Development of Articulate Storyline 3 Integrated Project Based Learning on Chemistry Class XI SMA/MA Even Semester

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Abstract. This research aims to develop media articulate storyline 3 which is integrated with project-based learning in chemistry subject class XI even semester which is valid. This study uses the ADDIE model. The results of the validator review research on the feasibility aspect of the average content indicated the valid category (92%), language feasibility indicated the valid category (92%), the presentation feasibility aspect indicated the valid category (89%), and the graphical feasibility aspect was a valid category (96%). The results of the review of the three teachers showed that the content feasibility aspect and the language feasibility aspect respectively were 91% and 94% in the very good category. Thus the articulate storyline 3 integrated project-based learning is said to be valid and can be implemented for the learning process.

Keywords: Articulate Storyline 3, Chemistry, PjBL

1 Introduction

In an era of education that continues to develop, the use of technology and innovative learning approaches is very important [1]. In a changing global context, 21st century skills such as creative thinking, adaptability, effective communication, and teamwork are becoming increasingly important. Therefore, the use of technology in education must embrace this learning goal.

Chemistry is one of the sciences. Chemistry is seen as difficult because it is difficult for students to understand abstract concepts that lead them to different ideas [2]. The different perspectives of students are very important to note because this hinders students' ability to obtain information and relate it to the knowledge they are learning, thus inhibiting the formation of new knowledge [3].

Media learning has a positive effect on student learning outcomes. In addition, learning media can increase student interest in learning and learning motivation. Media can make the learning process more interesting and clear [4]. One of the technological media that has had a positive impact on education is the development of e-learning software, such as Articulate Storyline 3. Articulate Storyline 3 provides the ability to develop learning content that can be adapted to different learning styles so that each student has the opportunity to learn independently effective [5]. Educators and students are increasingly accessing information and learning through digital platforms. Therefore, the development of Articulate Storyline 3 which is integrated with the Project-Based Learning (PjBL) approach to Chemistry material for class XI SMA/MA even semester is an important step in improving the quality of learning [6].

Chemistry material for even semester SMA/MA class XI involves concepts that require a deep understanding, such as acids and bases, hydrolysis of salts, buffer solutions, and so on. The use of Articulate Storyline 3 as an interactive learning tool allows students to understand these concepts through visual simulations, animations, and more dynamic interactions [7]. In addition, integration with the PjBL approach will provide a stronger real-world context in learning, increase student motivation, and develop critical thinking skills and collaboration [8]. Application of learning technologies such as Articulate Storyline 3 in the context of the PjBL approach will provide a more in-depth and meaningful learning experience. Students will not only understand theoretical chemistry concepts but also be able to apply them in real-life situations [9]. In addition, the use of this technology also facilitates the collection of data on students' learning progress, enabling teachers to provide more personalized and effective feedback. In the end, the development of the Articulate Storyline 3 module integrated with the PjBL approach to Chemistry for class XI SMA/MA even semester will create a learning environment that is innovative, inclusive, and relevant to the needs of modern education. This step will not only enhance students' understanding of the material but will also help them develop valuable skills necessary for success in their future personal and professional lives [10].

The integration between learning technology and the PjBL model in the development of Articulate Storyline 3 will create a more holistic, challenging, and relevant learning environment [11]. It is hoped that this combination will improve students' understanding of Chemistry concepts as well as develop the skills needed to face real-world challenges after they graduate from school. Therefore, the researcher developed an integrated PjBL Articulate Storyline 3 multimedia on even semester chemistry material.

