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DEVELOPING EDUCATIONAL E-POSTER BASED ON INSTAGRAM FOR THE TOPIC OF CORROSION AFFECTING FACTORS

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Abstract

The development of more sophisticated technology has become a powerful tool for achieving more effective and efficient educational objectives. In this instance, learning media that employ social media has been extensively adopted, and one of the potential alternatives is to utilize social media as learning media. This study aims to develop an e-poster social media Instagram on the material factors that affect corrosion and see the response of Chemical Education students of FKIP USK to the developed media. Using the ADDIE approach, R&D (Research and Development) is the sort of research used. Student requirements surveys, an evaluation of the viability of the e-poster medium, and student response questionnaires were used to gather data. This research was carried out on the campus of the Faculty of Teacher Training and Education, Syiah Kuala University, Department of Chemistry Education, with research subjects being students majoring in Chemistry Education Force 2020 FKIP Syiah Kuala University consists of 3 class units with a total of 61 students consisting of 57 female and four male. The results showed that With an average percentage of 89%, the generated e-poster learning material meets the requirements for "very viable." With an average score of 84%, student reactions to the generated medium met the criterion for "extremely feasible." Based on the study's findings, the e-poster is a viable alternative learning medium.

Keywords: Development; Learning Media; Instagram; E-Poster; Corrosion

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INTRODUCTION

The development of more advanced technology has become a significant tool for achieving more effective and efficient educational goals. Technology can be seen by people in various forms of experiences and conveniences that vary over time [1]. The technical sophistication of the fourth industrial revolution era shows that this progress continues, resulting in convenience for human beings in overcoming the difficulties that arise in human existence, so that various problems can be overcome to the fullest extent possible. In the era of the fourth industrial revolution, technology is used as a learning medium in the field of education, which is one of the main focuses [2]-[4].

According to Azimi et al. (2020) [5], learning media encompasses everything that can convey messages through various channels, stimulate students' feelings, thoughts, and willingness, and encourage the development of a learning process to provide new information to students so that learning objectives can be achieved effectively [6], [7]. The function of media in education is to assist students in learning, facilitate communication between lecturers and students, and encourage the development of new ideas [8]-[11]. Due to the current Covid-19 pandemic, online education is used to replace traditional classroom settings. This is also related to the fact that we are currently living in the era of the fourth industrial revolution, which indicates that technological progress

will continue to evolve with improved performance to facilitate daily human activities. In the current classroom setting, technology is a valuable resource for maintaining a steady flow of learning. Technology in education enables the delivery of two-way teaching programs and encourages student participation [12], [13].

Many professors have adopted technology as a learning medium or as a learning technique that focuses on understanding technology and activities through technology and effectively utilizing technology. The use of social media as a learning medium can be made as an alternative choice to the widespread use of social media-based learning media in this context [14], [15]. Because social media is a current trend, including Instagram, it is chosen. Instagram is a prominent social media application today. Instagram is derived from the word "insta," which means "instant," and "gram," which comes from the term "telegram." Thus, Instagram is characterized as an application for rapid information transmission, namely images [16].

Chemistry education at the Faculty of Education and Teacher Training at Syiah Kuala University requires a conceptual thinking process in one of its courses, including the topic of corrosion, so lecturers must be able to develop diverse media for better learning outcomes. In this course, students are introduced to what corrosion is and the factors that influence

corrosion according to the teaching materials. Therefore, the researcher wants to provide innovation in media development, namely e-posters as additional media in the learning process. Posters are a combination of bold design, bright colors, and intended messages to attract attention. Posters are educational tools for expanding vocabulary. E-posters will be posted on the Insta story feature in the Instagram application. Not only that, the Insta story feature also includes other functions such as a question box, quizzes, and links that make it easy for users to use them as learning media.

METHOD

The type of research used is research and development, commonly known as R&D (Research and Development), with a qualitative approach that focuses on product development using the ADDIE model. According to Aldoobie et al. (2015) [17], this model consists of five stages, including: analysis, design, development, implementation, and evaluation.

