

Development Of Teaching Materials Of Courses Program Development And Increasing Learning Outcomes

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ABSTRACT

This development research aims to produce textbooks for the P3KIM (Program Development) course chemistry learning) that is feasible to be applied to program development lectures, as well as seeing an increase in learning outcomes and student responses by using textbooks that have been developed. The research refers to the development research steps put forward by Borg & Gall, and the subjects are Unimed chemistry education students class of 2018 who are taking this course at the time the research is taking place. Methodology – The data analysis method uses pass rates based on BSNP (National Education Standards Agency) criteria and suggestions for improvement by tutors and inspectors. Tests and student responses are calculated as percentages, and learning gains are added to usability tests. Findings – Individual test results were 80.2% (very good), small group tests 79.2% and large groups 80.5%. As a result of the students' answers, 82% of the students responded positively to the developed materials. Further field tests showed that using the developed textbooks improved student learning outcomes by 71% (high). Significance – The study claims that the developed P3KIM text is usable and has been used very well in university chemistry departments to learn P3KIM courses. The developed P3KIM texts are recommended for use in the P3KIM lectures of the Unimed Chemical Education Study program.

Keywords: Development, Teaching Materials and Learning Outcomes.

1. Introduction

The P3KIM (Chemical Learning Program Development) course is one of the groups of subjects that must be studied by students of the Department of Chemistry Education, FMIPA UNIMED, where the lecturers are members of the group of lecturers in the field of educational studies. The characteristic of the course is a compulsory subject that must be mastered by students with a weight of 2 credits. This course is a prerequisite for students to be able to take Mikroteaching (Micro Teaching) and PPL courses (Field Experience Program). The importance of this course in educational studies is indicated by the prerequisites for taking this course, which must first pass or are currently taking the Teaching and Learning Strategy (STBM) and Curriculum Review courses.

As a teacher at the forefront, teachers must be able and creative to improve and innovate learning future to meet the needs of Education 4.0. Therefore, it is necessary to develop teaching materials as tools or basis for improving student abilities. When teachers from various disciplines design and implement lessons well, it is hoped that students will experience the relationship between the subject matter being studied and gain an understanding of concepts and concepts meaningful skills. It also helps students to use independent learning and promote metacognitive reinforcement to retrieve and transfer knowledge (Piccinini & Scollo, 2006). Independent learning is built based on the knowledge or competencies that students already have (Rahmawati et al, 2018) which aims to master a competency, with intentions or motives to overcome learning

problems (Mudjiman, 2008). Independent learning is in line with the principle of thorough learning. One of the advantages of independent learning is that each student can participate actively with pleasure according to their own desired learning speed, both for slow and fast learning students, according to their respective learning conditions (Harjanto, 2008). The most important thing in the learning process Independent is an increase in the will and skills of students in the process learn without the help of others, so that in the end students do not depending on the learner/instructor, mentor, friend, or other person learning (Yamin, 2013) in other words in the process of independent learning the role of the teacher or the instructor only acts as a facilitator or designer of the learning process (Majid, 2014). Students with high independent learning abilities can utilize a variety of learning resources, such as teaching materials that are developed to solve problems encountered when they study.

Heinich et al. (1996) wrote several things that should be considered when preparing learning materials that can make students learn independently and control the learning process as follows. 1). Bring interesting examples and images to support the presentation of the educational material. 2). Gives students the opportunity to give feedback or measure their mastery by providing practice questions, assignments, etc. 3). Contextual or presented material refers to the atmosphere or context of the task and the student's environment. 4). The language used is quite simple, because the students deal with the learning material only by studying on their own. Therefore, the use of the developed learning materials must be in accordance with the needs of the students, so that the students can use them for independent learning, which improves the skills of the student.

The Role of Learning Materials

Study materials are very important for teachers and students in the learning process. Without teaching materials, it is difficult for teachers to increase the effectiveness of teaching. Also, without study materials, it is difficult for students to follow the learning in class, especially if the teacher teaches the material quickly and it is unclear. They may lose track without being able to follow what their teacher has taught them. Therefore, the learning material is considered as a material that both teachers and students can use as a tool to improve the quality of learning. 1. The role of teaching materials for teachers Save the teacher's time in teaching. With different types and formats of teaching materials, the teacher can reduce the teaching time. In other words, the teacher can give the students the task of getting used to the taught material in advance and ask them to answer the questions at the end of each topic. Thus, when the teacher comes to the class, he no longer has to explain all the topics discussed, but only discusses the material that is not yet known to the students. In this way, more time can be saved for teaching and the remaining time can be used for discussion, question-and-answer or other learning activities.

