

DEVELOPMENT OF INSTAGRAM-BASED LEARNING MEDIA TO INCREASE STUDENTS LEARNING INTEREST IN ACID-BASE MATERIALS

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ABSTRACT

This study aims to determine the feasibility of Instagram-based chemistry learning media and the results of increasing student interest in learning acid-base material in everyday life with a multi-representation approach. The method used in this study is the ADDIE research and development model (Analysis, Design, Development, Implementation, and Evaluation). The research population is SMAN 3 Sidoarjo students, with the sample used being 89 students who carry out learning using Instagram in acid-base material in everyday life. Quantitative data was obtained from material and media validation results, as well as an analysis of student interest in learning before and after using the media. Qualitative data were obtained by analyzing descriptive questions of student learning interest in chemistry questionnaires. The results of the research on developing Instagram-based chemistry learning media on acid-base materials in everyday life with a multi-representation approach were obtained: 1) the feasibility of learning media developed based on the results of the assessment of materials and media by expert validators was included in the very feasible category; 2) the increase in students' learning motivation is in the medium category with a standard gain value of 0.40.

Keywords: Instagram, learning media, learning interest, acid-base, chemistry.

INTRODUCTION

Problems in education from this modern era must be resolved immediately. This problem includes aspects of the quality of education and supporting components for achieving learning objectives (do Amaral & Fregni, 2021). The quality of learning can be improved by innovating learning media that are adaptive to the current situation and integrated with technology (Yunus & Fransisca, 2020). This learning media facilitates student needs, including challenging facilities and infrastructure, liveliness, creativity, and the ability to innovate, be fun, and develop learning based on information and communication technology (Setiawan et al., 2021). Technology can provide more diverse learning facilities, including online learning (Bramastia & Purnama, 2021). Therefore, there is a need for adaptation for students in carrying out online learning.

Online learning also increases the intensity of students' use of gadgets. This gadget's use also impacts increasing the intensity of using social media (Gil-Fernandez & Calderon-Garrido, 2022). Students will open social media to spend their free time during the online learning process. 80% of people feel that social media can be used as entertainment and a distraction when dealing with daily routines during a pandemic (Rohmah, 2020). Instagram is one of the many social media that teenagers love. Instagram, as of July 2021, is known to have a total of 91.77 million users. The most dominant users are in the age segment 18-24 years, namely 36.4% (Annur, 2021). However, so far, Instagram has only been used as a medium of entertainment for its users because it has various features and meets the need to access photos, videos, and text. However, the use of Instagram certainly has a positive impact on students.

The use of Instagram brings many positive benefits that students can obtain. Students can find information easily, contact, and maintain kinship with family and friends. Instagram can be a means of increasing creativity, an entrepreneurial means of selling trending products, and a fun entertainment medium (Acun, 2020). Instagram has become essential to student interaction and lifestyle (Argyris et al., 2020). In addition, many smartphones provide free social media services for their users. The usefulness of Instagram is supported by features that are useful for students.

Instagram has several features that can support the online learning process, namely live streaming, which can be used as a teleconference for teachers to explain learning material to their students (Nawi et al., 2023). The post-feed feature can allow students to show their work results and work exhibitions online (Hussain et al., 2018). Instagram can present works and learning materials in videos or animations with a maximum duration of 30 minutes and a minimum of 1 minute (Ye et al., 2020). Instagram learning media can support the learning process but has not been used optimally.

The learning media used so far could have been more interactive and exciting (Khairunnisa, 2020). The use of learning media that is monotonous and unpleasant makes students bored in the online learning process. Passive learning makes students bored quickly, making it less effective (Pratiwi et al., 2020). Chemistry subjects that are abstract and conceptual experience problems in the implementation process. If it is not immediately addressed, there will be a decrease in learning outcomes.

Based on Bramastia's research, it can be seen that the weakness of the online learning process in chemistry at SMAN 6 Serang City is that 67.7% of students find it challenging to understand the material, 61.5% of students experience network or signal problems, 46.9% of students find it very dull, and 26.2% of students feel stuttered in the process of using media or technology. Therefore, online learning in chemistry is less effective (Bramastia & Purnama, 2021).

One of the chemistry materials that students need help understanding is acid and base materials. This acid-base material has basic competency knowledge about determining acid-base substances, differentiating the concept of acids according to Arrhenius, Brønsted-Lowry, and Lewis, determining natural materials that can be used as indicators, and identifying color changes of indicators in various solutions. Based on previous research data, the obstacles faced by students included 57.6% of students having difficulties using terms in acid-base material and 59.5% of students experiencing problems related to understanding the concept intact. The division of sub-materials that were considered problematic by students included the concept of acid theory, the concept of acid-base indicators, the concept of pH, the concept of ionization constants, and the concept of pH in life (Sanjiwani et al., 2018). These students struggle with learning because acids and bases are conceptual, abstract, representative, and very close to everyday life. The concept of acid-base matter requires understanding macroscopic, submicroscopic, and symbolic multi-representation. If students have problems understanding one of the representations, fully understanding the concept of acid-base material will not be easy (Widarti et al., 2020). Making it easier for students to understand the material requires a high interest in learning.