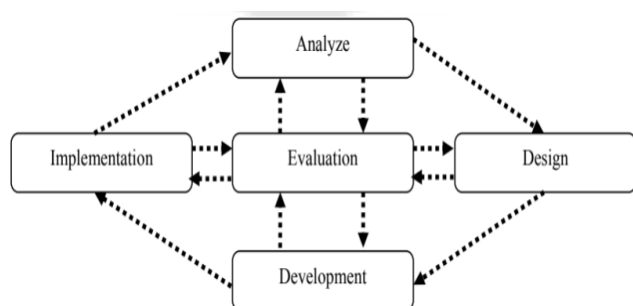


Figure 1. Stages of the ADDIE Model

The research subjects used in this study were students majoring in Chemistry Education, Batch 2020, at the Faculty of Education and Teacher Training, Syiah Kuala University. The subjects consisted of three class units, with a total of 61 students, including 57 females and 4 males. Purposive sampling was used to select research volunteers. Purposive sampling is a sampling strategy with specific considerations. Purposive sampling was used because not all samples met the criteria set by the author to obtain a representative sample.

This research was conducted at the Department of Chemistry Education, Faculty of Education and Teacher Training, Syiah Kuala University. The research was conducted from February to August in the academic year 2021/2022. The data collection technique in this study was through the distribution of questionnaires. The distribution of questionnaires for data collection was done through a Google Forms link via the WhatsApp application. The data analysis was obtained by processing data from student response assessment instruments, validation of instructional media, and student response questionnaires. The

percentages of these three assessments were calculated using the following formula.

$$\text{Percentage} = \frac{\Sigma S}{S_{\max}} \times 100\%$$

Where:

ΣS = Sum of score

$S_{\max}$ = Maximum score

Table 1. Criteria for Percentage Score Assessment

Score (%)	Criteria
80-100	Excellent
66-79	Good
40-65	Fairly Good
0-39	Poor

RESULTS AND DISCUSSION

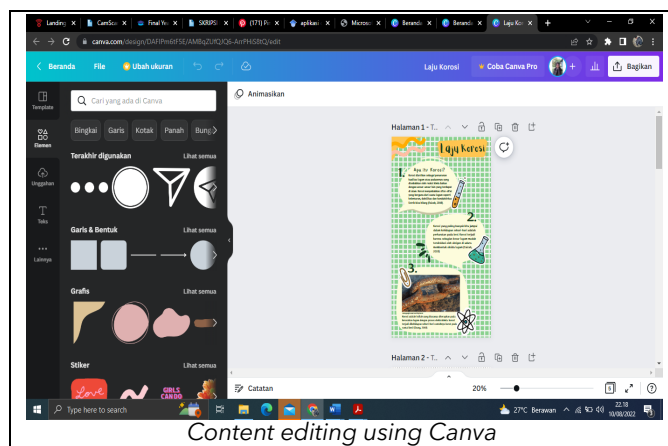
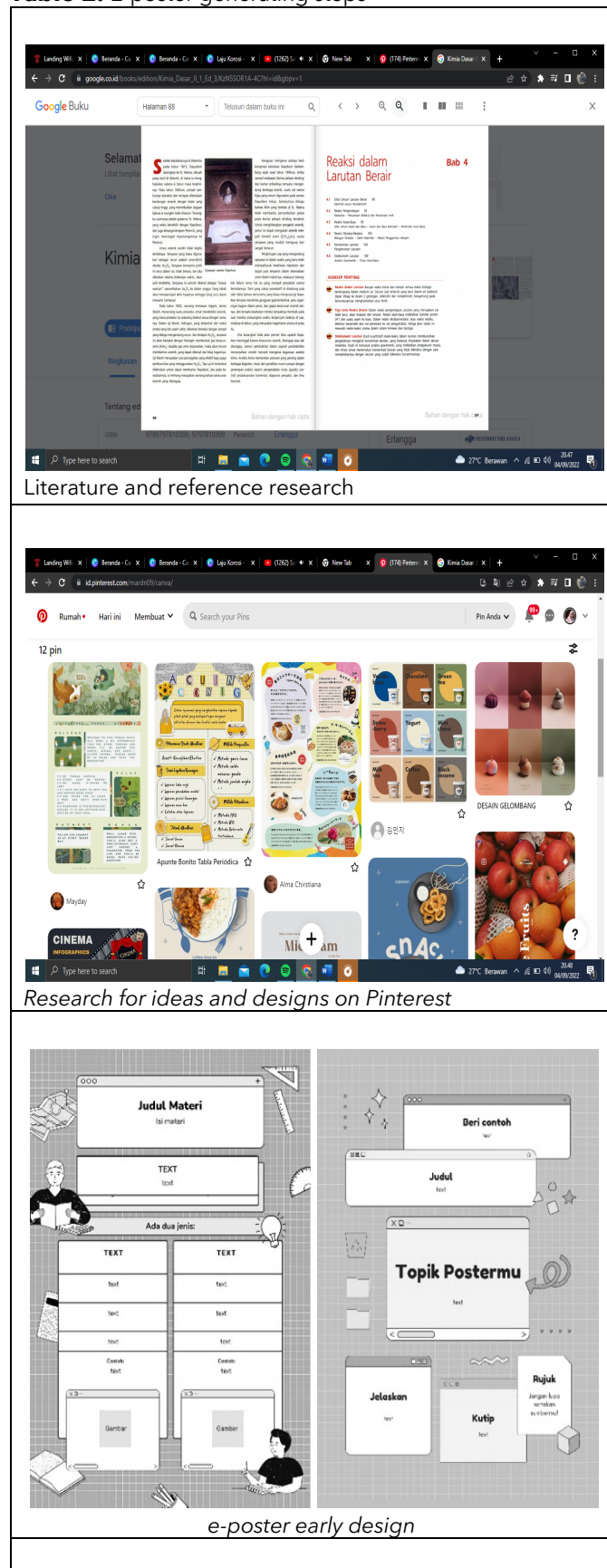
Need Analysis

