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DEVELOPMENT OF LEARNING MEDIA POWERPOINT-iSpring INTEGRATED WITH PROMPTING QUESTIONS ON STOICHIOMETRY TOPICS

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Abstract: PowerPoint-iSpring is one of the technology-based media needed in learning. Giving guiding questions is expected so students can find concepts independently through exercises and questions in the media. This study aims to develop PowerPoint-iSpring learning media integrated with prompting questions on stoichiometry class X SMA. The development model used was the Plomp model, which was carried out until the stage of prototype III formation due to time and research staff limitations. Researchers self-evaluate media that has been designed to determine the completeness of the components of a media. Then an assessment was carried out by experts consisting of four chemistry lecturers at FMIPA UNP and two chemistry teachers at SMAN 10 Padang. Three students of SMAN 10 Padang carried out the individual evaluation stage (one-to-one evaluation) with different abilities. The research instruments used were validity questionnaire sheets and interview sheets. The validity questionnaire was analyzed using the Aiken V formula with a category ≥0.79 valid and if <0.79 is invalid. The research results found that the average value of Aiken V PowerPoint-iSpring learning media on stoichiometry material for content validity was 0.88, and construct validity was 0.87. Technical quality validity was 0.93, with each validity being categorized as valid. The results of the one-to-one evaluation obtained from 3 students were good. The suggestion is that it would be better if these media were small so they could be installed on a device without requiring much space. The images that covered the writing explaining the material would be better if the layout was improved.

Keywords: *PowerPoint-iSpring, Prompting Question, Stoichiometry, Plomp model, Validity.*

INTRODUCTION

Science and technology, which continues to experience development according to the demands, also trigger the education system to apply technology in learning as a new form of innovation in schools [1]. Technological developments must be distinct from the types of teaching materials and learning media used as a tool for teachers to explain learning materials [2]. Teachers must have skills in making learning media, especially learning media supported by technological systems [3]. The learning media used must be based on the applicable curriculum and pay attention to the criteria of the media. The criteria for good learning media contain four components: relevance, convenience, attractiveness, and usefulness [1]. Good learning media does not only have meaning between text and graphics but is also equipped with sound, animation, video, and interaction [4]. PowerPoint is one of the learning media that can be used in the learning process [5].

PowerPoint is a computer program under Microsoft Office that runs a presentation application program [6]. The advantages of PowerPoint as a learning media are the availability of all media components such as text, images, audio, video, animation, and graphics which are combined into one complex presentation that allows users to navigate, interact, create and communicate. [7. PowerPoint learning media can be more enjoyable with the iSpring QuizMaker Software [8].

iSpring is software that can convert presentation files into flash formats connected to PowerPoint. iSpring has the advantage of providing various questions, web-based quiz services, automatic final scoring by the system, and audio and video records. [9]. PowerPoint learning media can be applied in learning activities, including chemistry. Chemistry is an abstract science because it is a necessary concept mastered in stages, starting from simple concepts to more complex concepts [10]. So it takes a correct understanding of the concept not to be found again that chemistry is difficult to understand [11]. One of the chemistry materials studied in class X even semester is stoichiometry. Stoichiometry contains concepts, laws, and basic formulas for chemical calculations. So many practice questions are needed to master the concepts well and be proficient in stoichiometry topic calculations. Stoichiometry contains basic chemical concepts, laws, and calculation formulas, so it takes a lot of practice questions to master the concepts well and be proficient in calculations [12].

Stoichiometry material is considered problematic by some students [10]. Stoichiometry material will be easy to understand, and students can find the concepts contained in the chapter by asking prompting questions in the learning process [13]. It is faced with producing questions students will be challenged to respond. Responses given by

students can be obtained by constructing or assimilating the concepts encountered before. So that material that was previously considered difficult and frightening can be easily understood by students. This research aimed to produce a PowerPoint-iSpring learning media integrated with promoting questions on stoichiometry material for class X SMA.

RESEARCH METHOD

This type of research is educational design research or Educational Design Research. Namely, research that aims to address complex problems in educational practice. Educational design research is a systematic study that designs, develops, and evaluates educational interventions, such as programs, strategies, instructional materials, products, and systems, as solutions to the problem, which also aims to advance knowledge about the characteristics of interventions and processes for designing and developing them [14].