2 Method

This type of research is Research and Development (R&D). The subjects of this study were lecturers at Medan State University and Malikussaleh University who are competent in their fields as well as teachers in three schools. R&D research is a research method used to produce certain products and test the effectiveness of these products [12]. The product developed is interactive multimedia using Articulate Storyline 3 software. The development model used is ADDIE (Analysis, Design, Development, Implementation, Evaluation). Of the five stages of the ADDIE model, only 3 stages were adapted in this study, namely analysis, design, and development. A more complete procedure in this study is presented in Figure 1.
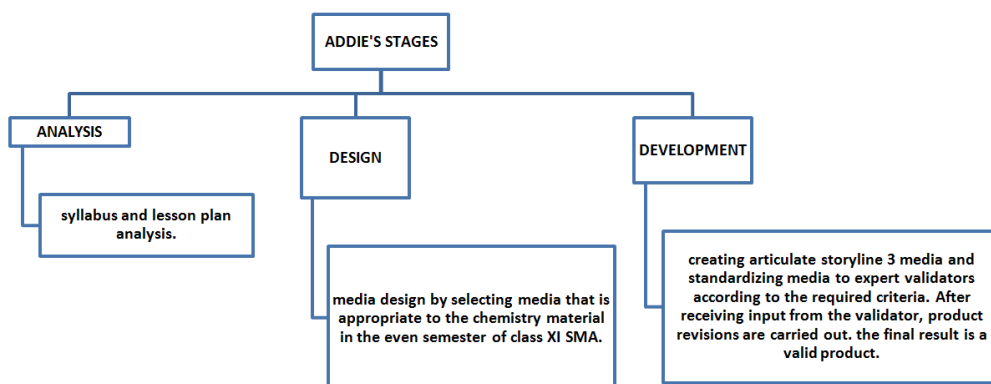
Fig. 1. Research Chart

The data collection instrument used in this study was a validation questionnaire sheet based on eligibility standards according to the National Education Standards Agency (BSNP). Questionnaires were given to three expert lecturers in the field of material and media as well as chemistry teachers. The scale used in the eligibility questionnaire for integrated project-based learning articulated storyline 3 media is a Likert scale with a range of 1-4 where the answers given are Valid, Fairly Valid, Less Valid, and Invalid [13]. The data analysis technique used is a quantitative descriptive analysis technique and a qualitative descriptive analysis technique. The average analysis validity criteria used can be seen in Table 1.

Table 1. Validity Criteria Analysis of Average Values

Average	Validity Criteria
3.26 – 4.00	Valid and does not need revision (very feasible)
2.51 – 3.25	Valid enough and no revision needed (Decent enough)
1.76 – 2.50	Invalid, some of the contents of the media are revised (less feasible)
1.00 – 1.75	Invalid and need total revision (not feasible)

3 Results and Discussion

This type of research is Research and Development (R&D). This development research process uses the ADDIE model which consists of analysis, design, and development.

3.1 Analysis

The first stage in this research is a preliminary analysis which aims to collect the information needed as material for consideration in the development of instructional media. The analysis was obtained from needs analysis, interviews, and media analysis used in the school as a reference in developing PjBL-based Articulate storyline 3 media.

Needs analysis was carried out through needs analysis observation sheets and direct interviews with chemistry teachers at SMA Negeri 18 Medan, information was obtained that the SMA needed PjBL-based Articulate Storyline 3 multimedia because the use of learning media could

help teachers complete the delivery of a lot of chemistry material [14]. However, learning time is limited, and learning chemistry becomes more interesting. In addition, PjBL-based Articulate Storyline 3 media was developed according to the digitalization era so that learning can be done anytime and anywhere.

The interview results showed low student literacy, this was reinforced by students' low interest in reading. This is due to the lack of availability of student textbooks so students lack reading references. Based on the results of the analysis of the three aspects of the assessment, namely content feasibility, language feasibility, and presentation feasibility of the learning media that is often used, namely PowerPoint (PPT). So it can be said that the media is suitable for use but there is a need for innovation in the media because there are still weaknesses, especially the feasibility of the content and the feasibility of presentation so that learning media is more appropriate and easily understood by students.

