Edukimia
e-ISSN: 2502-6399
http://edukimia.ppj.unp.ac.id/ojs/index.php/edukimia/

RESEARCH ARTICLE

Pengembangan Media Pembelajaran Menggunakan Instagram pada Materi Kesetimbangan Kimia Sebagai Sumber Belajar Mandiri Siswa Kelasa XI SMA

Development of Learning Media Using Instagram on Equilibrium Chemistry Topic as Independent Learning Resource for 2nd Grade Senior High School Students

A Khoirunnisa[1*], and Suryelita[1]

[1] Chemistry Education, Padang State University, Jl. Prof. Dr. Hamka, Air Tawar Barat, North Padang, West Sumatra, Indonesia. 25171.

* aftika2701@gmail.com

ARTICLE INFO

Received on:
10 December 2022

Revised till:
31 January 2023

Accepted on:
02 February 2023

Publisher version published on:
17 May 2023

ABSTRACT

Chemical equilibrium is a lesson material for 2nd grade of senior high school in chemistry subject. The material is difficult for some students to understand because the characteristics of the material are abstract and count a lot. Independent learning is required to better understand this topic. Social media can be used as an innovative source of independent learning, one of which is instagram. The utilization of this platform can attract interest in learning because most students are instagram users. But there are no accounts that have been found that use it to share chemical equilibrium learning media. The research was carried out to develop chemical equilibrium learning media using instagram and uncover its validity and practicality. The type of research is educational design research with the plomp model which consists of three stages, namely: preliminary research, prototyping stage, and assessment phase. The research is limited to prototype stage iii. The research subjects were unp chemistry lecturers, chemistry teachers, and students of sman 3 padang. Validation data processed using aiken's v formula shows that the media is valid with a value of v = 0.9. Practicality tests on teachers and students in small groups stated that the resulting media was very practical.

KEYWORDS

Chemical Equilibrium, Instagram, Learning media, Plomp

ABSTRAK

Kesetimbangan kimia merupakan pelajaran kimia kelas XI SMA. Materi tersebut sulit dipahami sebagian peserta didik karena karakteristik materinya abstrak dan banyak hitungan. Diperlukan belajar mandiri untuk lebih memahami topik ini. Media sosial dapat digunakan sebagai inovasi sumber belajar mandiri yang kekinian salah satunya adalah instagram. Pemanfaatan platform ini dapat menarik minat belajar karena sebagian besar siswa merupakan pengguna instagram. Tetapi belum ditemukan akun yang memanfaatkannya untuk membagikan media pembelajaran kesetimbangan kimia. Maka dilakukan penelitian dengan tujuan mengembangkan media pembelajaran kesetimbangan kimia menggunakan instagram serta mengungkap validitas dan praktikalitasnya. Jenis penelitian adalah Educational Design Research dengan model Plomp yang terdiri dari 3 tahap, yaitu: Preliminary Research, Prototyping Stage dan Assesement Phase. Penelitian dibatasi pada tahap prototipe III. Subjek penelitian adalah dosen kimia UNP, guru kimia dan peserta didik SMAN 3 Padang. Data hasil validasi yang diolah menggunakan formula Aiken's V menunjukkan media sudah valid dengan milai V= 0,9. Uji praktikalitas pada guru dan peserta didik dalam small group menyatakan bahwa media yang dihasilkan sangat praktis.

KATA KUNCI

Instagram, Kesetimbangan Kimia, Media Pembelajaran Plomp

1. INTRODUCTION

Chemical equilibrium is a topic of the chemistry subjects for 2nd grade of senior high school with the following sub-materials: (1) Reversible and Irreversible Reactions (2) The Dynamic Equilibrium; (3) The Equilibrium Law (4) The Equilibrium Shift. This material is difficult for some students to understand because of its abstract characteristics and many mathematical calculations[1]. This opinion is following the results of preliminary research by distributing questionnaires that 85% of students stated that chemical equilibrium was difficult. This can be overcome by independent study. Independent learning can increase understanding and ability[2].