Preliminary research consisted of needs and context analysis, literature review, and conceptual framework development. The development phase produces prototypes I, II, III, and IV. To produce prototype I, in the form of PowerPoint-iSpring learning media integrated with prompting questions on stoichiometry material for class X SMA, a media design was carried out based on preliminary research results. A formative evaluation was carried out on prototype I that had been produced to produce prototype II. Formative assessment at this stage is in the form of self-evaluation, which is a re-examination of the important components in the media. Four validators carried out a validation test or expert review to make prototype III. 3 class XI students of SMAN 10 Padang carried out an individual or one-to-one evaluation. This stage was carried out to obtain the validity value of the media being developed as well as suggestions and input given by students to improve the media. On prototype IV, a formative evaluation was carried out in the form of a small group evaluation of prototype III that had been produced. The assessment stage aims to measure the practicality and effectiveness of iSpring learning media on stoichiometry material. Due to limited time, circumstances, and research staff, this research was only carried out up to prototype III, which was limited to validity tests, expert reviews, individual assessments, or one-to-one evaluations.

This research was conducted on the FMIPA UNP campus and at SMAN 10 Padang in 2022. The subjects of this research were chemistry lecturers at UNP as validators, chemistry teachers at SMAN 10 Padang as validators, and students at SMAN 10 Padang as individual assessors. The object of research is PowerPoint-iSpring learning media on stoichiometry class X SMA. The data collection instruments used were interview sheets and questionnaires. Interview sheets and questionnaires were used at the preliminary research stage and the individual student assessment stage or one-to-one evaluation. The validation sheet assesses the content, construct, and media expert or technical quality of the media being developed. Data analysis techniques use the Aiken V formula, which can be seen below.

$$V = \frac{\sum s}{n(c-1)}$$

Description:
s = r - lo
r = the value provided by the validator
lo = lowest score in the scoring category
c = number of the rating category
n = number of validators

This study used six validators. So based on the number of validators, the minimum V value is 0,79 [15]. The category of validity levels can be seen in table 1 below.

Table 1. Validity category

Aiken V score	Validity
V ≤ 0.79	Invalid
V ≥ 0.79	Valid

RESULT AND DISCUSSION

The research results of each stage are described as follows.

Preliminary research stage

This preliminary research stage aims to identify problems in the field and get an overview of the characteristics that will be developed to solve the problems obtained [16].

Needs analysis

A needs analysis is carried out to determine everything in the school, whether the school is experiencing problems in learning activities, and what is currently needed by the school to realize good teaching and learning activities. Context analysis is related to whether the proposed solutions follow the school's situation, both in supporting facilities and infrastructure, available resources, required costs, and benefits of using media in terms of time.

This analysis aims to find out the basic problem or description of the situation and conditions encountered during the teaching and learning process in chemistry subjects, especially in stoichiometry material. This analysis begins with an analysis of the curriculum used by the school. The data obtained that the curriculum used is the 2013 curriculum. Based on the curriculum, basic competence (KD) can be analyzed in the

stoichiometry material contained in KD 3.10. From the basic competencies analyzed, competency achievement indicators (GPA) can be formulated to determine the competencies students must achieve. Needs and context analysis is also carried out by analyzing the concepts studied in KD 3.10. A concept analysis table is obtained based on the concept analysis that has been done. The results of the concept analysis are also used to develop concept maps.

Then the data analyzed were obtained from interviews with chemistry teachers. The data obtained show that teachers have used the 2013 curriculum with teaching materials such as textbooks, worksheets, learning videos, and ordinary PowerPoint, which still need to contain prompting questions. The learning media has yet to make students active in learning and cannot make students find concepts independently, especially in stoichiometry material. Completing the questionnaire by class XI students showed that students liked learning with PowerPoint media compared to other teaching materials. It happens because PowerPoint is more attractive with pictures, videos, animations, and quizzes and can be used anywhere and anytime.

Context analysis

Context analysis begins with an analysis of the curriculum used by the school so that data is obtained that the curriculum used is the 2013 curriculum. Based on the curriculum, basic competence (KD) can be analyzed in stoichiometric material. From the basic competencies analyzed, competency achievement indicators (GPA) can be formulated to determine the competencies students must achieve. Context analysis is also carried out by analyzing the concepts studied in KD 3.10. A concept analysis table is obtained based on the concept analysis that has been done. The results of the concept analysis are also used to develop concept maps. It follows the demands of the 2013 curriculum, where students are actively involved in the learning process, known as the student center. Therefore, with PowerPoint learning media integrated with prompting questions, students can find their concepts during learning. Prompting questions presented in learning media can lead students to answer questions correctly. Learning media must also be interactive and fun for students in learning and not dull.