Interests are feelings of liking, interest, focus, persistence, effort, knowledge, and skills. Interest in learning is known through 3 indicators: interest, attention, and student learning motivation (Winoto & Prasetyo, 2020). Interest in learning supports students to be more active and continue to understand knowledge related to that field. Students will have high enthusiasm for learning material because of the feelings of pleasure it generates. Student attention will increase concentration, making it easy to grasp the learning

material (Ariyanto et al., 2020). Therefore, interest in learning must continually be improved. Based on this description, it is necessary to implement research titled “Development Of Instagram-Based Learning Media To Increase Students Learning Interest In Acid-Base Materials.” This research is expected to increase students’ interest in learning chemistry.

METHOD

Research Design

In learning media development, adopt the method developed by Robert Maribe Branch. This method has five steps: analysis, design, development, implementation, and evaluation (Soesilo & Munthe, 2020). The five steps will be described in depth and discussed as follows:

The first step, namely the analysis stage, consists of two stages: analysis of the needs of learning media used by students and teachers and analysis of acid-base material. The first stage is an analysis of the learning media needs used so far and what kind of media students and teachers want. Concept analysis is needed to identify acid-base material that will be included in learning media. Researchers mapped acid-base materials in everyday life based on the benchmarks of core competency and essential competency learning that have existed so far.

The second step is the design stage designing and presenting material excitingly and enjoyably to read. Design templates are made in advance so that the overall design of learning media can be uniform and neater. The Instagram feed design contains images that match the topic of the material and choose exciting typography. The video reel that is made must look for clips that are per the learning material. This design pays attention to the aspects of the material’s beauty, readability, and coherence so that readers are clear when viewing the feed or reel on the Instagram homepage. Then it will create an Instagram account for researchers to post material regularly, and students can access it easily.

This third step is developing Instagram-based learning media, referring to the initial media planning. Several stages were passed by researchers in developing learning media in the form of Instagram, namely making feeds, stories, and learning videos, which would later be uploaded periodically according to the order of acid-base topics. The learning media was validated by a team of media experts and material experts to determine the feasibility level of using the media. After that, the researcher will make improvements to both the media and materials to the validator team’s directions and suggestions so that they are expected to obtain quality content and learning media.

The fourth step is the implementation stage of Instagram-based learning media by conducting trials on students. Students can access accounts @chemsquad.kimia to obtain the latest material updates so that learning media’s response and level of attractiveness are known.

The last step is the evaluation stage of the implementation results that have been carried out on the products made. This stage is a reflection and suggestion for implementing similar research in the future so that it is expected to obtain maximum results.

Time and Place of Research

This research was conducted at SMAN 3 Sidoarjo, located at Jl. Dr. Wahidin No.130, Sekardangan, Kec. Sidoarjo, Kabupaten Sidoarjo, Jawa Timur. The research was carried out in the odd semester of the 2021/2022 school year. This research starts from December 2021 to February 2022, from preparation to implementation or media trials.

Research Subject

The target students of the learning media developed are SMAN 3 Sidoarjo Class XI IPA 1, 3, and 4 students.

Data Collection Instruments

This study uses instruments that assist in retrieving the necessary research data. The instruments used were needs analysis questionnaires, validation sheets, Instagram feeds, videos, and learning interest questionnaires.

Data Analysis Technique

Data analysis in this study used qualitative and quantitative analysis techniques. Qualitative data in this study are in the form of input and suggestions from expert validators. Meanwhile, quantitative data was obtained by distributing questionnaires analyzing learning media needs and questionnaires responding to students' learning interests. The data will then be processed to obtain an overview of the results. These results will be a benchmark for the extent of success and achievements in a study. The results of data analysis are used as a guideline for improving Instagram-based learning media.

Analysis of learning media needs related to the use of Instagram social media by students is analyzed using the percentage formula as can be seen in Formula 1 (Sugiyono, 2018):

$$P = \frac{F}{N}$$

Information:

P: Percentage of student scores

F: Frequency of student scores

N: The number of students

The feasibility analysis of Instagram learning media is intended for teachers and students. This learning media feasibility questionnaire contains questions with semi-open answers. The writing order is the title, statement from the researcher, respondent identity, instructions for filling in, and question items. Quantitative questionnaire data can use a Likert scale as a measurement scale to be converted into a percentage value. This scale is arranged with five responses in the form of granules. This measurement scale was developed and modified by Riduwan's previous research. Quantitative analysis can be obtained from each answer in the form of a score, as shown in Table 1.

Table 1. Assessment Scores for The Questionnaire Answer Choices

Number	Quantitative Analysis	Those enrolled
1	Very Good	5
2	Good	4
3	Enough	3
4	Not Enough	2
5	Very Less	1

The assessment is given using a scale of one to five, describing very good, good, enough, less, and strongly disagree. The level of scale measurement in this study uses intervals. Interval data can be analyzed by calculating the average answer based on the score of each answer from the respondent.

$$\text{Percentage of Respondents' Answers} = \frac{\text{Number of Scores Obtained}}{\text{Total Highest or Ideal Score}} \times 100 \%$$

The results of the assessment scores are then averaged from some trial sample subjects and converted into assessment statements to determine the quality and usefulness of the resulting product based on user opinion. Converting scores into these assessment requirements can be seen in Table 2.

Table 2. Learning Media Feasibility Scale

Percentage Score (%)	Interpretation
81% - 100%	Very Worth it
61% - 80%	Worthy
41% - 60%	Decent Enough
21% - 40 %	Less Eligible
0 % - 20 %	Very Less Worth It

Based on the table data above, the resulting score assessment results become a reference for the feasibility of the media and materials that have been developed. Learning media using Instagram for students' learning interest in acid-base solution material in everyday life with a multi-representational approach is categorized as very worth it or worthy.