Independent learning is a process where students have control over knowledge and the application of appropriate strategies, understand their tasks, and strengthen decision-making and learning motivation[3]. Independent learning activities can be carried out alone or in groups depending on the way students like learning. The learning process can be carried out by utilizing social media technology. Social media is an effective medium used in learning[4]. One of the social media that can be used is Instagram[5].

Instagram is a free social networking service for sharing photos and videos[6]. This social media has a feed, which is a place to share and connect with people or things you like. This feature can be used to enrich learning resources so that they are more varied[7]. The use of Instagram can change students' perceptions of learning[8]. Learning can be more interesting because Instagram is a medium that is widely used and close to the lives of students[9]. Based on the preliminary research questionnaire conducted, it is known that 98% of the 60 students were Instagram users. But this social media has not been widely used in learning[10].

The media included in Instagram contains a brief explanation because it considers aspects of display size and readability rules[11]. Today, students do not like long reading. Students are currently preferring concise reading sources and short sentences[12]. Learning resources that are following these characters can be developed in the form of pictures, videos, colorful writing containing brief material, and shared on Instagram accounts. This social media can be used as a platform for students to open learning anytime and anywhere[13].

The results of the preliminary research questionnaire analysis stated that teachers and students were interested in using Instagram for learning. But no account has been found that contains chemical equilibrium learning. Based on this background, research on the development of learning media using Instagram was carried out on chemical equilibrium material for the 2nd grade of senior high school. The research purpose is to develop a chemical equilibrium learning media using Instagram for 2nd grade of senior high school and to reveal the validity and practicality of the media.

2. METHOD

The research was conducted at the FMIPA UNP and SMAN 3 Padang. The subjects of the research were three chemistry lecturers at UNP, two chemistry teachers, and fifteen students. The type of research is educational design research. The research was conducted following Plomp's research steps which consisted of three main stages, namely: preliminary research, prototyping stage, and assessment phase[14].

The steps taken at the preliminary research stage are 1) needs and context analysis. Needs analysis, namely identifying the use of Instagram and problems in learning chemical equilibrium by distributing questionnaires to 60 students and three chemistry teachers at SMAN 1 Baso, SMAN 3 Padang, and SMAN 8 Padang. These schools are located in the city and village. The aim to use these schools is to figure out Instagram use in general and to distinguish between students in the city or village regarding the use of gadgets and social media. Context analysis was carried out to analyze the range of chemical equilibrium materials used as interventions; 2) a literature study is carried out by gathering information from books, journals, and the internet; 3) the formation of a conceptual framework, to analyze important concepts related to the development of chemistry learning media using Instagram. Based on the results of preliminary research, an initial design was made.

The prototyping stage consists of prototype I, prototype II, prototype III, and prototype IV. Prototype I, resulted from the initial design of an Instagram account containing chemistry learning media. The media design was reflected by self-evaluation and then revised. The result of this evaluation is prototype II in the form of a design whose components are complete.

The complete media design was then reflected through expert review by 5 validators and one-to-one evaluation by 3 students. Based on the validation results, revisions were made to produce prototype II in the form of a valid media design.

Media designs that have been validly evaluated in formative small groups. This step resulted in prototype IV in the form of practical and effective media for use in small groups. The research was limited to the prototyping stage, namely the practicality test of prototype III.

The data collection instruments used were validity and practicality questionnaires. Data validation results are processed and represented using Aiken's V formula[15]. The Aiken's V index was obtained from a comparison between total validator scores minus the lowest score in each category and the number of validators times the number of categories minus one.

The results of the practicality questionnaire are processed and represented by a percentage formula[16]. The percentage obtained by comparison between the practicality value and the maximum practicality value times one hundred percent.

3. RESULT AND DISCUSSION

The results of the research that has been done are explained as follows:

3.1. Preliminary Research

3.1.1. Needs and context analysis

Needs analysis concludes that several problems are related to learning chemical equilibrium and using Instagram, namely: (1) students spend a lot of time playing Instagram; (2) chemical equilibrium material is difficult for some students to understand; (3) students are interested in learning to use Instagram; (4) there is no Instagram account containing chemical equilibrium learning media.