Literature review

A literature review was conducted to determine the impact and application of PowerPoint-iSpring in learning. A literature study is carried out by looking for sources and references that have a relationship and connection with the research to be carried out, namely, developing a learning media. Based on a literature study conducted on previous researchers' research results, it can be proven that PowerPoint-iSpring learning media is valid, practical, and effective as learning media used in schools. A literature study is carried out by looking for sources and references that have a relationship and connection with the research to be carried out, namely, developing a learning media. The title Validity of Integrated Power-Point-iSpring Learning Media Prompting Questions on Acid-Base Titration material produces a valid media of 0.92 for content validity, 0.92 for construct validity, and 0.99 for media expert validity so that the media can continue with the test practicality and effectiveness [17].

Similarly, the study's results show that prompting questions can increase student answering activities both on general concepts and on new concepts [18]. Prompting questions can also improve the quality of student answers. Prompting questions can be accompanied by providing visual media, time to think about answers, and awards to students who are willing to answer. It am also supported by research conducted by [19] with the research title Development of PowerPoint-iSpring Learning Media on Stoichiometry Material with an Emphasis on Three Levels of Chemical Representation to Improve Students' Higher Level Thinking Skills with the results of the research that PowerPoint-iSpring learning media has an effect on students' higher order thinking skills, as evidenced by an increase in Pretest to Posttest scores. The development of learning media on stoichiometry is also proven by other research conducted by [20] with the title Development of Sway-Based Interactive Chemistry Learning Media to Improve Student Knowledge and Self-Efficacy Learning Outcomes in Stoichiometry Material in Class X MIPA SMA Negeri 4 Banjarmasin. The research results were the development of Sway-based interactive chemistry learning media to improve students' knowledge and self-efficacy learning outcomes in stoichiometry material in class X MIPA SMA Negeri 4 Banjarmasin.

The results of the literature analysis made this research feasible. It is because this research uses PowerPoint-iSpring media, prompting questions, and stoichiometry material. However, there are differences in the type of learning material and the level of education.

Development of Conceptual Framework

The conceptual framework refers to all the concepts underlying the product developed by connecting the concepts related to product development. The problems often found when learning stoichiometry material are students needing help understanding concepts, low motivation, and students getting bored quickly in learning. These problems are overcome by giving

prompting questions through PowerPoint-iSpring learning media.

PowerPoint-iSpring can load videos, animations, images, text, and quizzes with various questions. There is an immediate response after students answer the questions on the slide in the form of a discussion of the selected answer, such as if the answer chosen is correct, they can continue. If the answer is correct to the next question, there will be a brief explanation for why the answer needs to be corrected. The results of quizzes taken by students can be known directly by the teacher via the email address entered when the examination has not started so that the teacher does not need to check student quiz results manually [21]. iSpring also provides a time duration for each question when working on a quiz, so students are required to be able to answer these questions correctly before time runs out. The time duration of each question will also stimulate students' thinking process. In addition, using iSpring PowerPoint learning media will be even better because it can minimize the number of slides. It is the basis for developing integrated PowerPoint-iSpring Prompting Questions on stoichiometry material for class X SMA.

Development or Prototyping Stage

At this stage, a formative evaluation is carried out for each prototype stage to obtain high-quality and complete interventions (products). The results of the stages that have been carried out are as follows.

Prototype I

In prototype stage I, media was made by designing and designing media using Microsoft PowerPoint 2010 and the iSpring suite ten application and using textbooks as a reference for making media. Textbooks were selected as learning resources used by students to understand stoichiometry material. The researcher also selects questions that can lead students to find material concepts, prepares pictures, animations, and videos that follow the GPA of the material, and prepares questions with the iSpring quiz maker. The media has been completed and published in html form, which can then be opened on laptops and computers and converted into Android applications that can be opened on cell phones and tablets.

This stage results are PowerPoint-iSpring learning media integrated with prompting questions on stoichiometry material for class X SMA, which has yet to be tested for validity. This learning media is designed and selected based on an analysis of the needs and context of the problems.