The questionnaire results can be processed into percentages with the help of the Linkert scale as the measurement scale. This scale is prepared with five responses in the form of grains. This measurement scale was developed and modified by Riduwan's previous research. Quantitative analysis can be obtained from each answer as a score in Table 3.

Table 3. Assessment Scores for The Answer Choices for the Student Learning Interest Questionnaire

Number	Quantitative Analysis	Those enrolled
1	Very Good	5
2	Good	4
3	Enough	3
4	Not Enough	2
5	Very Less	1

After the average value is obtained, the next step is calculating the increase in student learning interest. Increased student interest in learning can be seen through the normalized Standard Gain value with the following equation (Sundayana, 2015).

$$\text{normalized gains } (g) = \frac{\text{final motivation score} - \text{initial motivation score}}{\text{maximum score} - \text{initial motivation score}}$$

The resulting Standard Gain value is then interpreted according to Table 4, which is as follows:

Table 4. Interpretation of Modified Normalized Gain

Normalized Gain Value	Interpretation
$-1.00 \leq g < 0.00$	There was a decline
$g = 0,00$	Still
$0.00 < g < 0.30$	Low
$0.30 \leq g < 0.70$	Medium
$0.70 \leq g < 1.00$	High

RESULTS AND DISCUSSION

Analysis Results

In this analysis stage, the researcher analyzed the learning media needs of students and teachers. This questionnaire contains essential indicators of students' needs for Instagram-based learning media. In addition, regarding support from schools in terms of means, it intends to find out how necessary Instagram media can be used in the teaching and learning process and the development of Instagram-based learning media by teachers. Eighteen statement points describe essential indicators related to the development of learning

media that have been carried out by teachers and used by students so far. Then, there are 12 indicators of questions asked to the teacher so that the development of Instagram-based learning media can be known so far. The questionnaire respondents consisted of 89 students from SMAN 3 Sidoarjo who came from 3 classes, namely XI MIPA 1, 3, and 4, who took acid-base chemistry subjects. Other respondents consisted of 2 chemistry teachers from SMAN 3 Sidoarjo. Filling out a questionnaire for analyzing the needs of learning media by students can be shown in Table 5 below:

Table 5. Results of Analysis of the Needs of Facilities for Instagram-Based Learning Media by Students

Number	Questions	Answer Options	Percentage
1	You have Instagram.	Yes	98.1
		No	1.9
2	Use Instagram regularly.	Yes	65.4
		No	34.6
3	Period of use of Instagram.	2-3 years	25
		> 3 years	75
4	Number of hours used Instagram per day.	3-4 hours/day	84.6
		> 4 hours/day	16.4
5	What are you using Instagram for?	Study	3.8
		Social/Play/Entertainment	96.2
6	The school has internet/wifi	Yes	96.2
		No	3.8
7	The learning media used by the teacher has been integrated with Instagram in learning activities.	Yes	75
		No	25
8	If the answer is YES, how often do you use the media?	Every Meeting	2.3
		Several Meetings	97.7
9	The teacher introduces Instagram Feeds and Video Reels for learning activities.	Yes	67.7
		No	42.3
10	Using Instagram Feeds and Video Reels is a necessity for you?	Yes	53.2
		No	46.8
11	Using Instagram Feeds and Video Reels can make learning activities more fun.	Yes	63.5
		No	36.5
12	You have difficulty learning chemistry in acid-base material in everyday life.	Yes	55.8
		No	44.2
13	You already know about the multirepresentational approach in the chemistry learning process.	Yes	55.8
		No	44.2
14	Teachers have used a multirepresentational approach to acid-base material in everyday life.	Yes	69.2
		No	30.8
15	The teacher has provided sufficient and understandable explanations in learning acid-base chemistry material in everyday life with a multirepresentational approach.	Yes	25
		No	75
16	Teachers have used Instagram in chemistry learning media in acid-base material in everyday life with a multirepresentational approach.	Yes	26.9
		No	73.1
17	If the answer is NO, is it necessary to use Instagram media in the form of Instagram feeds and video reels in learning chemistry in acid-base materials in everyday life with a multirepresentational approach?	Yes	45.8
		No	54.2
18	Do you agree if the development of Instagram-based learning media is designed to increase students' interest in learning acid-base material in everyday life with a multirepresentational approach?	Yes	73.1
		No	26.9

This study develops several questions about students' needs for Instagram-based learning media. Based on the results of completing the questionnaire, the needs students need for Instagram-based learning media, especially in acid-base chemistry subjects in everyday life, will be known. The results of questionnaires and data processing in research can refer to Table 5. Based on Table 5 shows that 98.1% of students in grade 11 MIPA 1, 2, 3, and 4, as many as 53 students, have utilized and used Instagram in their daily lives. The students routinely use Instagram to complete their daily activities, as shown by the data of 65.4%. The use of these devices was 94.1% used by students 2-3 years ago with a percentage of 25%, and the majority were used more than three years ago with a percentage of 75%. The duration of using Instagram for students is 3-4 hours per day percentage of 84.6%, and it is used for learning with a small percentage of 3.8%. This finding is supported by previous research that adolescents have supporting facilities in accessing social media through more equitable and stable internet services (Rizky et al., 2018). Therefore, it is easier for 91% of youth aged 16-24 to access massive social media services (Febrianti & Supriyadi, 2020). Social media, especially Instagram, can be used as an interactive learning media popular with students because it has become part of their daily life.

