



Needs Analysis of Articulate Storyline 3-based interactive learning media, assisted by Canva for Colloid Topic

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Abstract concepts in chemistry, such as colloids, continue to pose challenges for students, who often struggle to understand them. The instructional media used by teachers have also not been able to optimally visualize colloid concepts, indicating the need for interactive learning media to support students' comprehension. This study aims to analyze students' needs for interactive learning media based on Articulate Storyline 3, assisted by Canva, for the college topic. This research employs a descriptive quantitative design with a sample comprising one chemistry teacher and 40 twelfth-grade students from SMA IT Granada Samarinda. The sampling technique used is purposive sampling. Data were collected through questionnaires and unstructured interviews with the teacher. The questionnaire's validity and reliability were assessed using Pearson's Product-Moment correlation in IBM SPSS 27. Questionnaire data were analyzed using descriptive percentage statistics. The findings show that 84.5% of students have adequate access to digital devices, 83% prefer visually oriented learning media, and 76% express a need for interactive media in learning. The interactive learning media, developed using Articulate Storyline 3 and Canva, are expected to include learning videos, interactive exercises, and simple educational games relevant to colloid concepts, making the learning process more engaging and easier to understand. This study has the potential to serve as a foundation for the further development of more innovative and adaptive interactive learning media.

Abstrak: Pembelajaran kimia dengan konsep abstrak seperti koloid masih menghadapi kendala karena peserta didik merasa kesulitan memahami materi. Media pembelajaran yang digunakan guru juga belum mampu memvisualisasikan konsep koloid secara optimal, sehingga diperlukan media pembelajaran interaktif untuk membantu pemahaman siswa. Penelitian ini bertujuan untuk menganalisis kebutuhan peserta didik terhadap media pembelajaran interaktif berbasis *Articulate Storyline 3* berbantuan Canva pada materi koloid. Jenis penelitian ini adalah deskriptif kuantitatif dengan sampel satu guru kimia dan 40 siswa kelas XII SMA IT Granada Samarinda. Teknik pengambilan sampel menggunakan teknik *purposive sampling*. Instrumen penelitian menggunakan angket dan wawancara tidak terstruktur pada guru. Validitas dan reliabilitas angket diuji menggunakan korelasi *Pearson Product Moment* berbantuan aplikasi IBM SPSS 27. Data hasil angket dianalisis menggunakan statistika deskriptif persentase. Hasil penelitian menunjukkan bahwa 84,5% peserta didik memiliki akses perangkat digital yang memadai, 83% menyukai media pembelajaran berbasis visual, dan 76% menginginkan penggunaan media interaktif dalam pembelajaran. Media pembelajaran interaktif berbasis *Articulate Storyline 3* berbantuan Canva yang dikembangkan diharapkan dapat menyediakan video pembelajaran, latihan soal interaktif, dan games sederhana yang relevan dengan materi koloid agar pembelajaran lebih menarik dan mudah dipahami. Penelitian ini berpotensi menjadi dasar pengembangan media interaktif yang lebih inovatif dan adaptif di masa mendatang.

A. Introduction

The development of information and communication technology (ICT) in the digital era has transformed how people learn, work, and interact. This transformation requires the education sector to adapt to produce learners who are not only academically capable but also adaptable to the demands of a rapidly changing world. 21st-century learning necessitates flexible, technology-based, and collaborative approaches that foster mastery of critical thinking, problem-solving, creativity, communication, and collaboration. Such approaches can only be achieved when learners are actively engaged in meaningful learning experiences. Fithriyah et al (2024) emphasize that the integration of technology in education is no longer merely supportive; instead, it has become a key element in creating interactive, effective, and efficient learning.

However, in practice, classroom conditions indicate that chemistry learning still encounters various obstacles. Chemistry is a subject taught at the senior high school level that includes calculation-based topics, chemical reactions, and abstract concepts (Prastika et al., 2024). Learning abstract concepts in chemistry can be challenging, particularly in colloid science (Pradilasari et al., 2020). Learning chemistry requires understanding concepts rather than merely memorizing information (Simbolon et al., 2018). Many concepts in chemistry can only be explained through models or visual representations (Husaeni et al., 2023). As digital natives, students tend to prefer visual and interactive learning; therefore, one-way lectures or teacher-centered approaches often fail to sustain their focus and learning motivation (Natsir et al., 2022). Studies by Pradilasari et al (2020) and Laliyo et al (2023) demonstrate that more than 60% of students experience difficulties in understanding colloid concepts due to the lack of visualization or learning media capable of presenting colloid topics at the microscopic (particle) level, as well as the limited availability of interactive learning resources. This situation indicates a mismatch between today's learners' needs and the learning media currently available.

This gap highlights the importance and relevance of developing interactive learning media in the current educational context (Ismaniati & Iskhamdhanah, 2023). Interactive learning media can assist students in understanding chemistry topics such as colloids through engaging visual experiences, as the presentation of learning materials is not limited to text but is enriched with images and instructional videos that can provide a stimulating experience for learners (Hafinah et al., 2019). According to Abdurrahim et al (2020), the use of learning media that facilitates direct interaction and visualization can significantly improve chemistry learning outcomes. Interactive learning media can be utilized both during classroom instruction and in independent learning activities (Amatullah et al., 2023). Such media not only enhance learning motivation but also help students understand the relationships among concepts through meaningful learning experiences (Jannah & Nurdiyanti, 2021; Munawir et al., 2024).

