HYDROGEN
JURNAL KEPENDIDIKAN KIMIA
https://e-journal.undikma.ac.id/index.php/hydrogen/index

August 2024. 13(4)
e-ISSN: 2656-3061
p-ISSN: 2338-6487
pp. 869-879

Development of a Tutorial Video for Creating Digital Based Card Game Media

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Article History
Received: 09-07-2025
Revised: 21-08-2025
Published: 31-08-2025

Keywords: Card Game; Development; Digital Based; Tutorial Video

Abstract
The primary objective of this study is to measure the level of validation and identify educators responses to a tutorial video on the creation of digital based card game media. This study employs a Research and Development (R&D) method, using the ADDIE model as its development framework. Data were collected through interviews, literature review, and response questionnaires. The subject of this study is a tutorial video on developing digital based card game media, which was tested with 12 chemistry teachers from six districts in Pontianak City. The selection of respondents in this study was based on the willingness of educators to participate as respondents and to provide the necessary data. The developed media were validated in terms of media and language aspects by two media experts and two languange experts, respectively. The validation results indicated that the media and language aspects achieved validity percentages of 93% and 97%, respectively. The average response percentage from chemistry educators toward the developed product was 96%. Therefore, the tutorial video for creating digital based card game media is categorized as highly valid and received very positive responses, indicating its potential for use by educators in designing digital base. The novelty of this research lies in the development of a tutorial video designed specifically to assist educators in creating digital-based card game learning media.

How to Cite: Faridy, F. A., Enawaty, E., & Muharini, R. (2025). Development of a Tutorial Video for Creating Digital Based Card Game Media. Hydrogen: Jurnal Kependidikan Kimia, 13(4), 869–879. https://doi.org/10.33394/hjkk.v13i4.16889

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INTRODUCTION

Educators play a crucial role in utilizing instructional media, however a considerable number of them are unable to use or fully optimize such media for teaching purposes (Mukarromah & Andriana, 2022). One of the challenges faced by educators during the learning process is their limited skills and understanding of information technology, which hinders their ability to maximize the use of learning media (Winda & Dafit, 2021). This situation alligns with a survey conducted by Center for Educational and Cultural Data and Technology (Pusdatin) in 2020, which revealed that 60% of educators were still unable to effectively utilize technology in the learning process, particularly when dealing with abstract subject matter. Moreover, the majority of this percentage falls into the category of being less skilled or technologically illiterate (Rahman et al., 2021). Abstract subject matter, such as chemistry, further hinders educators ability to develop suitable learning media (Muderawan et al., 2019)

Several studies have shown that card game media is highly effective in supporting chemistry learning. This is evidenced by Granath & Russell (1999) which state that chemistry learning through the use of card games can offer an engaging and enjoyable learning experience. Meanwhile, according to Sari et al (2018) the use of domino cards in colloid material demonstrated that students motivation questionnaire responses to positive statements reached the very good category, with a significant improvement observed in the experimental class.

Another study reported that the use of quartet cards in teaching acid base material resulted in an average student motivation score toward the media that fell into the very good category. In addition, the Quarchem card game media, designed for chemical bonding material, has also been proven effective in enhancing students analytical thinking skills, as evidenced by the high level of learning mastery achieved by the students (Ramsyiah, 2018). These studies demonstrate that chemistry, as an abstract subject, can be effectively delivered and learned through the use of card games as learning media. Thus, card media has been proven to be effective in supporting the learning process.

Based on interview results, despite the effectiveness of card media, educators still face difficulties in creating or developing card based instructional tools. Interviews with several educators in Pontianak City also revealed that this issue is primarily due to their limited technological skills in operating design applications such as BookCreator, Canva, interactive PowerPoint, and many other similar tools. The interview findings also indicated that this issue is further worsened by the absence of practical and systematic guidelines to assist teachers in innovating card game based learning media. This is indeed unfortunate, as educators already have acccess to premium Canva accounts provided by the Teacher and Education Personnel (GTK) to support their performance in developing learning media. To address this issue, tutorial videos serve as a necessary solution to enable educators to create digital based card game media.