Schools support WIFI facilities to support online or offline learning and achieve maximum learning outcomes. Students stated that 67.7% of teachers had used Instagram-based learning media in the learning process, but as many as 97.7% only used it in a few meetings. In line with this, ruru introduced Instagram feeds and video reels for learning activities. Only 67.7%, so others needed to be literate in using Instagram to support existing learning. Students are highly interested in Instagram feeds and video reels, so they have become necessary to complement their lives, as evidenced by 53.2%. 63.5% of students agree that using Instagram feeds and video reels can make learning activities fun. Media in images will accelerate students' interpretation of a still abstract lesson and increase interest in learning (Safitri & Kabiba, 2020). In addition, the video becomes interactive multimedia with audio-visual elements to actively involve user responses (Hasibuan & Napitupulu, 2021). Instagram feeds and video reels are the right choices for finding information and fun entertainment for students.

Students experiencing difficulties in chemistry learning activities in acid-base material in everyday life can be seen from the data of 55.8% feeling that they have problems with the material. Even though as many as 55.8% of students are familiar with the multi-representational approach in acid-base material, which can help understand abstract chemical material. As much as 69% of teachers have implemented a multi-representational approach to acid-base material in everyday life when learning in class. As many as 75% of students feel they need to understand more about acid-base material in everyday life and feel bored during learning. Multirepresentational learning combines text, realistic images, or graphics, so students will find it easier to understand acid-base learning topics (Yuniarti et al., 2019). The multi-representational learning taught by the teacher can be actualized in the form of Instagram feeds and video reels, which can reduce the boredom experienced by students during the learning process (Ye et al., 2020).

Teachers have never used Instagram in chemistry learning media in acid-base material in everyday life with a multi-representational approach based on data of 73.3%. Instagram-based learning media interests students, especially at SMAN 3 Sidoarjo. This finding is also supported by data that most students at SMAN 3 Sidoarjo have massively used and utilized Instagram in their daily lives, both at school and home. The use of Instagram in the learning process can also motivate students to actively participate in learning activities because of the ease of access anywhere and anytime. Therefore, 73% of students agreed to use Instagram to increase students interest in learning about acids and bases in everyday life with a multi-representational approach.

This questionnaire regarding the analysis of teacher needs for Instargam-based learning media has 12 question item indicators used to identify general needs. Questionnaire indicators can be seen in Table 6.

Table 6. Results of Analysis of Needs for Facilities for Instagram-Based Learning Media by Teachers

Number	Questions	Answer Options	Percentage
1	Teachers experience problems in determining learning media that match the existing material.	Yes No	0 100
2	Teachers use learning media.	Yes No	100 0
3	The teacher has been helped in conveying the material by using learning media.	Yes No	100 0
4	Learning media that have been applied have helped and supported learning activities.	Yes No	100 0
5	Teachers have needed learning media that are already available in schools.	Yes No	100 0
6	Students need learning media that can support self-learning when studying at home.	Yes No	50 50
7	Teachers have used Instagram in learning activities in class.	Yes No	50 50
8	The teacher has used learning media in the form of Instagram.	Yes No	100 0
9	Teachers have an interest in using Instagram as a supporting learning medium.	Yes No	100 0
10	Instagram-based learning media on acid-base material in everyday life with a multi-representational approach needs to be developed.	Yes No	100 0
11	Learning media using Instagram feeds and video reels can increase student learning interest.	Yes No	100 0
12	Learning media in the form of Instagram to increase students' interest in learning acid-base materials in everyday life with a multi-representational approach.	Yes No	100 0

This study uses a qualitative questionnaire. The data obtained is presented in a usual manner representing the results of filling out the questionnaire. Based on the data in Table 6, the points of the learning media used during the previous lesson can be seen.

The teacher has no constraints in terms of determining the material. The teacher entirely agrees that learning media supports and facilitates learning activities. The teacher wants different learning media to add variations to existing learning. Existing learning media provide an overview of abstract chemical material (Pratiwi et al., 2020). Learning media innovations must be carried out to increase the variety of learning and keep up with current developments (Agusti et al., 2021).

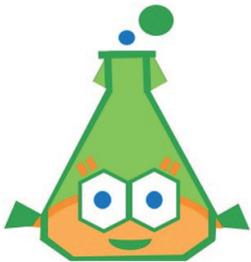
The teacher conveys the need to develop learning media that students can access independently at home. Instagram is indeed something that teachers have yet to use. It is proven that 50% of teachers have used Instagram to help the learning process, even if only a few times. Teachers have an interest in using Instagram, primarily because of the students' high interest in using Instagram. Learning media in the form of feeds and video reels can also be recognized by teachers as attracting students' interest in learning. All teachers are also interested in using Instagram as a learning medium in acid-base materials. An attractive and supportive visual appearance makes it easier for students to gain a complete learning experience and understanding of chemistry material (Safitri & Kabiba, 2020). In addition, the video becomes interactive multimedia with audio-visual elements to actively involve user responses (Hasibuan & Napitupulu, 2021). Instagram is an alternative that can facilitate teachers in explaining material because it can display interactive infographics and videos (Ye et al., 2020). The material analysis process was carried out to map the core and essential competencies of the acid-base material. Existing learning indicators will be described more in correlation with the material so that the content displayed on the Instagram account meets the appropriate learning requirements and criteria.