In this context, Articulate Storyline 3 emerges as an appropriate platform because it supports interactive e-learning that integrates animations, quizzes, and automated feedback

(Angraini et al., 2025). However, recent studies reveal that the visual appearance of Articulate Storyline 3 tends to be formal, less dynamic, and insufficiently appealing to students, as it does not align with their preference for informal and dynamic visual styles similar to those commonly found on social media platforms (Daryanes et al., 2023; Setianingrum et al., 2023). On the other hand, Canva offers modern, adaptable visual elements that align with students' visual preferences (Hasanah & Sunarno, 2023). The combination of these two platforms offers substantial potential for creating learning media that are not only interactive but also aesthetically pleasing, engaging, and capable of enhancing student motivation (Lestari & Susanto, 2023).

Research on the use of Articulate Storyline 3 has been widely conducted; however, most studies have focused on its effectiveness in improving learning outcomes without adequately addressing material visualization optimization (Daryanes et al., 2023; Winarti & Karenina, 2024). Some studies have also not integrated design applications to enhance the visual appeal of the media. Moreover, no studies published in the last five years have specifically examined students' needs regarding interactive learning media developed with Articulate Storyline 3, supported by visual elements from Canva, for a colloid topic. Therefore, a research gap exists regarding the needs analysis of interactive media that combines Storyline 3's interactivity strengths with Canva's visual capabilities for abstract chemistry content, such as colloids.

The strength of this research lies in its emphasis on identifying students' needs as a preliminary foundation for developing interactive learning media. This study focuses on analyzing the needs, expectations, and challenges encountered in colloid learning. Such an approach provides space for a more objective evaluation of the potential development and use of Articulate Storyline 3 supported by Canva as a candidate for interactive learning media that aligns with the characteristics of today's learners. By placing needs analysis at the center, this research offers a comprehensive initial overview that is rarely explored in previous studies and provides an empirical foundation for subsequent stages of interactive media development.

This study aims to analyze students' needs for interactive learning media using Articulate Storyline 3, supported by Canva, for the colloid topic. Accordingly, the research is guided by the following research questions: (RQ1) What are the students' needs for interactive learning media in learning colloid concepts?, (RQ2) What expectations do students have regarding the features and content of Articulate Storyline 3-based media assisted by Canva?, (RQ3) What constraints are encountered during the colloid learning process that should be addressed through interactive media design?. Based on these questions, the objectives of this study are (1) to identify and describe students' learning media needs, (2) to map their expectations toward interactive media features and learning support, and (3) to analyze learning constraints as a foundation for designing appropriate instructional media. More broadly, this research contributes to chemistry education by providing an empirical basis that

can guide the development of more adaptive, interactive, and relevant learning media aligned with the characteristics of 21st-century learners.

B. Method

This study employs a descriptive research design with a quantitative approach. According to Sugiyono (2019), quantitative descriptive research is a method used to describe or explain a phenomenon by utilizing numerical data processed statistically. This approach is applied because the study focuses on portraying students' needs for the development of technology-based learning media, using quantitative data from questionnaires and interview findings from chemistry teachers.

The study was conducted at SMA IT Granada Samarinda with a population consisting of all twelfth-grade students. The research subjects included one chemistry teacher who participated in an interview and 40 twelfth-grade students who served as questionnaire respondents. The selection of respondents was carried out using purposive sampling, with the criteria that respondents were teachers currently teaching the colloid topic and students currently learning it.

Data collection was conducted using a non-test method, with a questionnaire as the primary instrument. The questionnaire was developed based on four main aspects, namely: access and technological support, students' interest and understanding through learning media, the use and preference of learning media, and opportunities for developing learning media, symbolized as X1–X4, with a total of 12 statement indicators. Each item contained five Likert-scale alternatives (Sugiyono, 2019), as presented in Table 1. Prior to distribution, the questionnaire instrument had to be ensured to be valid and appropriate as a measurement tool (Sa'adah & Ikhsan, 2023). The questionnaire was administered online via Google Forms to students. At the same time, interviews were conducted directly with the chemistry teacher to obtain additional information on students' needs and readiness to use interactive learning media.

The teacher interview was conducted in an unstructured manner using an interview guide modified by the researcher, consisting of nine aspects: curriculum, material alignment, learning resources, technology use, learning media, student responses, student characteristics, media needs, and opportunities for developing interactive learning media, symbolized as X1–X9 with a total of 17 question indicators.

Table 1. Likert Scale Criteria according to Sugiyono (2019)

Criteria	Scale
Strongly Agree (SA)	5
Agree (A)	4
Neutral (N)	3
Disagree (D)	2
Strongly Disagree (SD)	1

The research procedure consisted of several stages, namely: (1) problem identification, conducted to determine the research focus related to students needs for interactive learning media; (2) literature review, by examining relevant scientific sources as the theoretical foundation; (3) data collection, through interviews and questionnaires to obtain information from teachers and students; and (4) report preparation, by processing and analyzing the research data into systematic and objective findings (Santoso et al., 2021).