A tutorial video is a type of video presented with the purpose of delivering learning content (Batubara, 2020). Studies have shown that tutorial videos can enhance students interest and learning outcomes. This is supported by Baharuddin (2014) In the referenced study, the use of tutorial videos in the learning process led to improved learning outcomes categorized as good. Based on the difficulties faced by teachers in obtaining systematic and practical guidance for creating card games, and building on this finding, the present study aims to develop a tutorial video that introduces educators to an alternative instructional medium in the form of card games, designed to be both enjoyable and engaging. This media is expected to assist educators in simplifying the delivery of abstract subject matter, making it more accessible and easier for students to understand. Furthermore, the tutorial video is intended to enhance educators competence in independently designing and implementing innovative instructional media.

METHOD

This study falls under the category of development research, commonly referred to as Research and Development (R&D). The primary objective of this approach is to produce a product that can be utilized in educational and instructional activities, with the product specifically designed to address particular needs or problems identified in the field (Sugiyono, 2022). The model consists of five phases which is analysis, design, development, implementation, and evaluation. In this study, only the development phase was carried out. The steps of the ADDIE development model are illustrated in Figure 1.

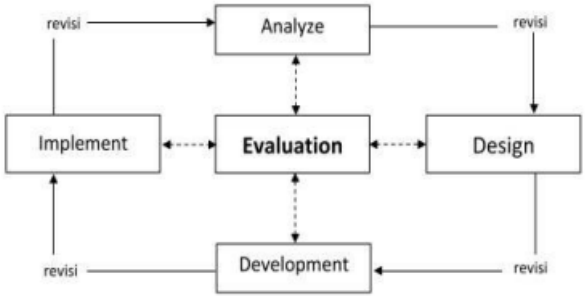


Figure 1. ADDIE development steps (Hidayat, 2021)

The outcome of this study is a tutorial video on the development of digital based card game media. The product was tested on 12 chemistry subject teachers from six districts at the senior high school level across Pontianak City. The selection of respondents in this study was based on the willingness of educators to participate as respondents and to provide the necessary data.

The analysis phase in this study began with identifying educators needs regarding the use of digital media in the learning process. The interview results indicated that a tutorial video on the development of digital based card game media is needed by teachers to create engaging and enjoyable learning experiences. In the design phase, a storyboard for the tutorial video was created. Additionally, validation instruments and teacher response questionnaires were developed to evaluate the tutorial video. The development phase involved validating the tutorial video to assess the quality and validity of the product. The validation process was carried out by two instrument experts, two media experts, and two language experts. The validation results were then used to review and revise the product, ensuring the tutorial video meets the established validation criteria.

Instrument validation was conducted to assess the validity of the language validation sheet, media validation sheet, and teacher response questionnaire. Validation was carried out by two validators. The measurement scale used for instrument validation was the Guttman scale, adapted from Sugiyono (2022) with a scoring system of 1 = Yes and 0 = No. The data obtained from the validators assessments were then calculated into percentages using the following formula::

$$K\% = \frac{Total\ accumulated\ score}{Criterion\ score}\ X\ 100\%$$

Once the percentage results are obtained, the validity criteria of the research instruments can be determined as shown in Table 1.

Table 1. Validity percentage criteria

Range (%)	Category
0-20	Very Invalid
21-40	Invalid
41-60	Fairly Valid
61-80	Valid
81-100	Very Valid

(Riduwan, 2016)

Next, media validation was carried out using a validation sheet consisting of four aspects which is media presentation, audio, typography, and content accuracy. Meanwhile, language validation employed a validation sheet covering two aspects which is language feasibility and language presentation. After the validation process conducted by the experts, a response test was also administered, involving 12 chemistry teachers from six districts at the senior high school level across Pontianak City.