1. The Role of Teaching Materials for Teachers

Save the teacher's time in teaching. With different types and formats of teaching materials, the teacher can reduce the teaching time. In other words, the teacher can give the students the task of getting used to the taught material in advance and ask them to answer the questions at the end of each topic. Thus, when the teacher comes to the class, he no longer has to explain all the topics discussed, but only discusses the material that is not yet known to the students. In this way, more time can be saved for teaching and the remaining time can be used for discussion, question-and-answer or other learning activities.

2. The Role of Teaching Materials for Students

Students can learn without a teacher or other fellow students. This means that with learning materials planned and written in a good and logical order and according to the existing lesson plan, students can study these learning materials independently, wherever they want. In this way, the students are more willing to follow the class because they already know the material to be discussed. In addition, when students first become familiar with the study material, they already at least know the basic concepts of the material discussed in the meeting, and they can identify still unclear material to ask the teacher later in class. In addition, students can use the study material to predict what assignments the teacher will give after the lesson. In this way, students are better prepared to complete these tasks.

From the above description it can be seen that good learning materials should be prepared according to principles and learning objectives that take into account students' interests and learning needs according to local potential, the easy principle, and arouse interest in learning. The learning material must also be problem solving and meet the learning needs of the students.

Regarding teaching materials, there are several views on teaching materials. Pannen (2001) says that teaching materials are a set of materials that are arranged systematically, both written and unwritten, so as to create an environment or atmosphere that allows students to learn, and this needs to be supported by appropriate learning guides considering that face-to-face time in front of the class is very difficult. limited compared to the volume of material to be completed. Lestari (2013) states that learning materials are a set of learning tools or tools that include learning materials, methods, limitations and assessment methods that are systematically and attractively designed to achieve the expected goals, i.e. to achieve competence or partial competence. all the complexity. According to Hall (2007), teaching materials, on the other hand, are all types of materials that are used to help teachers or instructors in carrying out the learning process. The proposed

material can be in written or unwritten form. The above concept explains that teaching material must be designed and written according to teaching principles because teachers use it to help and support the learning process.

Based on the above explanation, we can see that the role of the trainer in planning or assembling the learning material largely determines the success of the teaching and learning process. With the study materials, students can learn independently, and the teacher is more consistent in the study materials intended for students and achieves all the predetermined competencies.

The study materials are very unique and special. Unique, which means that the learning material can only be used for specific target groups in a specific learning process. Specificity means that the content of the learning material is designed to achieve only certain goals for a certain audience. Also, the method of systematic activity is adapted according to the characteristics of the subjects and the students using it.

Koesnandarin, 2018: According to Mulyasa (2006), subject-based learning materials consist of two types, including: (a) learning materials designed for conscious learning, such as books, manuals, worksheets and modules; b) educational materials that are not intended but can be used for learning, such as clips, newspapers, films, advertisements or news. Koesnandar also noticed that the planned educational materials consisted of three groups according to their function: presentation materials, reference materials and self-learning. Based on the technology used, High School Development (2018) divides teaching materials into four categories, namely: (1) printed teaching materials include sheets, books, modules, student worksheets, brochures, pamphlets, wall maps, photos/images and models. . /models. (2) Listening (auditory) teaching materials are cassettes, radio, LPs and audio discs. (3) Audio learning materials (audio-visual), such as video CDs and movies. (4) interactive multimedia learning materials (interactive learning materials), such as CAI (Computer Assisted Instruction), interactive learning multimedia CDs (CDs), and online learning materials (online learning materials). The study materials mentioned in this study are mostly printed study materials in the form of textbooks. This is because textbooks are very closely linked to the curriculum, curriculum, qualification standards and core competencies. Rudi Susilana (2007) reveals that a textbook is a book about a specific field of study or knowledge that is structured to facilitate the achievement of the learning objectives of teachers and students. Textbooks play an important role in achieving the trainer's goals

Based on the brief description of this P3KIM course, the discussion includes: instructional design concepts, learning components, instructional analysis, general instructional objectives, specific instructional objectives, taxonomy of learning objectives and analysis of learning programs and their application in chemistry learning. Seeing the many concepts and skills needed for students as prospective teachers, it is necessary to develop teaching materials that are developed as student handbooks.