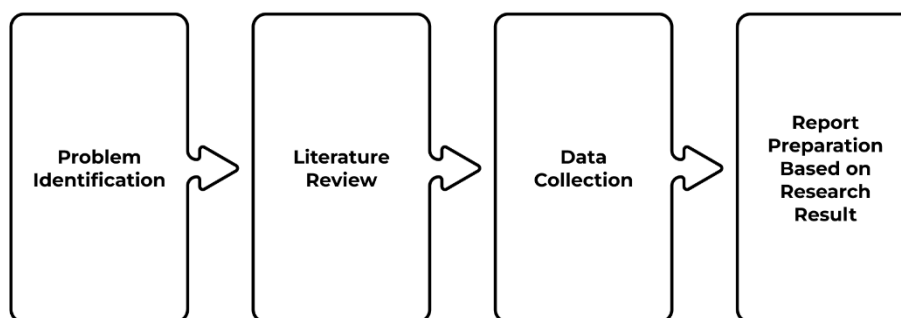


Figure 1. Research Flow

The instrument trial was conducted by administering the developed questionnaire to respondents who possessed characteristics similar to those of the research sample but were not included in the actual sample. The respondents consisted of 13 twelfth-grade students from SMA IT Granada Samarinda. This trial aimed to obtain data regarding the validity and reliability of the needs-analysis questionnaire to be used in data collection (Anggraini et al., 2022). Through this trial, the researcher assessed the extent to which the questionnaire items accurately and consistently measured the intended aspects, ensuring that the instrument used in the main study was of adequate quality and scientifically accountable (Alfiyah et al., 2025; Lusiana et al., 2024).

The validity of the questionnaire instrument was analyzed using the Pearson Product-Moment correlation technique in IBM SPSS 27, comparing the r count with the r table ($df = n - 2$) at a significance level of 0.05 to determine the validity of each item. Meanwhile, the instrument's reliability was measured using Cronbach's alpha to assess the questionnaire items' internal consistency (Ghozali, 2021).

To obtain an overview of students' needs regarding learning media, the questionnaire data were analyzed using descriptive percentage statistics, with the following formula: $P = \frac{n}{N} \times 100\%$. In this formula, P represents the percentage score, n denotes the empirical score obtained by the respondents, and N denotes the maximum possible score for each item. The use of percentage analysis allows results to be presented in a more straightforward, more comprehensible manner, thereby facilitating the researcher in interpreting response tendencies and drawing conclusions about the need for interactive learning media (Sugiyono, 2019). The criteria for descriptive percentage analysis are presented in Table 2.

Meanwhile, the data obtained from the chemistry teacher's interview were analyzed by compiling all gathered information, summarizing and condensing it according to research needs, presenting the interview data systematically according to the aspects outlined in the interview guide, and drawing conclusions (Miles & Huberman, 2007).

Table 2. Criteria for Descriptive Percentage Statistical Analysis

Percentage	Criteria
$81 \leq \% < 100$	Strongly Agree (SA)
$61 \leq \% < 81$	Agree (A)
$44 \leq \% < 61$	Neutral (N)
$21 \leq \% < 44$	Disagree (D)
$1 \leq \% < 21$	Strongly Disagree (SD)

C. Result

Topic Analysis

Based on the Decree of the Head of the Agency for Standards, Curriculum, and Educational Assessment of the Ministry of Education, Culture, Research, and Technology Number 033/H/KR/2022, the colloid topic is taught in Phase F, namely in Grades XI and XII, in accordance with the *Kurikulum Merdeka*. The subtopics that educators should teach and students should learn, along with the level of representation for each, are presented in Table 3.

Table 3. Colloids Topic Analysis

Colloid System	
Sub Topic	Level of Representation
Definition of Colloidal Systems	Macroscopic
Differences between colloids with liquid mixture and suspensions	Macroscopic & Microscopic
Types of colloids	Macroscopic & Microscopic
Dispersant and dispersed phases	Microscopic
Examples of colloid types (solid aerosols, emulsions, sols, etc.)	Macroscopic
Properties of Colloids	
Tyndall Effect	Macroscopic & Microscopic
Brown Movement	Microscopic
Electrophoresis	Microscopic & Symbolic
Adsorption	Microscopic
Coagulation	Microscopic
Protective colloid	Microscopic
Dialysis	Macroscopic & Microscopic
Colloid Making	
Condensation	Microscopic
Dispersion	Microscopic

Validity and Reliability Analysis of the Research Instrument

Following the topic analysis results, which highlight key issues and learning needs related to colloid concepts, this study further ensured the accuracy of the findings by evaluating the quality of the research instrument. Therefore, the questionnaire used in this study was tested for validity and reliability, and the validity test results are presented in Table 4.