Results of Design Stages

The design stage is to determine the right visuals to support acid-base learning materials in everyday life. The multi-representational approach demands a description in the form of a microscopic image of a phenomenon or the molecules that make up an existing object. The resulting designs are in the form of images or feeds and video reels that have been captioned. The application used in editing feeds and video reels is Canva.

An Instagram account certainly requires a logo as branding for learning media products that students will recognize. The logo and account name will be the primary display when students access Instagram. A logo can create consistency for Instagram-based social media learning accounts (Adir et al., 2014). A unique and distinctive logo can help the Chem Squad account differentiate itself from similar accounts on social media (Ad'r et al., 2012). The Chem Squad logo can visualize values and messages through learning accounts. This Chem Squad logo design reflects a fun and meaningful chemistry learning topic or goal (Lencastre et al., 2023). The following results from making the Chem Squad logo are in Table 7 below.

Table 7. Logo and Account Name

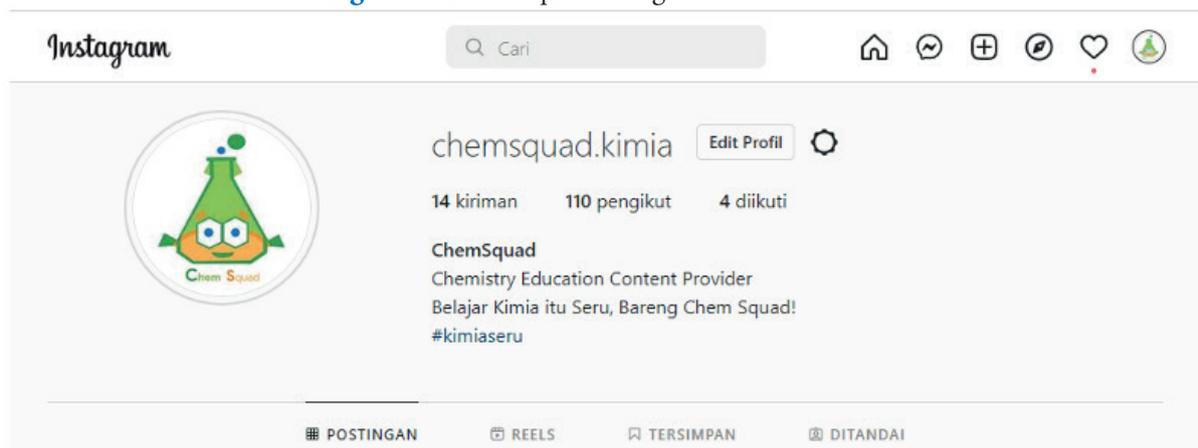
Number	Name	Picture	Information
1	Logo		Chem Squad logo: <ol style="list-style-type: none">1. Reaction Tube, which symbolizes chem squad as a container to explore chemistry.2. The formula for the benzene compound illustrates that chemistry is complex but can be presented easily through this chem squad learning account.3. The bubble image above the test tube shows that a reaction occurs in the tube, so Chem Squad will help students take action and care for the environment.4. Smiling expressions and open arms indicate that chemistry is very open to innovation and can be learned in a fun way.
2	Logo		The Chem Squad or Chemical Troop is a place for students to learn chemistry in an easy and fun way.

The Instagram feeds and video reels that have been made will later be uploaded to the Instagram account periodically for one week. Students can use this learning media as an additional resource besides the existing books and worksheets. Learning content uploaded regularly can increase follower engagement (Ezaldeen et al., 2023). Consistent learning posts can encourage comments and likes and increase user interaction (Dutt, 2023). Postings will be scheduled according to students' free time to access learning content (Gu et al., 2023)s.

Development Stage

The development stage is to create an Instagram social media account. At this stage, a particular Gmail account was created for learning with the name chemsquad@gmail.com. After that, register an existing Gmail to create an Instagram account with the name @chemsquad.kimia and add a brief description of the Chem Squad account explanation, namely "Chemistry Education Content Provider Belajar Kimia itu Seru, Bareng Chem Squad! #kimiaseru".

Figure 1. Chem Squad Instagram Account Profile



Quantitative data obtained in this study contains input and suggestions for improving media and learning media materials. The validation stage aims to ensure the validity of learning media before being tested on students at school. Media validation was carried out by expert validators in media and material by high school chemistry lecturers and teachers.

The results of material validation in learning media will be calculated on average to determine the accurate representation of the final results. The results of this validation contain two aspects of the data: quantitative data derived from the results of the Linkert scale and qualitative data derived from expert validator comments. The validation of this material concerns four aspects: content feasibility, language, correctness, and use of Instagram. More concisely, the results of data recapitulation are presented in Table 8 below.

Table 8. Results of Material Validation by the Validator

Criteria assessed	Validators			Expected total score	Total empirical	Percentage	Criteria
	V1	V2	V3				
1. Main View							
a. The attractiveness of the Instagram interface display	5	4	5	15	15	93,3	Very Worth it
b. The suitability of the color combination and image object with the background	5	5	5	15	15	100	Very Worth it
c. Clarity of font size and shape	4	4	4	15	13	80	Worthy
d. The appropriateness of the placement of the text	5	4	4	15	13	86,67	Very Worth it
Main View Eligibility Average Results						89,99	Very Worth it
2. Image Display							
a. The shape of the image on the Instagram feed	5	4	4	15	13	86,67	Very Worth it
b. Form images in stories and learning videos	5	4	4	15	13	86,67	Very Worth it
c. Image size	5	5	4	15	14	93,3	Very Worth it
d. Image variations	5	4	5	15	14	93,3	Very Worth it
Image Display Feasibility Average Results						89,98	Very Worth it
3. Post View							
a. Title writing	4	5	4	15	13	86,67	Very Worth it
b. Font size in writing	4	5	5	15	14	93,3	Very Worth it
c. Clarity of writing	4	5	5	15	14	93,3	Very Worth it
Image Display Feasibility Average Results						89,98	Very Worth it
4. Instagram accounts are used in acid-base learning in everyday life with a multi-representational approach		5	4	5	15	93,3	Very Worth it
Percentage of Feasibility of Material in Learning Media						90,54	Very Worth it