Books are a number of sheets of paper, both printed and blank, bound and covered. Books as teaching materials are books that contain a science resulting from an analysis of the curriculum in written form. Usually educators use books as teaching reference sources. Textbooks contain knowledge that can be used by students to learn, fiction books will contain the fictional thoughts of the author, and so on. Textbooks should be actual describing current knowledge.

It should be noted that a good book is a book that is written using good language and is easy for the reader to understand and is presented in an attractive manner accompanied by pictures and explanations, the contents of the book also describe something that is in accordance with the idea of writing.

According to the study material published by the General Directorate of Vocational Secondary Education of the Ministry of Education in 2003, the study material has several characteristics, namely self-directed, self-sufficient, independent, adaptable and usable (Widodo and Jasmadi in Lestari, 2013).

First, self-management, namely learning materials can make students self-learning with the help of designed learning materials. To realize self-management, learning materials must have clearly formulated goals, and final and intermediate goals. In addition, learning materials facilitate deeper student learning by providing learning materials packaged into more specific units or activities.

Second, independent, i.e. all materials comprising one learned competence or sub-competency are contained in one study material as a whole. Therefore, the study material must contain all its parts in one book as a whole, so that it is easier for the readers to familiarize themselves with the study material.

Third, separate learning materials that are developed independently of other learning materials or that do not need to be used together with other learning materials. This means that the study material can be used independently, independently of other study materials.

Fourth, adaptable, namely the teaching material should be well adapted to the development of science and technology. The study material must contain material that can increase the reader's knowledge of the time or, more precisely, the development of science and technology.

Fifth, user-friendly, that is, every instruction and information displayed is useful and friendly to the user, including the ease of the user to respond and use it as desired. Therefore, educational materials should be added to make it easier for readers to get the information as clearly as possible.

Research by Hera, et al (2014) found that the teaching materials they developed felt appropriate and were able to increase students' conceptual understanding of embryology material in the Animal Development course. The results of Lasmiyati and Harta's (2014) research also show that the teaching materials developed are declared feasible and there is an increase in concepts between students who use the developed teaching materials. Another study conducted by HR Widarti et al (2020) showed that the development of electrolytic

cell books as teaching materials developed could help improve the quality of learning resources available in schools and increase students' knowledge and understanding of mathematics and chemistry lessons on the topic of electrolytic cells. Manalu et al (2016) also found that the learning outcomes of students who were taught using developed textbooks were higher than the learning outcomes of students who were taught without using developed textbooks. Research by Hanum, L., Ismayani, A., & Rahmi, R. (2017). regarding the development of teaching materials in the form of media, concluded that the media developed was in the form of bulletin media which was developed through the stages of analysis, development and design. Based on the results of the feasibility assessment percentage, the developed bulletin media is suitable for use because the percentage of feasibility assessment by the validator obtained an average of 93.8% and the feasibility assessment by the expert validator obtained an average of 90%, so the bulletin learning media is included in the very feasible category.

Then the students' responses to the media obtained an average value of 84.4%, included in the very good category. So it was concluded, with the development of this media helps teachers and students in the teaching and learning process.

2. Method And Research

This research was conducted at the Unimed Chemistry Education Department. In the early stages of development research, it refers to the steps developed by Borg and Gall (2013). This study uses the Borg and Gall (2013) model. R & D research in education includes ten steps, as shown in the following flow chart:

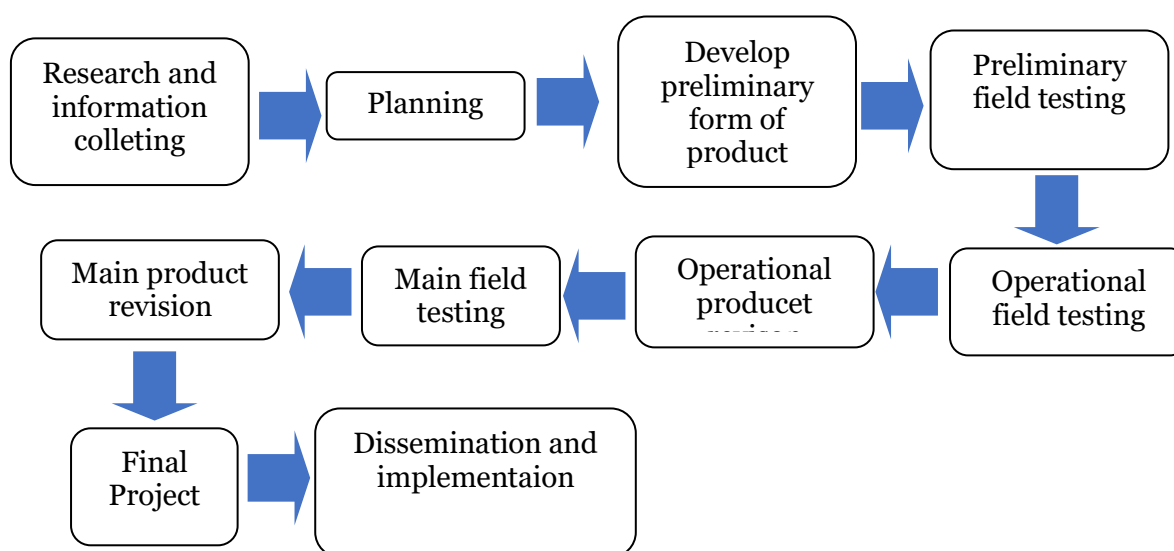


Figure 1. R&D Research Steps (Borg and Gall, 2013)

In connection with the existence of various limitations in this study, either in terms of time and available resources, then the measures development in this study is simplified into 4 stages, namely stage Needs Analysis, Product Design Stage, Validation and Evaluation Stage, and Final stage

1. Needs Analysis Stage

This stage aims to examine the purpose of the product to be developed in the form of developing P3Kim course textbooks

The Needs Analysis Stage includes:

a. Front End Analysis

The purpose of the pre-final analysis is to highlight and define the problems encountered during learning, so we need the development of textbooks for the P3Kim course. This analysis was conducted through field observation, interviewing parallel students and faculty who teach P3Kim courses related to learning skills in the course.

b. Analysis of students (students)

Student analysis is a study of the characteristics of students (students) in accordance with the design of the development of learning tools. These characteristics include background academic ability (knowledge), cognitive development, and related individual or social skills learning, media, format, and language chosen. Student analysis was carried out by giving questionnaires to students to get an overview student characteristics, including: 1) level of ability or development intellectual, 2) individual or social skills that have owned and can be developed to achieve learning objectives that set.

Student analysis is the study of the characteristics of students (students) in accordance with the planning of the development of teaching aids. These characteristics include academic background ability (knowledge), cognitive development and learning of related individual or social skills, media, format and language of choice. Student analysis was done by giving students questionnaires to get an overview of the students' characteristics, including: 1) intellectual ability or level of development, 2) individual or social skills that are possessed and can be developed to achieve the set learning goals.

c. Concept Analysis

Concept analysis was used to identify the most important concepts to be taught, to develop textbooks, to organize them in a hierarchical form, and to identify individual concepts as critical and significant concepts.

d. Task Analysis

The purpose of task analysis is to identify the skills that researchers are investigating and to analyze them as additional skills that may be needed. This analysis fully confirms the assessment of the task of the developing material.

e. Formulation of Learning Objectives (Specifying Instructional Objectives)

The formulation of learning objectives is useful to summarize the results of concept analysis and task analysis to determine the behavior of the study object. The collection of items becomes the basis for the preparation of tests and the design of teaching materials, which are then integrated into the developed textbooks for use by researchers.

2. Product Design Stage

The results of the needs analysis will then determine the product design which will be developed. The Product Design Stage includes:

a. Preparation of benchmark reference tests

The preparation of benchmark reference tests is based on specifications and learning objectives student analysis.

b. Selection of Teaching Materials

Selection of teaching materials is done to identify the material learning that is relevant to the characteristics of the material to be implemented in the field. In this study the P3Kim lecture material chosen was Instructional Design material

c. Format Selection.

Selection of formats in the development of this textbook intended to design or design textbooks developed. The selected format is one that meets the criteria of being attractive, easy and assist in studying P3Kim lecture material.

d. Initial design (Initial Design).