Table 4. Results of the Instrument Validity Test for Students' Needs Questionnaire

Aspect	Item Number	significance value	Pearson Correlation (n = 13)	Criteria
Technology access and support	X1.1	<0,001	0,927	Valid
	X1.2	0,006	0,716	Valid
	X1.3	0,002	0,762	Valid
	Mean		0,802	
students' interest and understanding through learning media	X2.1	<0,001	0,835	Valid
	X2.2	<0,001	0,835	Valid
	Mean		0,835	
Aspects of learning media use and preferences	X3.1	0,002	0,768	Valid
	X3.2	0,014	0,662	Valid
	X3.3	<0,001	0,852	Valid
	X3.4	0,048	0,557	Valid
	Mean		0,710	
Aspects of learning media development opportunities	X4.1	0,048	0,557	Valid
	X4.2	<0.001	0,835	Valid
	X4.3	<0,001	0,812	Valid
	Mean		0,735	

Based on the IBM SPSS 27 output presented in Table 4, the Pearson Correlation values (r count) for the four aspects of student needs are greater than the r table, where r table ($n - 2$) = 0.553. This is indicated by the first aspect consisting of 3 items (X1.1–X1.3) > 0.553 with an average r count of 0.802; the second aspect with two items (X2.1–X2.2) > 0.553 with an average of 0.835; the third aspect with four items (X3.1–X3.4) > 0.553 with an average of 0.710; and the fourth aspect with three items (X4.1–X4.3) > 0.553 with an average of 0.735. In terms of significance level, all items have significance values below 0.05.

The results of the instrument validity test based on the trial data indicate that all aspects and all items in the interactive learning media needs questionnaire are valid and suitable for use in the study. This is consistent with the validity criteria proposed by Ghozali (2021), which state that an item is considered valid if r count > r table and the significance level is < 0.05.

Table 5. Reliability Test Results of the Student Needs Assessment Questionnaire

Reliability Statistics	
Cronbach's Alpha	N of Items
0,931	12

Based on the reliability test results presented in Table 5, the Cronbach's Alpha value obtained was 0.931. This indicates that the needs assessment questionnaire is reliable, as the Cronbach's Alpha value exceeds the minimum threshold of 0.70. According to the reliability criteria proposed by Ghozali (2021), this value falls into the *very high* category ($0.90 < r \leq 1.00$). This finding suggests that the questionnaire used in the trial has a very high level of reliability and is therefore appropriate for the research. The obtained Cronbach's Alpha value also demonstrates strong internal consistency among the instrument's items.

Analysis of Students' Needs Regarding the Development of Articulate Storyline 3 Based Interactive Learning Media Assisted by Canva for the Colloid Topic

After confirming that the questionnaire items were valid and reliable, the analysis was continued by examining students' needs regarding the development of Articulate Storyline 3-based interactive learning media assisted by Canva for the colloid topic. This section presents the results of students' responses related to their learning preferences, expectations, and the required media features to support understanding of colloid concepts.

Table 6. Results of Student Needs Questionnaire Analysis

Item	Indicator	Percentage (%)	Criteria
X1.1	Understanding the electronic devices owned by students to support the learning process	84,5	Strongly Agree
X1.2	Understanding the facilities of electronic devices commonly used by students to improve their understanding of learning materials	84	Strongly Agree
X1.3	Understanding the ability to use smartphones in classroom learning for educational purposes	82,5	Strongly Agree
X2.1	Understanding students' difficulties in learning Colloid Topic	69	Agree
X2.2	Understanding the use of learning media, such as PowerPoint or videos, can help students understand the Colloid Topic	71	Agree
X3.1	Understanding the frequency and consistency of teachers in using learning media	77,5	Agree
X3.2	Understanding the benefits of learning media commonly used by teachers in delivering the Colloid Topic	68,5	Agree
X3.3	Understanding students' preferred learning media	83	Strongly Agree

Item	Indicator	Percentage (%)	Criteria
X3.4	Understanding students' desired learning media for learning Colloid Topic	76,5	Agree
X4.1	Understanding the use of interactive learning media for the Colloid Topic	62	Agree
X4.2	Understanding students' opinions regarding opportunities for developing interactive learning media	84,5	Strongly Agree
X4.3	Understanding students' opinions regarding the use of interactive learning media in the learning process	85,5	Strongly Agree

Overall, the results in Table 6 indicate that students show a positive tendency toward the use of interactive learning media for the colloid topic. The highest response appears in the indicator related to students' opinions on the use of interactive learning media in the learning process (X4.3), which reached 85.5% and was categorized as strongly agree. This finding suggests that students are highly ready and interested in learning media that are more engaging, visually supported, and interactive. In addition, the high percentages in the technology access aspect (X1.1–X1.3) confirm that most students have adequate digital facilities to support the implementation of technology-based learning media. However, before these needs-analysis findings are interpreted further and used as a basis for media development, it is essential to ensure that the questionnaire data collected from the research sample meet the required measurement standards. Therefore, the validity of the instrument based on students' needs data was re-examined using Pearson Product-Moment correlation, and the results are presented in Table 7.