The assessment of the media validation sheet, language validation sheet, and teacher response test referred to a Likert scale adapted from Sugiyono (2022) with a scoring range from 1 to 4 points, where 4 = Strongly Agree (SA), 3 = Agree (A), 2 = Disagree (D), and 1 = Strongly Disagree (SD).Comments and suggestions from validators and respondents were used as evaluation input to refine the developed product. Meanwhile, numerical assessment data from validators and respondents were analyzed using a formula adapted from Akbar (2017) as follow:

$$V - ah = \frac{Tse}{Tsh}\ X\ 100\%$$

Where V–ah represents expert validity, Tse refers to the total empirical score given by the validators, and Tsh denotes the maximum possible score.

Once the percentage results are obtained, the product's validity criteria can be determined as shown in Table 2.

Table 2. Validity percentage criteria

Achievement Criteria	Validity Level	Description
85,01-100%	Very Valid	Can be used without revision
70,01-85,00%	Fairly Valid	Can be used with minor revisions
50,01-70,00%	Less Valid	Not recommended for use due to the need for major revisions
01,00-50,00%	Invalid	Not suitable for use

(Akbar, 2017)

Meanwhile, the percentage results obtained from the teacher respondents can be interpreted based on the validity criteria presented in Table 3.

Table 3. Response test percentage criteria

Percentage (%)	Category
0-20	Very Poor
21-40	Poor
41-60	Fairly Good
61-80	Good
81-100	Very Good

(Riduwan, 2016)

RESULT AND DISCUSSION

The outcome of this study is a product in the form of a tutorial video on developing digital based card game media. After completing the data collection phase, the obtained data were analyzed and described in detail. The results of this process can be outlined as follows:

Analysis Phase

The analysis phase is the initial stage aimed at identifying various problems and gaps occurring in the learning process (Hidayat, 2021). This phase focused on analyzing educators needs, particularly regarding their difficulties in creating engaging and interactive instructional media for abstract subject matter, as well as their interest in tutorial videos for developing digital-based card game media. The needs analysis was conducted through direct interviews with several chemistry teachers in Pontianak City and a review of relevant literature related to the research problem. The interview results revealed that teachers were unable to create learning media using tools such as BookCreator and Canva to produce interactive and enjoyable learning materials. They expressed the need for a systematic and practical guide in the form of a tutorial video to obtain information related to digital based card game media

Design Phase

In this phase, the product was designed, including the development of a storyboard and the construction of research instruments, such as validation sheets and teacher response questionnaires, which were first validated by two expert validators. The product was created using BookCreator and Canva. BookCreator was chosen for its simplicity and lightweight web interface, while Canva was selected for its user friendly features compared to other editing

applications such as Adobe Premiere Pro. The purpose of instrument validation was to assess the validity of the media validation sheet, language validation sheet, and teacher response questionnaire. Additionally, relevant references were gathered regarding digital based card game media, covering its principles, benefits, and development. Subsequently, language and media validation were conducted by two experts, followed by a response test from educators on the developed tutorial video.

Development Phase

The development phase began with the creation of a product based on the initial storyboard design, which served as the prototype for validation. In this phase, the storyboard design was realized into a developed product and subsequently validated to determine the validity of the resulting tutorial video. The developed video product can be accessed via the following link:

https://bit.ly/PembuatanKartuPermainanBerbasisDigital

Figure 2. Initial apperance of the tutorial video

The validation sheet serves not only as an evaluation tool but also as a reference for improving the quality and acceptability of the developed product or instrument (Arikunto, 2010). Ensuring the relevance and appropriateness of the instrument in relation to the elements being measured is the primary objective of instrument validation in this study (Ernawati & Sukardiyono, 2017). The instrument validation results were then measured using the Guttman scale.

The results of the instrument validation calculations showed that the media validation sheet received a score of 100%, which falls into the very valid category. Next, the language validation sheet obtained a score of 96%, also categorized as very valid. Lastly, the teacher response questionnaire achieved a score of 100%, likewise classified as very valid. According to Akbar (2017), a score range of 80.01%–100% is considered very valid or usable without revision. However, suggestions were provided on the language validation sheet, including: (1) modifying the validation grid from a single aspect to two aspects namely, language feasibility and language presentation; and (2) improving sentence structure for clarity and effectiveness in several items. The revised results based on the validator's suggestions are presented in Table 4.