Context analysis produces Indicators of Competence Achievement (ICA) derived from Basic Competency (BC) 3.8 and 3.9[17]. 3.8 describes the reaction equilibrium in terms of the relationship between the reactants and the products of the reaction. The ICA of BC 3.8 are: (1) distinguish between reversible and irreversible reactions; (2) explain the concept of dynamic equilibrium; (3) differentiate homogeneous equilibrium from heterogeneous equilibrium; (4) determine the equilibrium constant for an equilibrium reaction; (5) explain the reaction equilibrium in terms of the relationship between the reactants and the products; (6) analyze the relationship between Kc and Kp; (7) analyze the meaning of the value of the equilibrium constant; (8) describes the dissociation equilibrium.

BC 3.9 analyzes the factors that influence shifts in the direction of equilibrium and its application in industry. The ICA of BC 3.9 is: (1) explains Le Chatelier's principles; (2) analyzes the factors that influence the shift in the direction of the equilibrium; (3) analyzes the application of shifts in the direction of equilibrium in the industry.

3.1.2. Literature Study

The literature study produces references related to research, as follows:

1. Instagram is a free social networking service for sharing photos and videos[18]. Instagram has a feed, which is a feature for sharing and connecting with people or things you like. Social media can be used as an effective innovation to help increase students' interest and learning achievement[19].
2. Chemical equilibrium material contains facts, concepts, principles, and procedures. Examples of the four dimensions of knowledge are obtained from university chemistry books.
3. Relevant research, namely: Development of an Instagram-based e-poster for alkaline concept material, produced a chemistry learning media for alkaline group material in the periodic table in the form of a valid and practical Instagram e-poster[20]. Development of Instagram social media-based mathematics learning media on circle material in junior high school, producing valid, practical, and effective media to improve learning outcomes[21].
4. Educational Design Research follows the steps of Plomp's research consisting of 3 main stages: preliminary research, prototyping stage, and assessment phase[14]. From these stages obtained data validation and practicality. To represent the validation results, Aiken's V formula is used. Practical data is processed using the percentage formula.

3.1.3. Conceptual Framework Development

The conceptual framework refers to all the ideas underlying the research, namely:

1. The problems that underline the research are: the habits of students who spend a lot of time accessing Instagram, difficulty understanding chemical equilibrium material, and chemical equilibrium material not being available on Instagram.
2. The solution offered to overcome the problem is the development of learning media using Instagram as a chemical equilibrium material.
3. The steps taken in producing the media are the Plomp research steps.

The results of the preliminary research were used as a reference in making the initial design of chemical equilibrium learning media using Instagram. The initial design was a @equilibrium_chem account containing chemical equilibrium learning media, which was developed based on the results of preliminary research. Uploads to the account contain (1) Identity which contains the research title, name and supervisor, and institution; (2) BC material; (3) the material following the order of the ICA which is equipped with captions and hashtags; (4) Practice questions.

3.2. Prototyping Stage

The prototyping stage produces prototypes that will be tested and revised based on the formative evaluation. Each prototype and evaluation carried out are:

3.2.1. Prototype I

Prototype I, namely the chemical equilibrium media on Instagram accounts is reflected by self-evaluation. Evaluation is done by completing a checklist of media components. The results of checking indicate that it is necessary to revise the products produced, namely: (1) adding important concepts; (2) correcting the wrong concept; (3) breaking posts into one ICA per post. This improvement resulted in prototype II in the form of a chemical equilibrium learning media using Instagram which has complete content.

3.2.2. Prototype II

The complete equilibrium media chemistry is then reflected through formative expert review evaluation and one-to-one evaluation. An expert review was conducted to test the validity of the developed media. This test was carried out by filling out a questionnaire by three UNP chemistry lecturers and two chemistry teachers at SMAN 3 Padang. This test was carried out using a validity

questionnaire instrument that contains content and constructs validity[22].