Table 7. Questionnaire Validity Based on Student Needs Data

Aspect	Item Number	significance value	Pearson Correlation (n = 40)	Criteria
Technology access and support	X1.1	0,009	0,408	Valid
	X1.2	<0,001	0,579	Valid
	X1.3	0,002	0,471	Valid
	Mean		0,486	
students' interest and understanding through learning media	X2.1	0,003	0,461	Valid
	X2.2	0,002	0,471	Valid
	Mean		0,466	
Aspects of learning media use and preferences	X3.1	0,016	0,378	Valid
	X3.2	<0,001	0,688	Valid
	X3.3	0,014	0,386	Valid
	X3.4	<0,001	0,595	Valid
	Mean		0,512	
Aspects of learning media development opportunities	X4.1	<0,001	0,727	Valid
	X4.2	<0,001	0,638	Valid
	X4.3	<0,001	0,973	Valid
	Mean		0,779	

Based on Table 7, the validity test results show that the questionnaire items meet the required criteria, indicating that each statement is able to measure the intended aspects of students' needs. After confirming the validity of the instrument, the next step is to examine its reliability to ensure the consistency of the questionnaire when used to collect data from respondents. Therefore, the reliability analysis was conducted using Cronbach's Alpha, and the results are presented in Table 8.

Table 8. Questionnaire Reliability Based on Student Needs Data

Reliability Statistics	
Cronbach's Alpha	N of Items
0,724	12

As shown in Table 8, the reliability test results indicate that the questionnaire has good internal consistency, meaning that the instrument is stable and reliable for measuring students' needs regarding interactive learning media. With the instrument confirmed to be both valid and reliable, the analysis was continued by examining the distribution of students' responses to each indicator. Therefore, the descriptive results of students' needs analysis related to the development of Articulate Storyline 3-based interactive learning media assisted by Canva for the colloid topic are presented in Table 9.

Table 9. Teacher Interview Results

Item Number	Indicator	Result
X1.1	Identifying the curriculum implemented at the school	The school implements both the <i>Kurikulum Merdeka</i> and the <i>Kurikulum Islam Terpadu</i>
X2.1	Identifying whether the colloid topic is taught at the school	The teacher delivers the colloid topic, though not in full detail, because it is considered relatively easy to memorize and can be learned independently by students.
X2.2	Ensuring that the colloid topic is delivered in accordance with the learning outcomes of the <i>Kurikulum Merdeka</i>	Yes, the colloid topic is taught in accordance with the learning outcomes.
X3.1	Identifying the learning resources used during the teaching process	The learning resources used include textbooks, internet, and student worksheets (LKPD).
X4.1	Identifying the allowance for using technology during classroom instruction	Students may use smartphones in the classroom when the teacher permits it.
X5.1	Identifying the learning media utilized in the teaching process	The teacher frequently uses PowerPoint presentations and occasionally utilizes instructional videos.
X5.2	Identifying the adequacy of the media used for teaching the colloid topic	The media used are considered sufficiently helpful.

Item Number	Indicator	Result
X5.3	Identifying the challenges faced by the teacher when using media to teach the colloid topic	The main challenges in teaching the colloid topic are limited instructional time and differences in students' learning styles.
X5.4	Identifying the solutions applied to overcome these challenges	The teacher has alternative solutions to overcome these challenges.
X6.1	Identifying students responses to the learning process	students responses to the learning process are generally positive.
X7.1	Identifying students' interest and engagement when the teacher uses learning media	Students show strong interest and enthusiasm when lessons are supported with images and videos.
X7.2	Identifying students' enthusiasm and participation during conventional learning	Students tend to become bored during conventional learning.
X7.3	Identifying students' understanding of the colloid topic when presented through visual illustrations or audiovisual media	Students understand the colloid topic more easily when it is presented in videos.
X8.1	Identifying media types that can facilitate students' understanding of the colloid topic	The teacher prefers learning media that efficiently cover the entire topic and include visual elements such as images and videos.
X9.1	Identifying the use of interactive learning media in teaching the colloid topic	Interactive learning media specific to the colloid topic have not been used; however, the teacher has experience using Canva.
X9.2	Identifying the teacher's openness toward the use of interactive learning media in the learning process	The teacher is highly open to using interactive learning media.
X9.3	Identifying opportunities for developing interactive learning media	The teacher considers the development of interactive learning media to be very necessary.

D. Discussion

The questionnaire's validity and reliability, previously established through a pilot test involving 13 students, were further reinforced through re-testing using the actual questionnaire data collected from 40 students as the research sample. The validity and reliability tests were performed using IBM SPSS Statistics 27. Based on the analysis in Table 7, the Pearson Product-Moment correlation values (r count) for all four student-need aspects were higher than the r table value of 0.312, with $X1 = 0.486$, $X2 = 0.466$, $X3 = 0.512$, and $X4 = 0.779$, and all significance values were below 0.05. In accordance with Ghozali (2021) criteria, these results indicate that all questionnaire items are valid. Furthermore, the Cronbach's Alpha value of 0.724 indicates that the instrument is reliable, falling within the high-reliability range ($0.70 < r < 0.90$). This suggests that each item has good internal consistency and is reliable for measuring students' needs regarding interactive learning media. Thus, the quantitative findings can be trusted and serve as a strong foundation for developing targeted interactive learning media.