Table 4. Before and After Revisions of the Language Validation Sheet Instrument

Before Revision	After Revision
The sentences used represent the content of the message or information being conveyed while still following good and correct Indonesian sentence structure.	The sentences used represent the content of the message or information that you want to convey by following Indonesian sentence structure.
The terms used are in accordance with the Big Indonesian Dictionary and/or are technical terms that have been standardized for use.	The terms used are in accordance with the standard Big Indonesian Dictionary

Before Revision	After Revision
Messages or information are conveyed in an interesting and common language in Indonesian language communication.	Messages or information are conveyed in interesting and communicative language.
Voice intonation can be heard clearly and communicatively	The intonation of the voice can now be heard clearly
The sentence structure used to convey the message refers to the rules of good and correct Indonesian grammar.	The sentence structure used is in accordance with Indonesian language rules.

The media validation test was conducted by two media experts. This validation covered four aspects: media presentation, audio, typography, and content accuracy. After calculations were completed, the average media validation score across these four aspects was 93%, which falls into the very valid category. The average media validation results are presented in Figure 3.

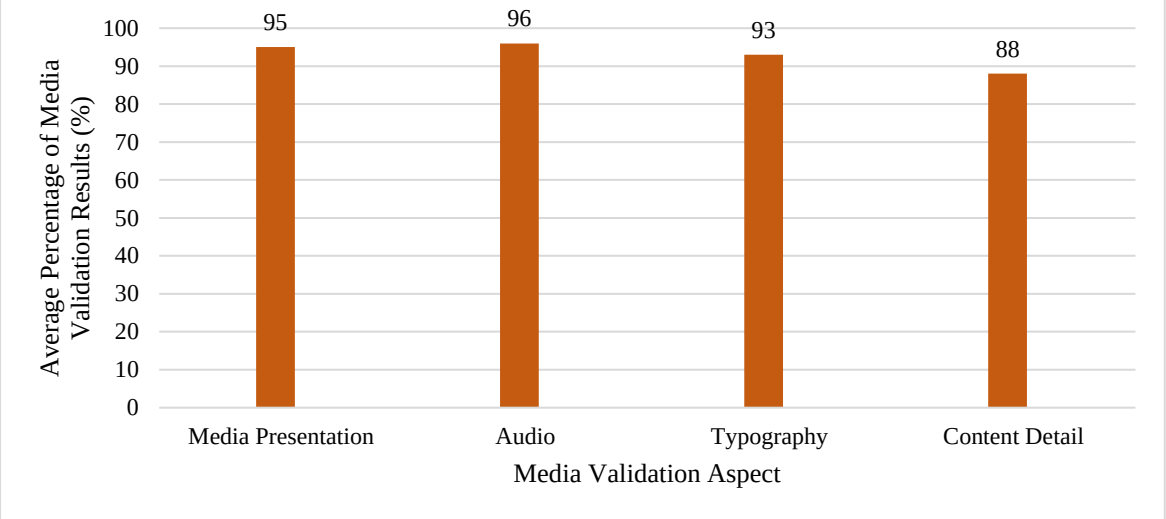


Figure 3. Average percentage of media validation results

Based on Figure 3, the media presentation aspect in the media validation received a validity percentage of 95%, which falls under the very valid category. This indicates that the developed media meets the quality standards of an effective educational tool, particularly in terms of color display, element harmony, text layout, illustrations, image placement, and visual design. An attractive and intuitive interface enhances user engagement, making it effective as a tool to measure interest in learning. With a visually appealing design that aligns with user expectations, the media can be beneficial in providing clearer visuals, interactivity, ease of understanding, and in enhancing the level of thinking skills (Hulu DM et al., 2022). Next, the audio aspect in the media validation received the highest percentage score of 96%, which is categorized as very valid. This percentage indicates that the developed media meets the audio quality standards in terms of sound, clarity of narration, and background music.