The results of the material validation for the development of Instagram-based learning media reached 90.41%. According to (Seftiana & Delia, 2021), the validation value in the 81.00% to 100.00% range is very feasible, so it is classified as very valid without revision to be used for trials. Based on research (Rohmah, 2020) that Instagram has supporting features that users can carry out teaching and learning processes virtually. This feature consists of post feeds and Instagram TV, which can spoil users to continue surfing on Instagram.

The feasibility of learning content must meet several predetermined criteria, namely, the material's accuracy, suitability, and completeness. Content eligibility has a scoring result with a percentage of 91.42%, so it is classified as very feasible, valid, or can be used without revision. Instagram-based learning content continuously provides information related to acid-base material based on trusted references (Agusti et al., 2021).

The language's feasibility is compatible with using commonly used Indonesian language rules. This Instagram-based learning media must be reflected in the excellent and correct writing systematics by PUEBI. Good learning media must meet the terms and conditions set by the Ministry of National Education regarding legibility, straightforwardness of information, and conformity with the correct and proper use of Indonesian (Arsanti, 2018). The feasibility of the concept of Instagram-based learning media has met the standard of eligibility for the concept of acid-base material in everyday life by KD and KI learning. The basic concept of standard material will impact the ease of students learning science correctly (Sappaile, 2019).

The aspect of visual feasibility in presenting learning material in an interactive and structured manner based on a series of existing materials. In addition, learning media that displays images will greatly support existing learning media. In addition, learning media that displays images will greatly support existing learning media (Adawiyah et al., 2021). Based on research (Arifuddin & Irwansyah, 2019) that learning videos help students get an overview of material visually and auditorily. They can increase students' knowledge of the material presented by the teacher.

The data from media validation results from the average validator shows quantitative and qualitative data, which must later be processed to represent the final results of a study. The validator will assess the media from several aspects, namely the principal appearance, images, writing, and Instagram interviews. The following is the result of value recapitulation, which can be presented in Table 9 below.

Table 9. Results of Material Validation by the Validator

Criteria assessed	Validators			Expected total score	Total empirical	Percentage	Criteria
	V1	V2	V3				
1. Main View							
a. The attractiveness of the Instagram interface display	5	4	5	15	15	93,3	Very Worth it
b. The suitability of the color combination and image object with the background	5	5	5	15	15	100	Very Worth it
c. Clarity of font size and shape	4	4	4	15	13	80	Worthy
d. The appropriateness of the placement of the text	5	4	4	15	13	86,67	Very Worth it
Main View Eligibility Average Results						89,99	Very Worth it
2. Image Display							
a. The shape of the image on the Instagram feed	5	4	4	15	13	86,67	Very Worth it
b. Form images in stories and learning videos	5	4	4	15	13	86,67	Very Worth it
c. Image size	5	5	4	15	14	93,3	Very Worth it
d. Image variations	5	4	5	15	14	93,3	Very Worth it
Image Display Feasibility Average Results						89,98	Very Worth it
3. Post View							
a. Title writing	4	5	4	15	13	86,67	Very Worth it
b. Font size in writing	4	5	5	15	14	93,3	Very Worth it
c. Clarity of writing	4	5	5	15	14	93,3	Very Worth it
Image Display Feasibility Average Results						89,98	Very Worth it

4. Instagram accounts are used in acid-base learning in everyday life with a multi-representational approach	5	4	5	15	93,3	Very Worth it
Percentage of Feasibility of Material in Learning Media					90,54	Very Worth it

The media validation results based on the data above show a value of 90.54%. Therefore, the learning media developed are feasible, valid, or can be used without revision. According to research (Miftah, 2013), learning media has proven capable of making abstract material concrete. In addition, learning media can generate interest in learning and extrinsic motivation for students to thoroughly understand the material (Pratiwi et al., 2020). The central display aspect with the number of indicators 4 obtains a score percentage of 89.99% which can be categorized as very valid and without revision. The prominent appearance of learning media can support the learning process so that it looks attractive and arouses student learning interest at school or home (Kuswanto & Radiansah, 2018).

The image display aspect with the number of indicators 4 obtains a score of 89.98%, so it is categorized as very feasible. Using attractive images with high quality will make students feel happy using learning media. In addition, classroom learning will be fun, interactive, and easy to use (Damayanti et al., 2021). Based on the results of the display aspect of the writing with the number of indicators 4 obtaining a score percentage of 89.98%, it is categorized as very feasible. A high level of legibility in learning media makes it easy to understand the material. The National Education Standards Agency guides readability in a medium which is one of the essential aspects that must be implemented (Pebriana, 2021).

The results of the material validation in Table 11 related to Instagram learning content that has been completed are feasible based on the validator's directions. Expert validators provide suggestions and comments that are expected to improve learning media more optimistically. The following are comments and suggestions presented in Table 10 below.