Based on the analysis of the students' needs questionnaire presented in Table 6, the students' responses indicate a positive tendency toward the use of interactive learning media in the colloid topic. The highest percentage was observed in the indicator "students' opinions on the use of interactive learning media during the learning process" (X4.3), at 85.5%. This percentage reflects students' strong interest and readiness to use interactive media. The dominance of this indicator is closely related to the nature of chemistry content, which requires visual support to help students construct conceptual understanding. Students tend to understand the material more easily through visual representations, animations, and simulations rather than through text-based explanations or lectures. Consequently, the high score for X4.3 reflects students' need for a learning model that provides a more concrete cognitive experience through digital visualization.

These findings align with chemical representation theory, which emphasizes the connections among macroscopic, microscopic, and symbolic levels. The colloid topic involves microscopic concepts such as particle size, Brownian motion, and the Tyndall effect, which are difficult to understand without visual representation. Interactive learning media developed using Articulate Storyline 3 have the potential to bridge these levels through animated processes, particle visualizations, and links between macroscopic phenomena and symbolic or scientific models. When students can observe the relationships among these representational levels, conceptual construction becomes more meaningful. This is supported by the indicator "Identifying students' difficulties in learning colloids" (X2.1), which shows that 69% of students still face obstacles in understanding the material without visualization. This aligns with Taber's (2018) argument that visual representations are essential for helping students connect real-world phenomena with theoretical models in chemistry. This condition explains why the use of interactive learning media received the highest response, as such media provide representational structures that is not offered by learning media commonly used by teacher, such as textbook and PowerPoint, which is less dynamic, do not offer.

The indicator "Identifying the frequency and consistency of teachers' use of learning media" (X3.1), which scored 77.5%, indicates that teachers frequently employ PowerPoint and videos in classroom instruction. However, some students still feel that the media used has not fully supported their understanding of the material. This is reflected in the questionnaire, which found that only 68.5% of students feel helped by the media used by the teacher. This suggests that the existing learning media do not fully meet students' learning needs, particularly in understanding abstract chemical concepts such as colloids.

Findings from interviews with the chemistry teacher further reinforce students' needs for interactive learning media. The teacher stated that students show greater enthusiasm when learning is supported by images and videos rather than conventional lectures. Although the teacher commonly uses textbooks, worksheets, online resources, PowerPoint, and videos in colloid lessons, no interactive learning media that comprehensively present all subtopics of colloids have been available or used. As a result, the explanations provided often lack sufficient depth at the microscopic level. Therefore, the teacher is highly open to adopting and

developing interactive media, acknowledging that such media are greatly needed and hold significant potential for chemistry instruction.

The alignment between students' needs and the teacher's perspective further underscores the urgency of developing interactive media. The teacher mentioned that Articulate Storyline 3 has never been used in teaching, although Canva has been used for straightforward visual content. The teacher's openness to using Storyline 3 indicates that the school is ready to adopt more advanced learning technologies. In this context, interactive media are not merely an alternative but a pedagogically relevant solution aligned with 21st-century learning demands, which emphasize active engagement, creativity, and digital literacy.

The findings of this study are consistent with previous research. [Winarti & Karenina \(2024\)](#) found that the use of Articulate Storyline 3 improves the quality of chemistry conceptual understanding due to its interactive nature, which facilitates independent exploration. Meanwhile, [Daryanes et al \(2023\)](#) reported that the animation and interactive quiz features in Storyline 3 increase student retention and promote more active interaction during learning. These comparisons strengthen the present research's position by showing that the use of Storyline 3 aligns with recent empirical evidence on the effectiveness of interactive media for teaching abstract chemical concepts.

Practically, these findings have important implications for teachers and students. For teachers, interactive media can serve as pedagogical tools that support more comprehensive, efficient, and adaptive content delivery, accommodating diverse learning styles. Teachers can utilize Articulate Storyline 3 to present complex concepts through layered visualizations, thereby reducing the need for lengthy verbal explanations. For students, interactive media can increase motivation, engagement, and conceptual understanding through more meaningful and engaging learning experiences. The use of interactive media also contributes to improving students' digital literacy, a key competency in the *Kurikulum Merdeka*. These findings are consistent with [Santoso et al \(2021\)](#), who reported that interactive learning media enhance students' motivation and engagement by providing more engaging learning experiences.

E. Implication

The findings of this study have important implications across three aspects. Theoretically, the results on the need for visualization and the effectiveness of interactive learning media reinforce the development of theories of interactive instructional media, as well as chemical representation theory, which emphasizes the interconnectedness of macroscopic, microscopic, and symbolic levels. In practice, this study demonstrates that teachers require media that better align with the learning characteristics of today's generation, particularly those that are interactive, communicative, and adaptable to diverse learning styles. Socially, the use of interactive learning media can enhance students' digital literacy and promote active, adaptive engagement in the chemistry learning process.

F. Limitation and Suggestion for Further Research

This study has several limitations that should be acknowledged. First, the research was conducted in only one school, SMA IT Granada Samarinda, with a limited number of respondents consisting of one chemistry teacher and 40 students; therefore, the findings cannot be generalized to other educational contexts. Second, the data were collected using a non-test questionnaire with a Likert scale, which may introduce subjective bias, although the instrument had met the required validity and reliability criteria.