The initial design in question is the design of all components in the textbook to be done before testing is carried out. So the product design stage includes determining the concept of learning material that will be implemented in developing textbooks, the concept of presenting and organizing material, evaluation questions, pictures, and learning models and media that will be implemented.

3. Validation and Evaluation Stage

This stage is the core stage in the form of a series of assessments textbook product development. The Validation and Evaluation Stage includes:

a) Expert/Practitioner Validation

Experts/practitioners' assessment of the textbooks developed includes materials expert and design expert. Based on the validation results and input from para experts, and design experts, the learning material is revised to make it more precise, effective, easy to use, has high technical quality and textbooks can also be revised to make it more attractive and usable. Once designed and got the validity level of the validator, then the teaching material is feasible to be tested in the field.

b) Development trials

The next series of validation and evaluation stages is the testing phase try product. Products that have been declared feasible by the next expert/expert tested on students majoring in chemistry education, FMIPA Unimed 30 students who are currently taking the P3Kim course. The trial design in this study used a research design in stages, namely with a descriptive analysis of the limited design as follows:

In the early stages, validation and testing were carried out by material experts and design experts, as well as 3 students for individual tests, 12 students for small group trials and 25 students for large group tests. Data collection methods are questionnaires and learning achievement tests.

The data obtained from this study is qualitative data obtained from assessment and revision to produce a product in the form of a textbook for teaching Instructional Design material in the P3Kim course. For qualitative data were analyzed using descriptive analysis. Percentage descriptive analysis is used to describe the percentage of each variable. Data obtained based on teaching material validation questionnaires and student response questionnaires will be processed using descriptive statistics (Arikunto, 2013).

The rating scale used in the modified National Education Standards Agency (BSNP) eligibility questionnaire is 1 to 4, where 1 is the lowest score and 4 is the highest score. The data analysis technique used to analyze validation data from lecturers is the average technique. The formula used to calculate the data from filling out the questionnaire is the average calculation, namely:

$$\bar{X} = \frac{\sum X}{n} \quad \text{With :}$$

\bar{X} = average value

$\sum X$ = number of validator/test subject assessment answers

n = number of validators/test subjects

Criteria for the validity of the average analysis used can be seen in the following table:

Table of Validity Criteria for Average Analysis of Textbooks developed

Average	Validity Criteria
81-90	Valid and does not need revision (very feasible), very good
71-80	Valid and doesn't need (decent) revision, either
61-70	Invalid and some of the contents need to be revised (not feasible), not good
50-60	Invalid and need to be totally revised (not feasible)

Perception/response questionnaires of students (students) after using the textbooks that have been developed will be analyzed descriptively. The formula used to calculate the percentage of the questionnaire is:

$$P = \frac{f}{n} \times 100\% \quad \text{Description:}$$

P = Percentage of student responses

F = Frequency that is being searched for the percentage

N = Total number of objects (number of students)

Table. Criteria for Student Response to the developed P3Kim textbook

Score	Percentage Intervals	Criteria
16 – 20	83% s/d 100 %	Very high
13 – 16	67 % s/d 83%	Tall
10 – 13	51 % s/d 67 %	Currently
7 – 10	35 % s/d 51 %	Low
4 – 7	20 % s/d 35 %	Very low

The results of data analysis are then adjusted to the agreement figures so that validity criteria can be determined and these numbers can also draw conclusions from the results of the analysis.

This Validation and Evaluation Stage (Field trials) is also carried out to obtain direct input in the form of student responses, reactions, and comments on the textbooks that have been compiled, trials, revisions, and re-trials continue to be carried out until consistent P3Kim textbooks are obtained and effective.

The data from field trials during the Validation and Evaluation Stage were analyzed and then revised to obtain the final draft of the textbook that had been developed.

4. Final Product Stage

This stage will produce the final product in the form of P3KIM textbooks that have been developed which have been revised based on the criticisms and suggestions from this stage. validation and evaluation. The final product is ready to be produced and used as P3Kim textbooks, especially Instructional Design materials. To see how much the increase in student learning outcomes taught using this textbook has been developed, the normalized gain test (N-Gain) is used, student learning outcomes after being given treatment.

The normalized gain score can be calculated using the following formula:

$$N\text{-Gain} = \frac{(\text{Skor Posttesague pr dest pres short} / \text{Skor maksimal} - \text{Skor Pre fix})}{100}$$

To see the level of effectiveness of the developed textbooks

The results of the n-gain calculation are then interpreted as follows:

Classification table of the effectiveness of textbooks.