This stage is conducted to identify the problems faced by students majoring in Chemistry Education, Batch 2020, who were chosen as the research subjects. The analysis stage is carried out by collecting data using a questionnaire consisting of 9 multiple-choice questions and 1 essay as input or suggestions from students regarding the developed e-poster learning media. The questionnaire was sent via a Google Forms link and will be filled out by students majoring in Chemistry Education, Batch 2020. The analysis of student needs revealed that the respondents require engaging and innovative learning media. Therefore, it is necessary to enhance their interest in learning and utilize the existing technological advancements as a learning tool through Instagram-based social media platforms.

Design

The initial step in developing the media is to create a design that is aligned with the information and data obtained in the previous stage. This draft aims to establish the framework for creating the e-poster learning media. Various factors need to be considered in media development, including the color scheme, text arrangement, and images. These features are important to be address and designed to ensure the visual quality of the e-posters because the posters are viewed using various electronic devices with different quality.

Canva is the program that was used for creating the media. Canva is a web-based program that offers both free and paid options, and it is user-friendly, particularly for creating instructional materials [18]. Canva is an internet-based program for creating instructional materials. Table 2 presents the draft for creating the e-poster media.

Table 2. E-poster generating steps

Development Stage

This stage involves designing the e-poster media based on the storyboard created in the previous stage. The development of the media is based on the analysis of student needs, which indicated that the respondents preferred visual media, specifically an e-poster for the Basic Chemistry II course, focusing on the topic of eye corrosion. Various aspects need to be considered during the media development process, including the content, color selection, and illustrations. Validators are included to assess whether the developed media product has any shortcomings, and then the researcher makes revisions to improve the media. In this study, two expert validators were involved in evaluating the developed product. The validators evaluate both content knowledge of the e-posters and the learning media. The e-posters were revised three times before the final product was completely developed and tested. The results of the development of the e-posters before and after the revisions are presented in Table 3.

Table 3. Results of Development Before and After Revisions

Initial version	Revised version

Nomenclature correction and reordering the content. The picture was removed to the top of the e-poster

Korosi

Korosi merupakan salah satu contoh peristiwa yang proses terjadinya berkaitan dengan sel elektrokimia. Gas oksigen dan air merupakan faktor yang harus ada pada saat besi mengalami perkaratan (Chang, 2010).