Table 10. Results of Comments and Suggestions for Material Validation by Validators

Validators	Suggestions and Comments
V1	<ul style="list-style-type: none"> Media on video reels added subtitles to make it easier for students to understand.
V2	<ul style="list-style-type: none"> The two formulas of benzene referred to as benzene need to be corrected again. Sulfur, $S_{(g)}$ is described as having an octahedral structure, needs to be corrected. The equation for the conjugate acid-base reaction (slide 7), ammonia and hydrogen ions, needs to be improved, especially the structure of the ammonium ion. The equation for the reaction of Cu^+ oxygen, needs to be corrected.
V3	<ul style="list-style-type: none"> The word "substances" needs to be removed and revised. The word "knowing" in the competency achievement indicator is simply replaced inappropriately. The concept map is not correct. The word "how about this" in video reels is replaced with a more standard word (Video Reels number 1). Avoiding chemical words is hard (Instagram feed number 3). Avoid sentences that are less communicative (Instagram Feed number 6). Just delete the word lethal, just delete slide 3, which tells about the formation of sulfuric acid from SO_x gas which reacts with rainwater, slide 5 better tells about the formation of nitric acid from NO_x gas which reacts with rainwater (Instagram feed number 7). On slide 4 ($HCl(g) + H_2O(l)$) using the example of $NaOH(s) + H_2O(l)$ (Instagram feed number 9). Don't write down $\frac{1}{2}$ reaction but immediately write $HCl + NH_3 = NH_4^+ + Cl^-$ (Instagram feed number 11). Slides 5-6 translated into Indonesian (Instagram Feed number 12). Slide 2 (Follow the standard IUPAC writing) (Instagram feed number 14). Add an explanation of what kind of bad impact it caused (Instagram Feed number 28).

Comments and suggestions that expert validators have given regarding learning content material to fix deficiencies so that the Instagram-based learning media that is developed can be improved. The results of the final refinement of the learning media can later be used directly in trying out the learning media for students. These comments and suggestions are presented in Table 11.

Table 11. Results of Media Validation Comments and Suggestions by Validators

Validators	Suggestions and Comments
V1	•
V2	• Images on the Instagram feed are replaced with local, non-European nuances.
V3	• Adding words after progress and given appropriate image illustrations (Instagram feed number 9). • Slide 4 deleted only (Instagram feed number 15). • The video needs to show illustrations of vegetables, flowers and tubers (Instagram Video Reels number 23). • The scene with the video is synchronized with the story being told (Instagram Video Reels number 27).

Then revisions were made to the learning media in the form of Instagram feeds and video reels, which function to perfect Instagram-based learning media so that they are ready for use. Learning media will already be equipped with captions and hashtags that support disseminating learning content on Instagram social media.

Implementation Stage

Field trials are carried out when the learning product has been completed based on comments and suggestions at the material and media validation stages. The purpose of implementation is to find out how there is an increase in student learning interest in class XI MIPA 1, 3, and 4 as many as 89 students before and after using learning media. Students who carry out the implementation of this learning media have relatively varying levels of ability. The trial lasted two weeks, from Friday, 14 January 2022, until Friday, 28 January 2022. The schedule for posting Instagram feeds and video reels is carried out twice a day, namely at 12.30 WIB and 17.00 WIB. In this trial, students were asked to use and access the @chemsquad.kimia account from start to finish. Students are introduced to using Instagram accounts at the beginning of the week and then fill out an interest in learning questionnaire before the trial. The learning process using Instagram is carried out independently using each participant's mobile phone.

The research results related students' learning interests before and after using learning media. This data is obtained from distributing a learning interest questionnaire which students will fill in before using the media, accompanied by a brief explanation of the background to creating innovation and how to use learning media. After one week, students use Instagram-based learning media and fill out an interest in learning questionnaire after the trial. The results of the before and after tests will be compared, and calculate the standard gain, as well as interpreted data describe the results of interest in learning, including low, medium, or high. The results of the interest in learning questionnaire are as follows in Table 12.

Table 12. Results of the Study Interest Questionnaire

Number of Average Questionnaire Scores		Gain Standard	Category
After	Before		
56.51	74.13	0.40	Medium

Based on the study results, the average student experienced an increase in gain in the medium category, with details in Table 13.

Table 13. Results of Analysis of Student Learning Motivation Gains Based on Number of Students

Number	Normalized Gain Value	Interpretation	The number of students
1	$-1.00 \leq g < 0.00$	There was a decline	0
2	$g = 0.00$	Still	5
3	$0.00 < g < 0.30$	Low	27
4	$0.30 \leq g < 0.70$	Medium	41
5	$0.70 \leq g < 1.00$	High	16

Data on interest in learning chemistry consists of questionnaires before and after using Instagram as a source of independent learning. Learning motivation data is qualitative data converted into quantitative data with a two-questioner scale with “yes” and “no” answers. Data on interest in studying chemistry were then averaged for each respondent. The data from filling out the motivation questionnaire before and after using Instagram media was analyzed using gain standards to see improvements.

The results of the motivation questionnaire before using Instagram media showed an average value of 56.51 with medium criteria. This average result is lower when compared to the results of the motivation questionnaire after using Instagram media, with an average result of 74.13. The average results were then analyzed with standard gain showing a result of 0.40 in the medium criteria. This increase shows that Instagram media can provide independent learning for students to increase learning motivation. Students are interested in Instagram-based learning media because it is a viral social media among the younger generation. Many students spend much time on these platforms to interact with friends, follow accounts they are interested in, and get the latest information. Based on data, there are 109.33 million Instagram users in Indonesia as of April 2023. This number has increased by 3.45% compared to the previous month, which was 105.68 million users (Shellanabilla et al., 2022). Regarding age, 38% of Instagram users in the country are in the 18-24 age group. As many as 30.1% of social media users are from the 25-34 age group (Hafidz et al., 2017).