The content validation value is V = 0.85 with the representation that the developed media is valid. This is Aiken's opinion that a product can be said to be valid if the value of large V is equal to 0.8 with an error percentage of 4%. The results of this content validity test showed that the resulting media conforms to the scientifically correct chemical equilibrium theory and the 2013 curriculum[23]. This is following the opinion of Plomp (2013), content validity is the suitability of the product content produced with science (also called relevance).

Construct validity was tested to determine the consistency of the resulting product[24]. According to Plomp (2013), each component of research results must be constantly related to one another. The results of construct validity can be seen in Figure 1.

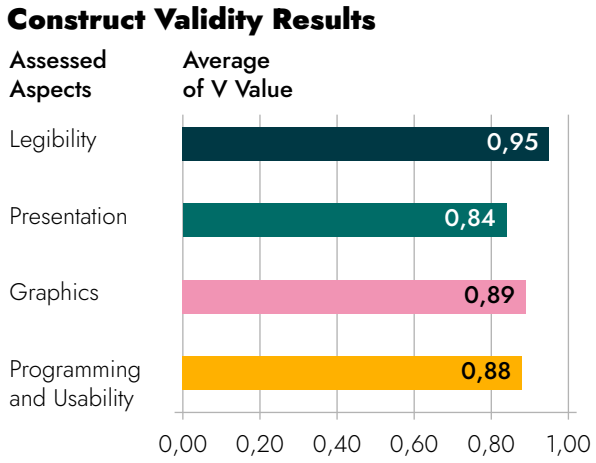

Figure 1. Construct Validity Result

Overall construct validity has a V value of 0.87 with a valid category. The details of each aspect are as follows:

1. The legibility category has a value of 0.95, which means it is valid. This data shows that the developed media complies with PUEBI[25]. In addition, the media presented already has language that is easy to understand so that the desired goals are achieved.
2. The value presentation category obtained is 0.84 with the representation that the developed media is presented in a systematic, clear, and easily observable manner. The presentation of good learning media is media that is easy to see, interesting, simple, accurate, and useful[26].
3. The graphical component gets a V value of 0.89. This shows that the media design is attractive and neat[27].
4. The programming and utilization component gets a value of V = 0.88. This value indicates that the chemical equilibrium learning media using Instagram is following the terms of uploading on Instagram. The media that is uploaded to Instagram must be free from copyright[28].

A one-to-one evaluation was carried out by filling out interview sheets by three students. Students said that the chemical equilibrium learning media using Instagram has an interesting design. This media can also help students understand the material. This was proven through the results of completing the exercises by the three participants. The students wrote the answer on the provided papers. They were able to answer the questions correctly.

Suggestions from expert reviews and one-to-one evaluations serve as the basis for revising. This improvement resulted in prototype III in the form of a valid chemical equilibrium learning media using Instagram.

3.2.3. Prototype III

Valid media were tested for practicality in small groups. The evaluation was carried out by filling out a questionnaire by two chemistry teachers and twelve students at SMAN 3 Padang. The students have used the chemical equilibrium learning media on Instagram to learn the topic and complete the exercise by writing on the provided paper. And then they were filling out the practicality questionnaire to give their opinion about the media.

The practical results obtained from the practicality questionnaire filling data by students obtained a P = 90% with very practical criteria and practicality by the teacher got a P = 91% (very practical). The determination of practicality criteria as per the provisions; namely, if the P-value is in the range of 81% - 100% it means very practical.

The practical results of students and teachers can be seen in Figure 2 and Figure 3.

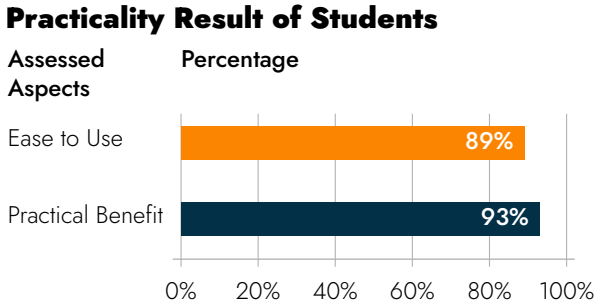

Figure 2. Practicality Result of Students.