At the design and design stage, PowerPoint-iSpring learning media starts with making a storyboard. Components contained in the storyboard include covers, home pages, profiles, instructions for use, competencies (basic competencies, indicators of learning achievement, and learning objectives), learning materials, and quizzes which can be seen in Figure 1.

To produce prototype I, the material design was also carried out using various questions so that students would stay energized in learning and would be interested in using PowerPoint-iSpring learning media as a learning resource which can be seen in Figure 2.

Prototype II

After prototype I was produced, the next stage was a one-to-one evaluation using a checklist system for the important components that must be contained in the PowerPoint-iSpring media. Based on the self-evaluation results, all media components are included in the integrated PowerPoint-iSpring prompting questions on stoichiometry for class X SMA. However, the media need to be made to improve its appearance and completeness of the media. Improvements were made, such as beautifying the cover's appearance, fixing misspelled words, fixing the background color, changing images or videos that match the material, and other improvements to produce prototype II.

Prototype III

At prototype stage III, an expert review and one-to-one evaluation were carried out, which produced a PowerPoint-iSpring learning media integrated with prompting questions on stoichiometry material for class X SMA, which was complete and valid. The explanation from the expert review and one-to-one evaluation is as follows.

At the expert review stage, a validity test is carried out, namely, giving values and suggestions for products that have been developed. The assessment was carried out by lecturers majoring in chemistry at FMIPA UNP and chemistry teachers at SMAN 10 Padang. This assessment uses a content validation questionnaire, and constructs and media experts use a Likert scale. The validity test was carried out to obtain the validity value of integrated PowerPoint-iSpring learning media prompting questions on stoichiometry material. The validity of the content, constructs, and media experts are described as follows. Content validity is based on product relevance based on science, prompting questions, and three levels of chemical representation in the discussion of stoichiometry which can be seen in Figure 3.

The results of content validity data processing using the Aiken V formula were obtained at 0.88 with the valid category. The data processing results show the suitability and correctness relationship of each material content on the developed PowerPint-iSpring media. Construct

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validity refers to and relates to the consistency of the product components. It can be seen in Figure 4. Namely, molecular images can be observed. Clearly, the writing can be understood easily, and the background helps clarify the learning material.

Figure 1. Media component display

Figure 2. Media component display

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Figure 3. Display of course topics