Percentage N-Gain	Classification
100 - 71%	Tall
70 – 31 %	Currently
30 – 1%	Low

(Hake, 1999)

Based on the data above, if the developed textbook can improve student learning outcomes by $\geq 1\%$, then the textbook is said to be effective.

Thus it can be concluded that there are 3 data collection tools in this research, namely:

- 1) Observation is a process of observing and recording systematically, logically, objectively and rationally. Observations were made when the P3Kim course textbook was prepared until the draft book was used in lectures.
- 2) Questionnaires, questionnaires are given to students to find out students' opinions or responses to the books being developed. Questionnaires were given to students to fill in after students took part in the P3Kim book draft trial activities that were developed.
- 3) The tests carried out in this study were a number of questions or exercises that were asked to students after attending P3Kim lectures using the draft textbooks developed.

How to interpret and draw research conclusions

Drawing conclusions on the results of analysis/interpretation of data and evaluation of activities that include searching for meaning and providing explanations from the data that has been obtained. Drawing conclusions is carried out in stages, the first is to draw temporary conclusions, but with increasing data it is necessary to verify the data, namely by reviewing existing data. Second, draw final conclusions after the first activity is finished. Conclusions are drawn by conceptually comparing the suitability of the respondent's statement with the meaning contained in the researcher's problem.

The results of the individual trials of 3 students with high, medium, and low abilities obtained 80.2% in the very good category, while the results of the small group trials with 12 students obtained 79.2% in the good category and 80.5% in the test try a large group with 25 students in the very good category. While further tests in the field used the gain test to improve learning outcomes, the results showed an increase in student learning outcomes by 71% (high) with the use of developed textbooks, as shown in table 2 below:

3. Result And Discussion

The results of this development research are textbooks for the P3KIM course which have been developed and designed in the format or form of printed teaching materials in the form of printed books with A4 size (21×29.7 cm) totaling 196 pages. As follows :

Picture Teaching Book

Furthermore, the results obtained during the research are described as follows:

Prior to the one-to-one validation (individual test), the development materials were reviewed or tested by material experts, design experts and media experts. This test aims to get input about the suitability and correctness of the learning material arranged based on P3KIM lecture concept for the topic of Instructional Design. Material experts, design experts/media experts are given print outs of development textbooks the concept of the P3KIM course, for the topic of Instructional Design and the assessment content form to review the material being developed. Following are the results of data collection and analysis in the Preliminary Test:

1. Material expert test results

Based on the assessment of learning material experts, it can be seen that development of textbooks for the P3Kim course in the concept of Instructional Design, as a whole is rated very good at 82.4 for content feasibility (formulation of objectives, giving examples and tests), is rated Good for clarity of material and design, and is given a very good score for language feasibility and feasibility graphics on the concept of Instructional Design textbooks P3Kim.

The content and sequence of the material based on the expert's assessment of the material is considered very good, Likewise for the examples presented. Assessment for evaluation variables which was done very well, the material expert gave a good assessment of the indicator cognitive aspect. Likewise for the suitability of the content is given a good value while language and graphics get very good marks.

As for the material experts' input on the topic of Instructional Design for the P3Kim textbook that was developed, it was intended to increase the examples of questions and relate them to everyday life. And this input has been revised in the final improvement of the textbook product. Unimed students have different characteristics from other tertiary education students, where Unimed produces teachers and makes its students professional teachers, therefore the concept of Instructional Design is very important. In order to maximize the competence of each subject matter (concept) in the P3Kim textbook, examples and applications are made more concrete and more numerous.

Fitriyah, et al (2022) developed teaching materials in the form of printed books on redox material, and the results after validation tests were obtained in full the percentage of material aspects is above 92.5% so that the average percentage is high with a very decent category. where teaching materials are reviewed from the appearance of media including very decent category 94.39%. The readability test for 30 students obtained an average presentation of 91.6% which means that the students are very good and the textbooks are easy to read.