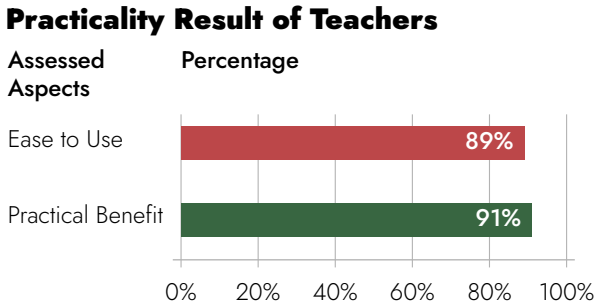

Figure 3. Practicality Result of Teachers.

The practicality aspect of ease of use based on the teacher and student questionnaire was very practical (P = 89%). The data shows that the media developed is easy to access and understand by students. Ease of access could minimize the costs required to obtain learning media. The practicality of research results refers to users and experts who considered the product to be clear, usable, and cost-effective[29]. The practical benefit aspect was in the very practical category with a P score of 91% of students and 93% of teachers. These results illustrate that media can be used to assist students in learning[30]. This formative evaluation produces media that is practical to use in small groups.

4.CONCLUSION

This research produced chemical equilibrium learning media using Instagram as a source of independent learning for 2nd-grade senior high school students. The validity test shows that the resulting media is valid in terms of content and construct with a value of V content is 0.85 and V construct is 0.89. And the small group practicality test shows that the media is very practical to use in small groups with a P-value from the teacher's questionnaire is 91% and students of 89%.

REFERENSI

1. Kadhafi R, Fajaroh F, Afandy D. PENGEMBANGAN MODUL KESETIMBANGAN KIMIA BERBASIS INKUIRI TERBIMBING (GUIDED INQUIRY) UNTUK SMK. UNY: 2013.
2. Uwes O:, Chaeruman A. SUATU MODEL PENDIDIKAN DENGAN SISTEM BELAJAR MANDIRI [Internet]. 2007. Available from: http://www.pustekkom.go.id
3. Chamot AU. The Learning Strategies Handbook. New York: Addison Wesley Longman Inc; 1999.
4. Hapsari S. THE USE OF SOCIAL MEDIA AS EFFECTIVE LEARNING MEDIA DURING THE COVID-19 PANDEMIC. JURNAL PAJAR (Pendidikan dan Pengajaran) 2020;4(6).
5. Nirmalasari V, Liliani E. The Use of Instagram as A Media for Indonesian Learning Assignments. International Journal of Linguistics, Literature and Translation 2022;5(1).
6. About Instagram | Capture, Create & Share What You Love [Internet]. [cited 2023 Jan 9];Available from: Instagram.com: https://help.instagram.com/1986234648360433
7. Ambarsari Z. Prosiding Seminar Nasional PBSI-III Tahun 2020 Tema: Inovasi Pembelajaran Bahasa dan Sastra Indonesia Guna Mendukung Merdeka Belajar pada Era Revolusi Industry 4.0 dan Society PENGGUNAAN INSTAGRAM SEBAGAI MEDIA PEMBELAJARAN BAHASA DAN SASTRA INDONESIA PADA ERA 4.0. UNIMED: 2020.
8. Irwandi, Juariah S. PENGEMBANGAN MEDIA PEMBELAJARAN BERUPA KOMIK FISIKA MENGGUNAKAN INSTAGRAM. Jurnal Ilmiah Pendidikan Fisika "Al-BiRuNi" 2016;05(1):33–42.
9. Salehudin M, Sarimin DS, Rondonuwu RHS, Yunus M, Safiah I. Using Instagram to support creative learning and project-based learning. International Journal of Advanced Science and Technology 2020;29(5).
10. Savina NH, Nyoman AI, Annis DA. Pengembangan Media Pembelajaran Berbasis Media Sosial Instagram pada Pokok Bahasan Limit dan Kontinuitas. UNION: Jurnal Pendidikan Matematika [Internet] 2020;8(3).
11. Mahzum E, Farhan A, Ramadhani E. The Use of Social Media Instagram as Instructional Media for Physics Toward Student's Learning Motivation. Asian Journal of Science Education 2020;2(1).
12. Hikmawati VY, Taufik LM. URGENSI STRATEGI MEMBACA PADA PEMBELAJARAN BIOLOGI. Jurnal Bio Educatio 2017;2(2):40–8.
13. Sallamah IB, As Sabiq AH. Does Instagram as Learning Media Affect Students' Writing Skills on Recount Text?: An Experimental Research. REiLA : Journal of Research and Innovation in Language 2020;2(3).
14. Plomp T, Akker J van den, Bannan B, Kelly AE, Nieveen N. Educational design research / Part A: an introduction. Netherland: SLO Endesche; 2013.
15. Aiken LR. Content Validity and Reliability of Single Items or Questioners. Educational and Psychological Measurement. Malibu: Pepperdine University; 1985.
16. Riduwan, Sunarto. Pengantar Statistika: Untuk Penelitian Pendidikan, Sosial, Ekonomi dan Bisnis. Bandung: Alfabeta; 2007.
17. Kementerian Pendidikan dan Kebudayaan. Permendikbud Nomor 37 Tahun 2018 Tentang Kompetensi Inti dan Kompetensi Dasar pada Kurikulum 2013 pada Pendidikan Dasar an Pendidikan Menengah. KEMENDIKBUD: 2018.
18. Carpenter JP, Morrison SA, Craft M, Lee M. How and why are educators using Instagram? Teach Educ 2020;96.
19. Nugroho IR, Ruwanto B. Pengembangan Media Pembelajaran Fisika Berbasis Media Sosial Instagram sebagai Sumber Belajar Mandiri untuk Meningkatkan Motivasi dan Prestasi Belajar Fisika Kelas XI SMA. UNY: 2017
20. Nazar M, Rahmayani RFI, Aida D, Puspita K. Developing Instagram-Based E-Poster for Learning the Concept of Alkaline Group of Periodic Table. Jurnal Penelitian Pendidikan IPA [Internet] 2021;7(3):458–63. Available from: http://jppipa.unram.ac.id/index.php/jppipa/article/view/733
21. Dhiwangkara B, Arcana IN, Ayuningtyas AD. Developing Learning-based Instagram Media on Derivative. Indonesian Journal of Mathematics Education 2020;3(2):59.
22. Pimenta SS. Development and validation of chemistry learning videos as learning media in the era of the COVID-19 pandemic. Journal

