:

1. The concept and scope of demographic science
2. Source of demographic data
3. Population composition
4. Population theory and population
5. Global population development
6. The transition of global demographics
7. Population fertility and mortality
8. Demographic mobility
9. Population strategic issues and issues in Indonesia in the era of industrial revolution 4.0
10. Human development index, and
11. Population policy in Indonesia.

The content as thick as 382 pages are presented in the *theme font* times new Romans, the size of letter 12, using 1.5 spaces and margins of 2.5 x 2.5 x 2.5. This book is presented in the form of a slightly smaller margin with the aim of being easy to carry. Also, the selection of font size 12 with a space of 1.5 will make it easier for students to read, since narration and numbers dominate this book.

IV. CONCLUSION

The conclusions from this study are:

1. The developed textbook draft consists of 12 chapters with the distribution of achievement indicators at LOTS level of 56.41% and HOTS level of 43.59%. based on the material category formulated in the textbook relevant to the data, that the distribution of material formulated at both thinking levels according to the Bloom Taxonomy the total percentage is almost the same, although the distribution of the numbers at each level is still not balanced.

2. The results of this initial test showed that none of the students were able to answer questions with HOTS level, with the highest score of 50 and the lowest score of 14. The average score of 23 students is only 32. This proves that the average high-level thinking ability of students is classified as lacking. This is caused by 1) the ability of students to associate various information still needs to be improved, one reason is that students are still confused when the concept is applied to different contexts; 2). A common mistake that occurs is lack of accuracy in analyzing questions; students are less careful in finding the main ideas in the questions given; 3). Students focus on memorizing rather than understanding the meaning of a concept.

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