3.2 Design

After carrying out the analysis stage as the initial stage in collecting initial data. Next, the researcher collected sources or references related to even semester class XI chemistry material and designed the initial media for the PjBL-based articulation 3 storyline. The material to be included in the articulate storyline 3 media based on PjBL by the learning objectives and achievement indicators that have been determined, researchers also collect images, animations, websites, teaching materials, teaching modules, and learning videos that will be used in developing PjBL-based articulate storyline 3 media. After collecting materials and references, the researchers then designed a PjBL-based articulate storyline 3 media design that would be developed. The design is made in the form of a storyboard and storyboard. The following display design can be seen in Figure 2.
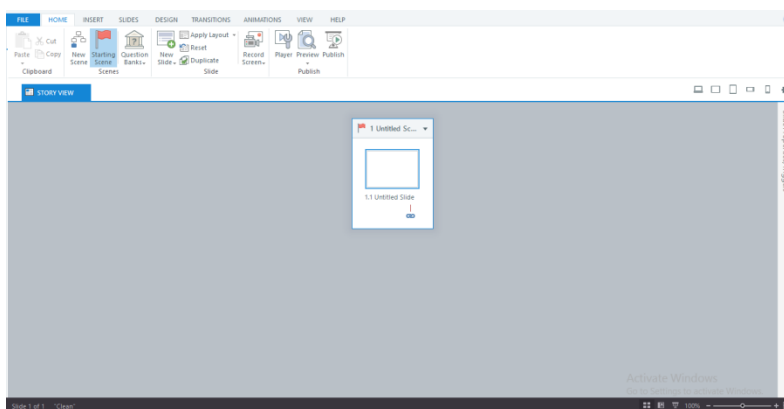

Fig. 2. PjBL-based Articulate Storyline 3 design

Making history aims to make the product developed have a clear path so that it can facilitate the development process. Meanwhile, the storyboard aims to describe the media as a whole which is used as a reference/guide in making media. In addition, PjBL-based articulate

storyline 3 media will be made using attractive colors and appearance. The design that the researchers used in making PjBL-based articulate storyline 3 media was made by themselves using the Canva Pro software so that students could more easily understand the material presented. Researchers designed PjBL-based articulate storyline 3 media based on existing media, the advantages contained in each media would be used and added the necessary aspects so that PjBL-based articulate storyline 3 media would be innovative.

3.3 Development

At the development stage, namely media articulate storyline 3 based on PjBL. The activities carried out are making designs, and questions, compiling material so that it is systematic and by predetermined indicators, making animated videos, and including pre-designed learning videos. After everything is finished, combine all the materials that have been prepared using the help of the articulate storyline 3 software packaged in the form of an android application (app.) so that it becomes an innovative PjBL-based articulate storyline 3 media. In addition, the PjBL-based articulate storyline 3 media design can be seen in Figure 3.