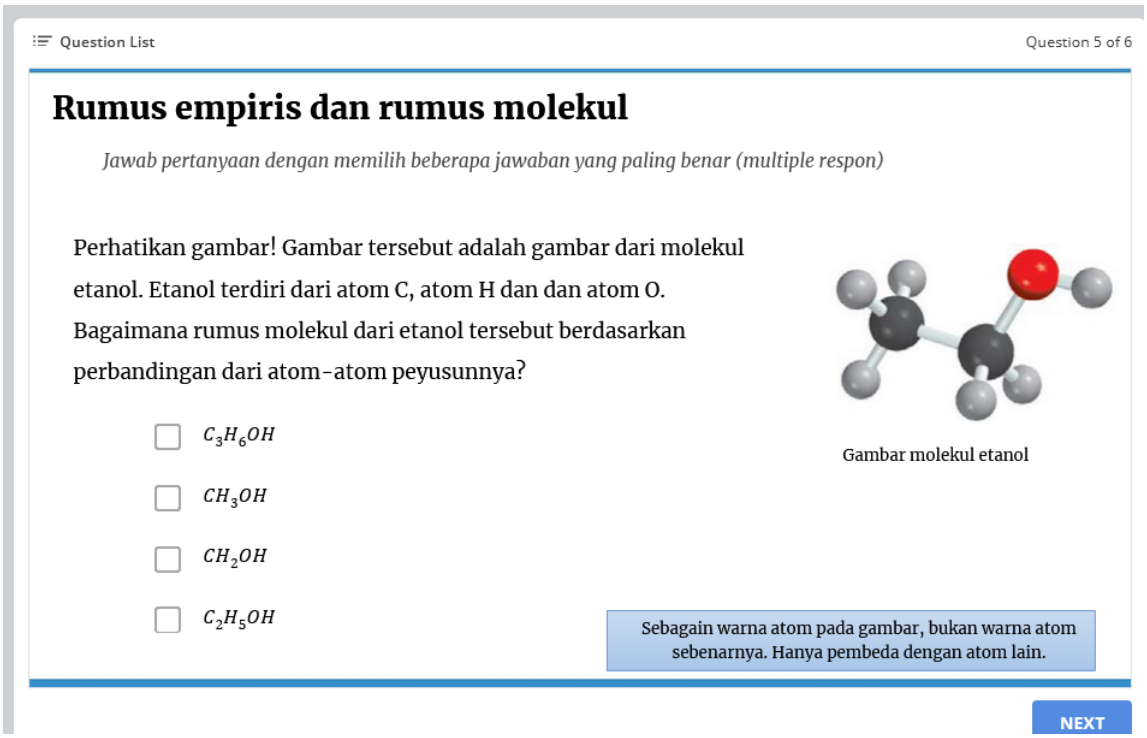

Figure 4. Display of course topics

The results of construct validity data processing using the Aiken V formula were obtained at 0.87, which was categorized as valid. Lecturers and chemistry teachers also validate media experts because the media designed and developed does not use sophisticated information technology (IT) systems. Such as creating websites, building networks, or making certain software or applications so that chemistry lecturers and teachers are eligible to become validators. The form of web-based media display can be seen in Figure 5. Namely, student answers can be sent automatically to the teacher's email address when finished working on the practice questions contained in the media.

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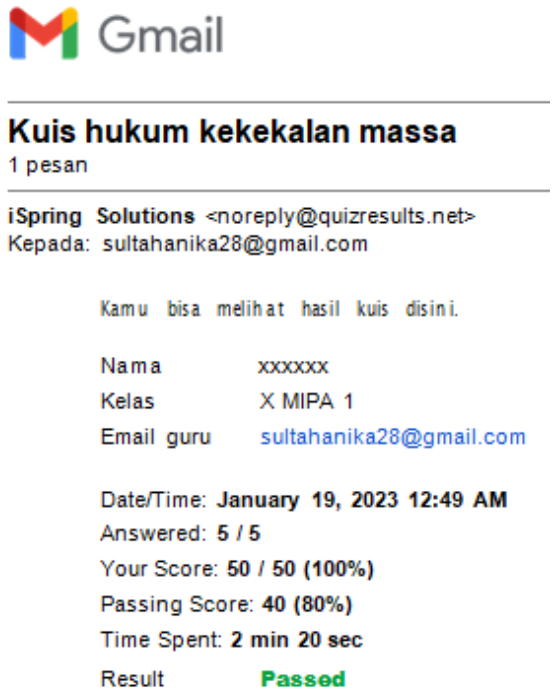
Gmail

Kuis hukum kekekalan massa
1 pesan

iSpring Solutions <noreply@quizresults.net>
Kepada: sultahanika28@gmail.com

Kamu bisa melihat hasil kuis disini.

Nama xxxxxx
Kelas X MIPA 1
Email guru sultahanika28@gmail.com

Date/Time: **January 19, 2023 12:49 AM**
Answered: **5 / 5**
Your Score: **50 / 50 (100%)**
Passing Score: **40 (80%)**
Time Spent: **2 min 20 sec**
Result **Passed**

Figure 5. Display of student answers in the teacher's email

The results of media expert validation data processing are based on the Aiken V formula of 0.93 with a valid category.

Table 2. PowerPoint-iSpring media validation results

Validity result	V	Category
Content validity	0.88	Valid
Construct validity	0.87	Valid
Media expert or Technical quality	0.93	Valid
Average	0.89	Valid

The value of the validity of the content, constructs, and media experts or technical quality that have been obtained in the valid category, this media is continued with a one-on-one test on three students at SMAN 10 Padang. The responses given by students to the media that have been developed are as expected. All media components are well organized, and the language is easy to understand. The background color and font letters used do not interfere with the clarity of the subject matter, and the animation in the form of pictures and videos are clear and easy to understand as well as prompting questions that have guided students in discovering concepts in stoichiometry material.

CONCLUSION

Based on the research that has been done, it can be concluded that PowerPoint-iSpring learning media has been developed integrated with prompting questions on stoichiometry material using the Plomp development model. The learning media is developed as a valid category of 0.89 based on the data analysis validation of material experts, and media experts can be used in learning chemistry.

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