High quality audio media is capable of capturing attention and encouraging educators to be more motivated in studying the material in depth. Moreover, content delivered through audio media can also be utilized to enhance listening skills and support the evaluation of information that has been heard or viewed (Mehrvarz et al., 2022). The typography aspect in the media validation received a percentage score of 93%, which is categorized as very valid. This indicates that the developed media has met the standards for good typographic criteria in terms of font type, font size, and text spacing. Furthermore, the content accuracy aspect obtained a score of 88%, also falling into the very valid category. This result demonstrates that the media has fulfilled the standards for systematic and informative content accuracy, particularly in the clarity of the steps presented.

The difference in validation percentage between the audio aspect (96%) and the content detail aspect (88%) indicates an interesting variation worth analyzing. The high percentage in the audio aspect reflects the excellent quality of sound, clarity of narration, intonation, and background music in the tutorial video, all of which met the validators expectations. This is most likely due to the audio aspect comprising multiple indicators, all of which were rated highly by the validators.

In contrast, although the content detail aspect also falls into the very valid category, its percentage is slightly lower. This is attributed to the fact that it consisted of only one evaluation item in the validation sheet. As a result, any less-than-optimal rating had a greater impact on the overall percentage compared to aspects with more indicators. Therefore, this discrepancy does not imply that the content lacks detail, but rather highlights the limitation in the number of evaluation items within that aspect. Hence, it is recommended that future developments include more indicators under the content detail aspect to allow for a more comprehensive and proportional validity analysis.

Next, the language validation test was carried out by two language experts. This validation consisted of two aspects: language feasibility and language presentation. After calculations were completed, the average validation score was 97%, which falls into the very valid category. The average results of the language validation are presented in Figure 4.

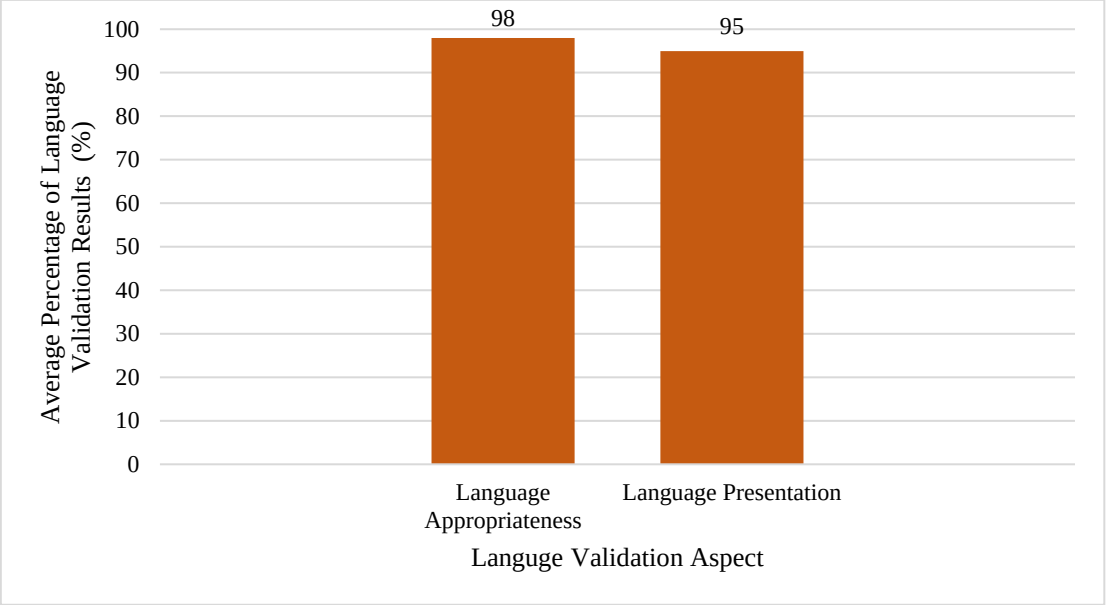
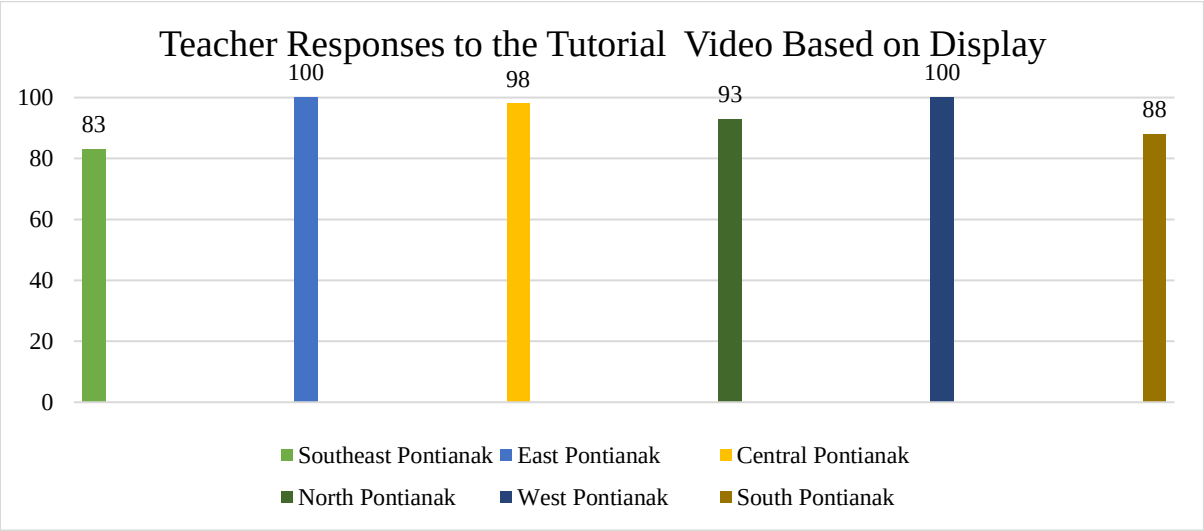