Research by Ihsan, M. S., Ramdani, A., & Hadisaputra, S. (2019) is a development research that produces and tests a products to improve critical thinking skills. The developed media contains material with microscopic and microscopic characteristics abstract. After validation with the results, the average percentage of media eligibility is 84.6%, including very feasible, the average feasibility of the conceptual understanding instrument is 84%, including very feasible, the average percentage of eligibility for critical thinking instruments is 79.1% with feasible criteria, so that the media and critical thinking ability instruments can be implemented in learning. Furthermore, it was found that there was an increase in the results of the pretest and posttest of critical thinking skills, namely 55.7 in the less critical category to 80.3 in the very critical category. So it can be concluded that the media developed is feasible, practical and effective and able to improve students' critical thinking skills in chemistry learning.

2. Test Results by Design and Media Experts

The results of the design expert's validation show that the development material is from the design side considered very good for the formulation of learning objectives. For variables the content of the material, the design experts also rated it very well, as well as the sequence of the materials. As for the questions, the presentation of the material received very good marks, Likewise, the language used in explaining the concept teaching material is very good, but gets good marks for the clarity of the examples. The example is considered to be even better by relating it to the characteristics of students and their campus life. This can add insight to students, as well as in supporting student independence to increase student motivation in studying P3Kim courses. Likewise with the clarity of graphics, it gets good marks, and it is suggested that it should be even better in picture illustrations, color graphics on faces and special topics or what are considered key concepts. Over all the results of the Material Expert Validation Test and the Design/Media Expert Validation Test can be seen in the following table:

Textbook Validation Results developed by course experts and design experts.

No	Component evaluation	Evaluator		Average
		Material Expert	Design Expert	
1	Content Eligibility	82.4	81.2	81,2%
2	Eligibility of Clarity	80.5	78.5	79,5%
3	Language Eligibility	89.6	89.0	89,3%
4	Graphic Feasibility	82.0	80.0	80,0%
	Average			82.5

Juniati and Budayasa (2017) conducted research related to the feasibility of developing textbooks. The results showed that the teaching materials produced met valid, practical and effective criteria but had not been tested in the field. Prabowo et al. (2016), shows that the teaching materials developed are feasible and effective in supporting learning activities. Pradilasari, et al (2018) researched the development of media as teaching materials, the results of his research found that media was categorized as very suitable for use as teaching materials and can motivate students in learning with an average score of a motivational questionnaire of 86.46% very good category.

The completeness of student learning outcomes using the developed teaching materials reached 77.02% in the high category. Dewi, et al (2022) obtained research on the development of media as teaching materials obtained an ideal percentage of material validation of 96.428% and included in the very good category and design validation obtained an ideal percentage of 84.375% and categorized very well. In addition, according to student responses, products that developed to get a percentage of 95%, and teaching material products can already be used in learning.

Meanwhile, Andriani, et al (2019) have succeeded in developing a product in the form of a contextual-based module with the ADDIE model design as indicated by the development results obtained an average percentage of material expert validators 88.8%, product design expert validators 95%, practitioner validators 92%, and testing try limited students 85.28%. This shows that the developed module is very feasible to proceed to the effectiveness test stage. Thus it can be concluded that contextually based modules are declared feasible with very good quality. Waluyo and Wahyuni, (2021) obtained the results of research on the development of teaching materials with a readability test of 86.88%, which means that students can easily understand the textbooks that have been developed. Putri, Y.D., Elvia, R., and Amir, H. (2021), researched teaching materials in the form of Android-based media for Increasing Student Learning Motivation and concluding with the media Android-based chemistry learning using an Adobe Flash based program assessment from the media validator, material validator, and question validator obtained validation results by media experts 4.45; material experts 4.63; and expert questions 4.6 are in the range of values included in the "very decent" classification. Its effectiveness also shows that the acquisition of a Ngain score of 0.65 is included in the "high" classification.

3. Individual Trial Results

Individual tests were carried out on three students of the chemistry education study program who took the P3Kim course. The three students have different abilities. One student with high ability, one student with medium ability, and one student with low ability

low ability. In general, the three students said they were good almost on all variables, only in terms of interaction and still color composition considered not good, but the cover design and text readability are very good, thus also the clarity of the feedback is very good. Based on the results of individual student tests (one to one evaluation) on the development of P3Kim textbooks/course materials, it can be concluded that the development of teaching materials was in Very Good criteria, with a percentage of 80.2%. Thus the development of P3Kim course textbooks on the topic of Instructional Design is good.