Students are highly interested in Instagram as a visual-based platform that displays images and videos (Gomez-Ortiz et al., 2023). The power of this visual can attract students because humans tend to more easily remember and understand information presented in visual form (Smelhausova et al., 2022). When information is taught through exciting images or videos, students tend to be more engaged in learning. The use of audio-visual media can increase the learning activities of the class (Rosa-Castillo et al., 2022).

Instagram can be accessed anytime, so students can access learning materials, assignments or discussions whenever they want (Richter et al., 2022). Instagram can help students with busy schedules or in a different time zone than the teacher (Lovina et al., 2021). Learning material is delivered through a platform they are familiar with and use daily, making students interested in learning (Indrawati, 2021). This flexibility is crucial in distance education or e-learning. Students from various parts of the world can access learning materials without being in the exact physical location (Gomez-Ortiz et al., 2023).

An everyday life-based approach can teach students how to use chemistry concepts to solve everyday problems, such as choosing safe chemical products for home use or understanding the impact of chemicals in the environment (Nara & Sata, 2016). Life-based learning can help them develop beneficial problem-solving skills. When chemistry material is related to everyday life, students are more likely to see the relevance and importance of the lesson in their lives (Laseinde & Dada, 2023). They can relate chemistry concepts to real situations they experience, which can motivate them to learn more deeply. Applying practical methods based on daily life to the science process skills of class XI MIA MAN 1 Mataram students can increase the value of students' science process skills by 84.8% (Astuti et al., 2019).

Calculating the standard gain in the interest questionnaire results for 89 respondents showed an increase from the analysis results in Table 12. Student interest before using Instagram media showed a lower value compared to the results after using Instagram-based learning media. In the standard gain measurement, five students did not experience an increase in results, and 27 students experienced an increase in motivation with low criteria. Forty-one students experienced moderate improvement, and 16 students experienced high improvement. These results show differences in student acceptance of using Instagram-based learning media. This difference is likely due to students having different initial knowledge and abilities. This ability influences the extent to which students can utilize Instagram-based learning media (Yunitasari & Hanifah,

2020). Students with high prior knowledge and skills may be better able to integrate and apply learning material in social media, while students with low prior skills may experience difficulties (Zulkarnain, 2019). Each student has a different learning style, which is the second reason for differences in the results of research trials. Some students prefer visual learning, while others prefer auditory or kinesthetic learning (Goosen & Steenkamp, 2023). Instagram-based learning media may be more suitable for some learning styles than others, influencing their learning outcomes (Yotta, 2023). The research results on student learning styles for differentiated learning show that class VI students have diverse learning styles. It is proven that students' learning styles are 47% visual, 31% auditory, and 21% kinesthetic (Himmah & Nugraheni, 2023). This difference is a challenge for teachers to implement differentiated learning strategies.

External factors such as environmental disturbances, social pressure, or personal problems can influence student learning outcomes (Ridho'i, 2022). Students who experience stress or disruption may tend to achieve lower results (Langen & Stamov Roßnagel, 2023). Social problems in students, such as bullying, may make it difficult to concentrate on learning (Johansson et al., 2022). External factors that influence the learning outcomes of class VIII students at SMPN 3 Singaraja for the 2018/2019 academic year show that the average percentage of internal factors in the questionnaire is 33.46%, and the average percentage of external factors is 29.45%. The questionnaire results showed that the relationship between family members was 19.588%, the family economy was 13.555%, student activities in the community were 4.182%, and the influence of relationships was 3.029% (Suarawan et al., 2019).

Evaluation Stage

Based on the implementation stages, the Chem Squad Instagram account must be evaluated for future development. At the evaluation stage, data collection was carried out for suggestions and input from students during the process of using the Chem Squad account. Based on the input and suggestions of students who were confronted with the Chem Squad Instagram account, namely adding guessing material content or QnA about acid-base material in everyday life, giving lots of learning content in the form of videos because it is more interesting, adding other chemical material to Instagram accounts. The comments and opinions of students as a whole are interested and can learn chemistry in a fun way. This research shows that Instagram-based learning media Chem Squad is very feasible to use. The responses and input will be used as a basis for product improvement for further research. Another obstacle when using Instagram-based learning media is ensuring that the content presented on Instagram follows the established curriculum and learning standards. Teachers must monitor and select content carefully. Instagram or other social media use must be relevant to the learning objectives and material being taught. These must be carefully integrated into the learning plan. Students should be assured that all learners have access to the platform and that no one feels left behind because they do not have an appropriate account or device.

CONCLUSION

Based on the research results obtained, the conclusions are drawn as follows:

1. The development of Instagram-based chemistry learning media on acid-base material in everyday life with a multi-representative approach is feasible. The score assessment with an average material value shows a percentage of 90.41%, so it is feasible. The media aspect was declared fit for use with an average value showing a percentage of 90.54%, so it was included in the very feasible criteria.
2. Increasing students' interest in learning after utilizing learning media based on Instagram accounts (Chem Squad) on acid-base material in everyday life with a multi-representational approach shows a standard gain with an increase of 0.40 in medium criteria.

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