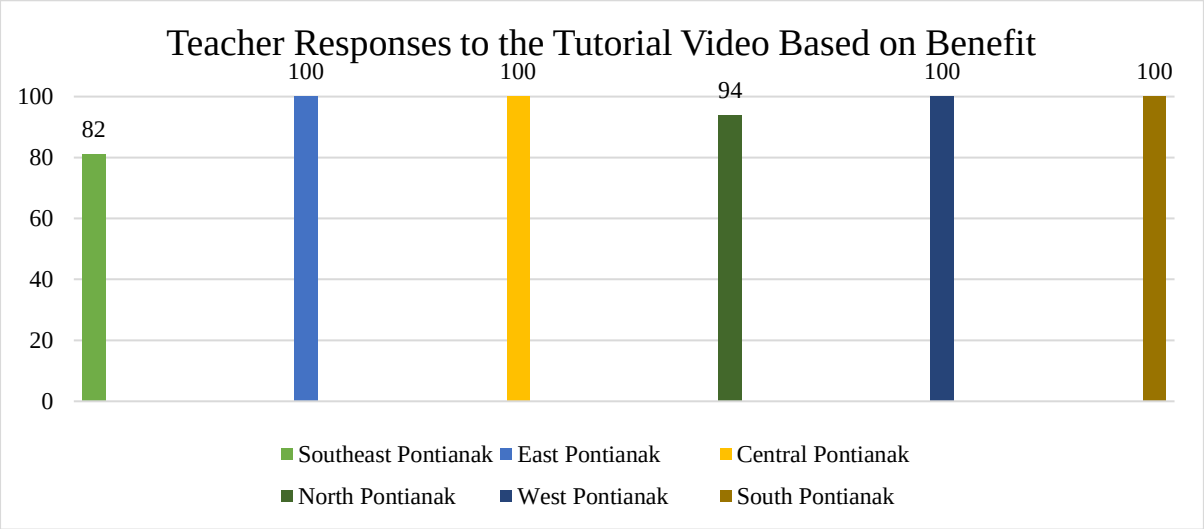
Figure 4. Average percentage of languange validation results