Future studies are recommended to involve a larger, more diverse sample to yield more representative results. Data triangulation, such as classroom observations or in-depth interviews, should also be considered to strengthen the accuracy of the findings. Moreover, subsequent research is expected not only to develop Articulate Storyline 3-based interactive learning media supported by Canva but also to test its effectiveness through a quasi-experimental design to evaluate its impact on students' understanding of colloid concepts and learning motivation, in alignment with the principles of the *Kurikulum Merdeka*.

G. Conclusion

Based on the results of the needs analysis, the data show that 84.5% of students have adequate access to digital devices, 83% prefer visual-based learning media, and 76.5% expect the use of interactive media in the learning process. These findings indicate that students require learning media that are accessible, engaging, and interactive to support their understanding of colloid concepts, which involve macroscopic, microscopic, and symbolic levels of representation. Teachers also emphasized the need for interactive learning media to enhance the clarity of the material and to accommodate students' diverse learning styles. Considering these needs, the development of Articulate Storyline 3-based interactive learning media supported by Canva, is recommended as a relevant solution to support chemistry learning innovation that aligns with the *Kurikulum Merdeka* and the demands of 21st-century skills.

References

- Abdurrahim, Mukhamad, N., & Yuli, H. (2020). Pengaruh Penggunaan Media Rolling Ball dalam Model Pembelajaran Predict, Observe, Explain (POE) terhadap Hasil Belajar Kimia pada Materi Laju Reaksi. *Jurnal Zarah*, 8(1), 44–49. <https://ojs.umrah.ac.id/index.php/zarah/article/view/2130/959>
- Alfiyah, N., Chalisah, N. D., & Zuhriyah, I. A. (2025). Validity and Reliability of Instruments: Students Perception of Google Classroom and Interest in Learning Islamic Religion. *JISAE: Journal of Indonesian Student Assessment and Evaluation*, 11(1), 13–21. <https://doi.org/10.21009/jisae.v11i1.52521>

- Amatullah, Duta, C., & AB, Joko, S. (2023). Pengembangan Media Pembelajaran Interaktif Matematika pada Materi Bangun Ruang Sisi Datar Kelas VIII SMP Al-Azhar 3 Bandar Lampung Tahun 2021/2022. *Jurnal Ilmiah Pembelajaran Sekolah Dasar*, 5(2), 243–250.
- Anggraini, A. et al. (2022). Pembelajaran Statistika Menggunakan Software SPSS untuk Uji Validitas dan Reliabilitas. *JURNAL BASICEDU*, 6(4), 491–6504. <https://jbasic.org/index.php/basicedu>
- Angraini, Y., Hardiansyah, F., & Kuswandi, I. (2025). Pengaruh Media Pembelajaran Articulate Storyline 3 terhadap Peningkatan Hasil Belajar IPAS Materi Bagian Tubuh Tumbuhan Siswa Kelas IV Sekolah Dasar. *JiIP - Jurnal Ilmiah Ilmu Pendidikan*, 8(2), 2194–2201. <https://doi.org/10.54371/jiip.v8i2.6659>
- Daryanes, F., Darmadi, D., Fikri, K., Sayuti, I., Rusandi, M. A., & Situmorang, D. D. B. (2023). The Development of Articulate Storyline Interactive Learning Media Based on Case Methods to Train Student's Problem-Solving Ability. *Heliyon*, 9(4), e15082. <https://doi.org/10.1016/j.heliyon.2023.e15082>
- Fithriyah, D. N., Habibullah, M. R., & Istiqomah, A. D. (2024). Pengembangan Media Pembelajaran Interaktif Berbasis Aplikasi Articulate Storyline 3 pada Materi Days and Months Kelas IV di MI Islamiyah Banat Senori Kabupaten Tuban. *Jurnal Pendidikan Dasar Flobamorata*, 5(2), 190–197. <https://doi.org/10.51494/jpdf.v5i2.1268>
- Ghozali, I. (2021). *Aplikasi Analisis Multivariate*. Badan Penerbit Universitas Dipenogoro.
- Hafinah, W. R., Kusumawardani, R., & Usman. (2019). Pengaruh Media Monopoli terhadap Hasil Belajar Siswa SMA pada Pokok Bahasan Larutan Elektrolit dan Nonelektrolit. *Bivalen: Chemical Studies Journal*, 2(2), 20–23. <https://doi.org/10.30872/bcsj.v2i2.310>
- Hasanah, U., & Sunarno, W. (2023). Pengembangan Media Pembelajaran Interaktif Berbasis Macromedia Flash dengan Pendekatan Project-Based Learning pada Materi Usaha dan Pesawat Sederhana untuk Kelas VIII SMP. *JIPF: Jurnal Ilmu Pendidikan Fisika*, 8(2), 98–106.
- Husaeni, A. S., Hidayat, R., & Khadijah, I. (2023). Peran Literasi Digital terhadap Kemampuan Berpikir Kritis Siswa pada Mata Pelajaran Bahasa Indonesia Kelas V MI. *JiIP - Jurnal Ilmiah Ilmu Pendidikan*, 6(11), 8913–8918. <https://doi.org/10.54371/jiip.v6i11.2697>
- Ismaniati, C., & Iskhamdhanah, B. (2023). Development of Interactive E-Modules to Increase Learning Motivation and Science Literacy in Elementary School Students. *Jurnal Iqra': Kajian Ilmu Pendidikan*, 8(1), 156–173. <https://doi.org/10.25217/ji.v8i1.2699>
- Jannah, M., & Nurdiyanti, N. (2021). Pengaruh Pembelajaran Online Berbantuan Google Classroom terhadap Hasil Belajar Peserta Didik pada Materi Sistem Peredaran Darah pada Manusia Kelas XI SMA Buq'Atun Mubarakah Makassar. *Jurnal Riset Dan Inovasi Pembelajaran*, 1(1), 75–84. <https://doi.org/10.51574/jrip.v1i1.21>