Proses terjadinya korosi

Korosi pada besi merupakan reaksi redoks alami. Reaksi kimia yang terjadi pada waktu korosi berlangsung dalam beberapa tahap (Faijah, 2018). Pada suatu logam, salah satu daerah permukaannya berfungsi sebagai anoda dimana anoda merupakan tempat terjadinya reaksi oksidasi.

$$\text{Fe (s)} \rightarrow \text{Fe}^{2+} (\text{aq}) + 2\text{e}^{-}$$

(Chang, 2010)

Elektron yang dilepaskan oleh Fe ditarik oleh oksigen yang ada di atmosfer dan menyebabkan oksigen teroksidasi menjadi air. Peristiwa ini terjadi di katoda, yang juga merupakan wilayah lain dari permukaan logam yang sama.

$$\text{O}_2 (\text{g}) + 4\text{H}^{+} (\text{aq}) + 4\text{e}^{-} \rightarrow 2\text{H}_2\text{O} (\text{l})$$

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$$\text{O}_2 (\text{g}) + 4\text{H}^{+} (\text{aq}) + 4\text{e}^{-} \rightarrow 2\text{H}_2\text{O} (\text{l})$$

Repositioning the chemical reactions and the explanations. The revised version text position were corrected as the same direction.

Faktor-Faktor yang mempengaruhi laju korosi

Q 1. Air dan Kelembapan Udara

Dilihat dari reaksi yang terjadi pada proses korosi, air merupakan salah satu faktor penting untuk berlangsungnya korosi. Udara lembab yang banyak mengandung uap air akan mempercepat berlangsungnya proses korosi.

Q 2. elektrolit

Elektrolit (asam atau garam) merupakan media yang baik untuk terjadinya transfer muatan. Hal ini mengakibatkan elektron lebih mudah untuk ditarik oleh oksigen di udara. Air hujan banyak mengandung asam, sedangkan air laut banyak mengandung garam. Oleh karena itu air hujan dan air laut merupakan penyebab korosi yang utama.

Bongkai kapal laut korosi yang terkoreksi (Sumber: Fadillah, 2020)

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Figure reorder and color change. The initial design background color was darker while the color of revised version background had been set to brighter and the picture position also moved to the top of the e poster

Faktor-Faktor yang mempengaruhi laju korosi

Q 3. Keberadaan Zat Pengotor

Zat pengotor (debu, cairan, dan lumpur) di permukaan logam dapat menyebabkan terjadinya reaksi reduksi tambahan sehingga lebih banyak atom logam yang teroksidasi.

Sebagai contoh, adanya tumpukan debu karbon dari hasil pembakaran BBM pada permukaan logam mampu mempercepat reaksi reduksi gas oksigen pada permukaan logam. Dengan demikian peristiwa korosi semakin dipercepat.

Keberadaan pengotor mempercepat korosi (Fadillah, 2020)

Q 4. Permukaan logam yang tidak rata

Permukaan logam yang tidak rata memudahkan terjadinya kutub-kutub muatan, yang akhirnya akan berperan sebagai anoda dan katoda. Permukaan logam yang licin dan bersih akan menyebabkan korosi sulit terjadi, sebab kutub-kutub yang akan bertindak sebagai anoda dan katoda sulit terbentuk (Edra, 2019).

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Color change

Based on the evaluation by the validators, several aspects were assessed based on indicators, namely the content aspect, instructional design, and media presentation aspect, which can be further divided into general poster appearance, typography, language, and color. This can be seen from the feasibility assessment results of the e-poster in Figure 2. After being revised by taking the suggestions provided by validators, the e-posters then went through final production and implementation in the class room.