Based on Figure 4, the average validation result for the tutorial video in terms of language scored 97%, which is categorized as very valid. This indicates that the developed tutorial video adheres to appropriate standards of grammar, spelling, and sentence structure. In delivering instructional content, it is essential to use proper and accurate Indonesian language. The use of correct Indonesian in the learning process enables students to better comprehend the material presented by the educator (Indawati, 2024). In addition, the quality of audiovisual presentation which includes the appropriateness of illustrations and images, clarity of voice, proper intonation, and balance of background music demonstrates that the developed tutorial video meets proper audiovisual standards. An engaging audiovisual medium can foster enthusiasm and reduce students boredom during the learning process (Kusumadewi et al., 2022)

After the validation done by the expert was completed, the next step in this phase was the teacher response test. This response test involved 12 chemistry teachers from six districts in Pontianak City. The average results of the teacher responses are presented in Figure 5.



(a)



(b)

Figure 5. Teacher responses in Pontianak City to the Tutorial Video Based on (a) Display Aspect, (b) Benefit Aspect

Based on Figure 5, the visual appearance aspect received a very good rating across six districts, with a score of 93%. This indicates that the media's visual design meets high visual standards, making it suitable for effective learning. An attractive and well structured display plays a crucial role in enhancing learning outcomes, as it helps learners to understand information more clearly and comfortably. Successful learning processes can be achieved optimally when students experience an engaging and enjoyable learning environment throughout the instructional activities (Utami, 2017). Therefore, this media is considered highly valid and can be used to support the learning process in guiding educators to develop digital based card game learning media.

The usefulness aspect received a very good rating across six districts, with a score of 96%. This indicates that the developed media provides significant benefits in the field of education, particularly by addressing teachers difficulties in designing instructional media, offering engaging learning resources, and encouraging students to interact more effectively with the media. Interactive media plays an important role in the learning process, as it assists educators in designing instructional tools, facilitates the delivery of learning materials, and helps create

a more dynamic and enjoyable classroom environment (Indartiwi dkk, 2020). Thus, the tutorial video media plays a significant role in utilizing learning media to create interactive and enjoyable learning experiences.

Moreover, this tutorial video holds significant potential in supporting the enhancement of teachers technological literacy. This is evident from the educators interest in systematic and practical guidance, which helps them understand and independently apply media design technologies. The Merdeka Curriculum emphasizes the importance of technological literacy for both teachers and students as part of an enjoyable, student-centered learning approach. This highlights the necessity for teachers to be proficient in utilizing technology in order to implement innovative teaching strategies effectively (Mawaddah, 2023). Through this tutorial video, teachers are not only assisted in creating engaging digital learning media, but are also empowered to independently develop and apply technology in creative and innovative ways throughout the teaching and learning process.

CONCLUSION

Based on the research and development conducted on the tutorial video media for creating digital based card game instructional tools, it can be concluded that the tutorial video product is categorized as highly valid, as indicated by the results of media and language validation. Furthermore, the average percentage of teacher responses also falls into the very good category. This tutorial video has the potential to enhance teachers technological literacy and support the implementation of the Merdeka Curriculum, particularly in the integration of ICT in the learning process. Therefore, it is recommended to conduct classroom implementation trials to directly observe its effectiveness. In addition, further development is necessary, especially in enriching the content to be more interactive and expanding the scope of the material so that it can be more applicable across various educational levels.

RECOMENDATION

This study has received very positive responses from educators however, there is still room for improvement and further development to make the product more engaging, interactive, and enjoyable, thereby supporting the learning process by helping educators produce alternative learning media that is both appealing and interactive. Additionally, its implementation requires greater attention to educators laptop specifications, internet access, and overall accessibility.

ACKNOWLEDGEMENT

The author would like to express sincere gratitude to the Faculty of Teacher Training and Education, Tanjungpura University. Appreciation is also extended to the respondents who willingly completed the questionnaires and to the validators who contributed to ensuring the validity of the product being tested. The author is also thankful to Rizki Furqanul Ichsan and Nadila, two students of the Chemistry Education Study Program, FKIP UNTAN, for their assistance in the data collection process.

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