- Laliyo, L., Djalil, Moh. R., & Bialangi, N. (2023). Identifikasi Kesulitan Belajar Siswa dalam Memahami Konsep Kimia Koloid di Kelas XI SMA. *JRPK: Jurnal Riset Pendidikan Kimia*, 13(1), 37–42. <https://doi.org/10.21009/jrpk.131.05>
- Lestari, N., & Susanto, H. (2023). Pengembangan Media Pembelajaran Interaktif Berbasis Articulate Storyline Berbantuan Canva pada Materi IPA. *Jurnal Teknologi Pendidikan*, 25(1), 45–57.
- Lusiana, I. S., Susongko, P., & Nafiati, D. A. (2024). Desain Instrumen Tes Capaian Pembelajaran Matematika dengan Uji Validitas Pearson Correlation. *Journal of Education Research*, 5(4), 5666–5675. <https://doi.org/10.37985/jer.v5i4.1700>
- Miles, M. B., and Huberman, A. M. (2007). *Qualitative Data Analysis*. UI Press.
- Munawir, M., Rofiqoh, A., & Khairani, I. (2024). Peran Media Interaktif dalam Meningkatkan Motivasi Belajar Siswa pada Mata Pelajaran SKI di Madrasah Ibtidaiyah. *Journal of Digital Learning and Education*, 5(1), 1–8. <https://doi.org/10.52562/jdle.v4i1.879>
- Natsir, S. Z. M., Rubini, B., Ardianto, D., & Madjid, N. (2022). Interactive Learning Multimedia: A Shortcut for Boosting Gen-Z's Digital Literacy in Science Classroom. *Jurnal Penelitian Pendidikan IPA*, 8(5), 2168–2175. <https://doi.org/10.29303/jppipa.v8i5.1897>
- Pradilasari, L., Gani, A., & Khaldun, I. (2020). Pengembangan Media Pembelajaran Berbasis Audio Visual pada Materi Koloid untuk Meningkatkan Motivasi dan Hasil Belajar Siswa SMA. *Jurnal Pendidikan Sains Indonesia*, 7(1), 9–15. <https://doi.org/10.24815/jpsi.v7i1.13293>
- Prastika, N. D., Anjarwati, D., Awaliah, M. A. S., Hartandi, D., Rahmadani, A., & Erika, F. (2024). Kajian Literatur Pemanfaatan Teknologi Artificial Intelligence untuk Meningkatkan Keterampilan Abad 21 Siswa dalam Pembelajaran Kimia. *Jambura Journal of Educational Chemistry*, 6(1), 47–60. <https://doi.org/10.37905/jjec.v6i1.23644>
- Sa'adah, S. I., & Ikhsan, J. (2023). Validity and Reliability Test of the Learning Independence Questionnaire Instrument in Using Electronic Modules. *Jurnal Penelitian Pendidikan IPA*, 9(12), 11173–11180. <https://doi.org/10.29303/jppipa.v9i12.4466>
- Santoso, R., Roshayanti, F., & Siswanto, J. (2021). Analisis Literasi Lingkungan Siswa SMP. *Jurnal Penelitian Pendidikan Sains*, 10(2), 1976–1982. <https://doi.org/10.26740/jpps.v10n2.p1976-1982>
- Setianingrum, T. U., Biru, L. T., & Nestadi, A. (2023). Pengembangan Media Pembelajaran Articulate Storyline Berbasis Inquiry Learning pada Materi Pencemaran Air dalam Menumbuhkan Kemampuan Berpikir Kreatif Siswa SMP. *PENDIPA Journal of Science Education*, 7(1), 43–52. <https://doi.org/10.33369/pendipa.7.1.43-52>
- Simbolon, Widyowati, I.I., & Kusumawardani, R. (2018). Pengaruh Penggunaan Media Pembelajaran Bonding Board dengan Model Pembelajaran Quantum Teaching

Berbasis Visual, Auditori, Kinestetik (VAK) terhadap Pemahaman Siswa pada Materi Ikatan Kimia. *Bivalen: Chemical Studies Journal*, 1(1), 21–26. <https://doi.org/10.30872/bcsj.v1i1.276>

Sugiyono, A. (2019). *Metode Penelitian Pendidikan: Pendekatan Kuantitatif, Kualitatif, dan R&D*. Alfabeta.

Winarti, A., & Karenina, T. S. (2024). Pengembangan Multimedia Interaktif Berbasis Articulate Storyline pada Materi Kimia Koloid Peserta Didik. *JCAE (Journal of Chemistry And Education)*, 7(3), 124–136.

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