Fig. 3. Design of Articulate Storyline 3 based on PjBL

After the PjBL-based articulate storyline 3 has been completed, the next stage is conducting a feasibility test for PjBL-based articulate storyline 3 to material and media experts and teachers to determine whether the PjBL-based articulate storyline 3 that has been developed is appropriate or not used in chemistry learning class XI even semester and aims to find out one aspect of product development quality, namely the aspect of validity by using a validation questionnaire based on eligibility standards according to the National Education Standards Agency (BSNP). The eligibility criteria for a media are obtained from the average score obtained from the expert validator which is converted according to the feasibility conversion table to determine the eligibility level of the media. The results of the PjBL-based articulate storyline 3 validation can be seen in Figures 4 and 5.
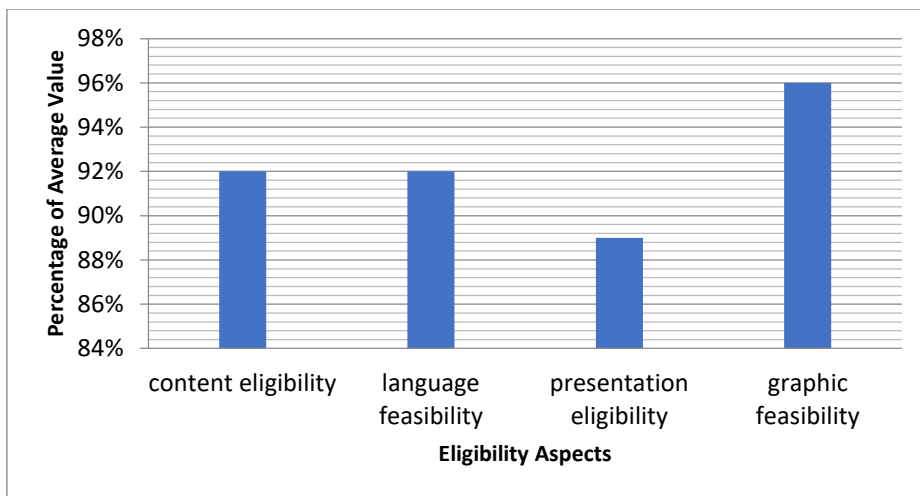
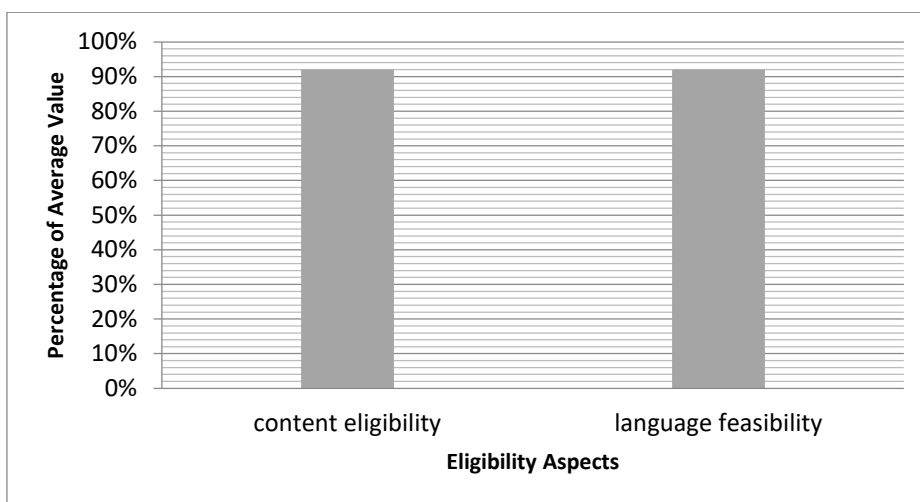**Fig. 4.** Average Feasibility Results by Lecturers

Fig. 5. Average Qualification Results by Teachers

Based on the data that has been obtained, the PjBL-based articulate storyline 3 media that has been developed is suitable for use in chemistry learning. This can be seen in Figure 4 based on the lecturer's opinion which shows the feasibility of content, language, presentation, and graphics obtaining an average of 92%, 92%, 89%, and 96% including the valid category. As well as based on Figure 5 according to the results of the teacher's review the aspects of content and language feasibility respectively obtained scores of 91% and 94%. There are also several suggestions for improvement from the validator for the PjBL-based articulate storyline 3 media that was developed including 1) entering the application profile, 2) making the instructions for use more detailed so that users can easily understand it, 3) entering a minimum of seven references, 4) insert the author's picture in the background, etc. where these

suggestions have been included as revisions to the PjBL-based articulate storyline 3 media product that has been developed.

Articulate storyline 3 based on PjBL can be used as a medium in learning chemistry. Completely designed media with attractive and adequate illustrations will influence the learning atmosphere so that the learning process that occurs in students becomes more optimal and will stimulate students to utilize learning materials as learning materials [15].

4 Conclusion

The results of this study are articulate storyline 3 integrated project-based learning which has been developed based on the design that has been designed, according to a review of three material expert lecturer validators in the aspect of content feasibility the average indicates a valid category (92%), and language feasibility indicates a valid category (92%). While the review results of three media expert lecturer validators on the feasibility aspect of presentation show the valid category (89%), and the graphical feasibility aspect the valid category (96%). As well as the results of the review of the three teachers showing the results on the feasibility aspect of the content and the feasibility aspect of the language respectively were 91% and 94% in the very good category. Thus the articulate storyline 3 integrated project-based learning is said to be valid, practical, and effective and can be implemented for the learning process.

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