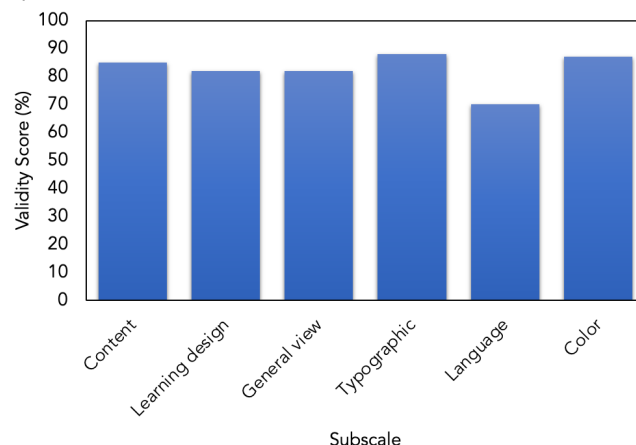


Figure 2. Percentage of media feasibility results by validator

The e-poster was validated by two experts in chemistry and instructional media who evaluated a number of aspects including the content knowledge of chemistry, typography, language and color. In addition, the learning design and general view of the posters were also assessed. The result indicates that the e-poster is valid considering that the overall score was found to be over 82.3 % which categorized as an excellent criteria as referred to Table 1.

The validity of the instructional media is important to ensure that the media can be utilized and

implemented easily in a real classroom. Validity is typically evaluated prior to the implementation of a product or system especially in educational sector. The aim of conducting reliability and validity in development research is essentially to ensure that data are sound and replicable, and the results are accurately presented. The evidence of validity and reliability are prerequisites to assure the integrity and quality of a measurement instrument or a learning media designed for helping students in learning both independently and dependently.

Implementation Stage

This implementation stage tests the developed media on the research subjects, which are students majoring in Chemistry Education, Batch 2020, totaling 61 students who have completed the Basic Chemistry II course, specifically focusing on the topic of corrosion. The first step in this implementation stage is to upload the validated media to the Instagram social media account (@kimiataalks_id), which serves as an account providing information about chemistry topics, including videos and image posts. The appearance of the Instagram account's homepage can be seen in Figure 3.

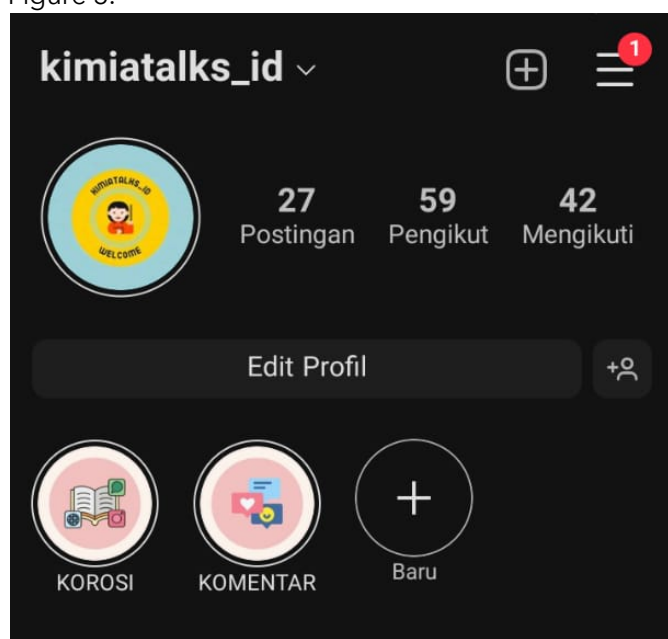


Figure 3. Homepage view of Instagram account (@kimiataalks_id)

The products that have been published on the Instagram social media platform will be shared by the researcher with the research group in the form of a link or can be viewed directly if the respondents have followed the @kimiataalks_id account. Respondents can view the media in the instastory within a 24-hour timeframe. This feature allows users to post photos and videos that are temporary and will disappear after 24 hours, but they will be automatically saved in the story archive and can be viewed again on the profile using Story Highlights [10]. The appearance of the shared e-

poster on the Instagram account can be seen in Figure 4.