4. Small Group Trial Results

Then the researcher (developer) gave the textbooks that had been developed and questionnaires for small group trials to 12 students majoring in chemistry education who were attending P3Kim lectures in parallel research classes. The results of this questionnaire are student assessments of the development of P3Kim textbooks on the topic of Instructional Design. The results obtained in the Good criteria are 79.2%. Thus the developed P3Kim textbook can already be tested in large classes.

5. Large Group Trial Results (Large Class)

After being revised according to the suggestions and findings of the Validator and students, a large group tryout was carried out, consisting of 25 students. From the results of this trial obtained in Very Good Criteria (80.5%). Thus the developed P3Kim textbook can already be implemented in the field.

6. Advanced Test Results, implementation of textbooks that have been developed

While further tests in the field are to see the increase in student learning outcomes taught using textbooks that have been developed (products from preliminary research), a gain test is carried out.

This test was carried out in one class of 2018 students who were taking the P3Kim course as many as 30 students. Gain test results show an increase in student learning outcomes by 71% (high) with the use of developed textbooks, as shown in the following table:

Table. Static Descriptive Student Learning Outcomes and increased learning outcomes

There is an increase in student learning outcomes using textbooks that have been developed, supported by several studies, including: Lubis, et al (2019), concluded that the teaching materials developed are feasible and effective in improving student learning outcomes. Sari, et al (2019) concluded that the teaching materials developed can be used as learning resources that help students learn independently. Listia, et al (2022) through research on the development of teaching materials in the form of CTL-based modules, an average validity value of 0.89 was obtained in the valid category and in terms of practicality by the teacher, a result of 88.52% was obtained in the very practical category. While in terms of practicality by students obtained results of 85.10% in the practical category. The assessment of the effectiveness of the module developed averaged an increase in students' N-Gain by 0.7 with a high effectiveness category. So the Contextual Teaching and Learning-based acid-base module that was developed was valid, practical, and effective in improving student learning outcomes and can help students understand the concepts contained in acid and base chemistry

7. Results of data analysis of Student Response Questionnaire

From the questionnaire distributed to students taking P3Kim courses in the Chemistry Education study program, there were 30 students. can be seen positive and negative responses to the teaching materials developed. Positive responses were known from student statements that stated they were happy, new and interested in the components of the textbooks being developed and negative responses in the form of student statements stating they were not happy, not new and not interested in the textbooks that had been developed. Research by Nita Sunarya et al (2018) regarding textbooks in the form of modules, it was found that electronic modules can be used as student learning resources and teaching materials for teachers both in the classroom and outside the classroom. Furthermore, positive responses were found on the use of the developed module.

The results of data analysis showed that students' responses to all aspects of the teaching materials developed were positively responded by 82%.

This shows that the teaching materials developed can already be used in P3Kim lectures in the chemistry education department, especially Unimed. Several studies that support these findings include Rahimah Ismail, et al (2021), whose research found that the teaching materials developed gave positive and very affective responses to use in learning. got an average percentage of 87.88% with very good criteria in the display aspect. This is because the developed textbooks can visualize material clearly and interestingly through the support of image explanations that help students interact to increase student understanding as a source of supporting teaching materials in the learning process. So students give a positive response to learning. Meanwhile, Siahaan, et al (2020) found that teaching materials developed using the guided inquiry model were feasible to use and gave a positive response to chemistry learning. Pradilasari, et al(2018)

researched the development of media as teaching materials, the results of his research found that media was categorized as very suitable for use as teaching materials and can motivate students in learning with an average score of a motivational questionnaire of 86.46% very good category. The completeness of student learning outcomes using the developed teaching materials reached 77.02% in the high category. Dewi, et al (2022) from research on the development of media as teaching materials also found that students' responses to the products developed obtained a percentage of 95%, and teaching material products can already be used in learning. Some of the research above shows that in general the development of teaching materials both as books and media provides a positive response to learning.

4. Conclusion

Based on the process of developing the P3KIM textbook, it was found that the P3KIM textbook had met the eligibility of the BNSP. Of all the aspects assessed by the validator, this research instrument was said to be feasible and very feasible to use, and received a very feasible category on the criteria (82.5%). Based on the validator's assessment and also proven by field tests and student responses reaching 82% responded positively by students. Thus, the P3Kim course textbook developed can be used in lectures. The results of the follow-up test using the Gain test found that the use of the developed textbooks could increase student learning outcomes by 71%, which was in the high category using the developed P3Kim textbooks.

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