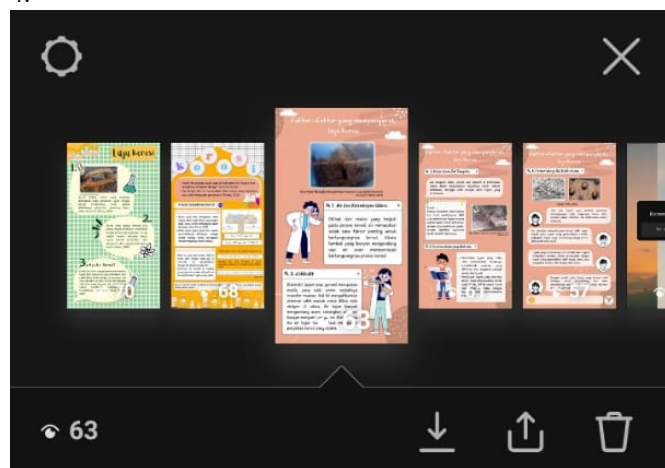


Figure 4. View of the e-poster shared on Instagram

After the publication process is completed, the next step is to assess whether the respondents are using the developed media by examining the number of viewers for the post. The post generated a total of 70 viewers. The feedback further indicates that the respondents liked the developed e-poster media, as evidenced by the number of likes received. Additionally, input or feedback was collected using the questions box feature provided in the instastory, which will be used as input for further development of the e-poster. Furthermore, the respondents filled out a questionnaire regarding their feedback on the e-poster learning media. The summary of the questionnaire responses from the students regarding the e-poster can be seen in Figure 5.

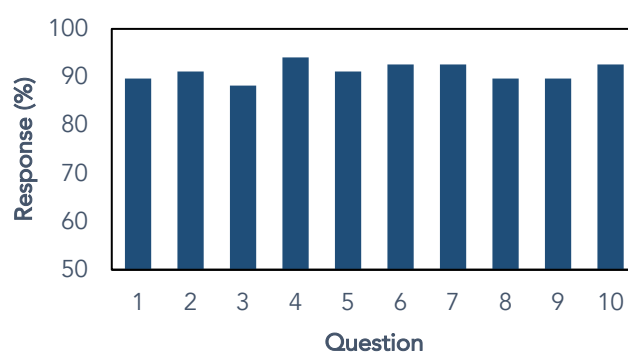


Figure 5. Student response to the Instagram-based e-poster

Based on the obtained assessment results, the average percentage is 91%. The analysis of student responses indicates that the designed poster media has a positive impact on learning. This conclusion is drawn from the summary of the questionnaire responses from the students regarding the e-poster. It can be concluded that e-poster learning media is well-liked among students as an innovative media that can be utilized in real classroom learning.

Students' responses are crucial for a system or media of learning since this authentic evaluation should give general picture of how the media is accepted among students. In addition, the data also reflects the usability and ease of use of the media supporting the SUS assessment

Evaluation Stage

The evaluation stage is conducted to assess the success of developing the Instagram-based e-poster media for the topic of factors influencing corrosion. This step collects evaluation results to determine whether the created media can be used for teaching the Basic Chemistry II course, with a focus on the topic of corrosion. The evaluation includes assessing the feasibility of the media in terms of content, instructional design, and media presentation, including visual appearance, typography, language, and color. The overall results obtained an average of 84%, categorized as highly feasible for use as a learning media.

CONCLUSION

Based on the research conducted on the development of e-poster media using Instagram for the topic of factors influencing corrosion, the following conclusions can be drawn:

1. The analysis of student needs indicated that there is a demand for visual learning media, specifically e-posters, which offer innovative ways of utilizing digital platforms for effective learning.
2. The developed Instagram-based e-poster media proved to be suitable for teaching the topic of factors influencing corrosion in the Basic Chemistry II course of the Chemistry Education Department at Syiah Kuala University, Batch 2020. It received a high feasibility rating of 84% based on validation by media experts, indicating its effectiveness as an educational tool.
3. The evaluation of student responses through questionnaires showed a significantly positive reception, with an average rating of 91%. This demonstrates that the Instagram-based e-poster media had a strong impact and was well-received by students in terms of teaching and learning about factors influencing corrosion.

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