of Sustainability Science and Technology 2021;1(2).
23. Herdini H, Erna M, Aminullah R. VALIDITAS BAHAN AJAR KIMIA PADA MATERI IKATAN KIMIA BERBASIS EXE-LEARNING UNTUK SEKOLAH MENENGAH TINGKAT ATAS/ SEDERAJAT. Jurnal Pendidikan Kimia Universitas Riau 2020;3(2).
24. Khaira U, Yerimadesi Y. Validitas E-Modul Kimia Unsur Berbasis Guided Discovery Learning untuk Kelas XII SMA/ MA. Entalpi Pendidikan Kimia 2021;2(1).
25. Kementerian Pendidikan dan Kebudayaan. Permendikbud No. 50 Tahun 2015 Tentang Pedoman Umum Ejaan Bahasa Indonesia. KEMENDIKBUD: 2015.
26. Nurseto T. MEMBUAT MEDIA PEMBELAJARAN YANG MENARIK. Jurnal Ekonomi & Pendidikan 2011;8(1):18–35.
27. Adriani N, Sabekti AW. Tingkat validitas media pembelajaran kimia berbasis android. Jurnal Zarah 2018;6(2).
28. Suprana WJ. Lisensi Hak Cipta dan Perlindungan Hukum Hak Cipta atas Konten Fotografi dan Potret Dalam Penggunaan Instagram. Binamulia Hukum 2020;9(2):183–96.
29. Marlini. PRAKTIKALITAS PENGGUNAAN MEDIA PEMBELAJARAN MEMBACA PERMULAAN BERBASIS MACROMEDIA FLASH. Jurnal Tunas Bangsa 2019;6(2):277.
30. Putra TDY. Praktikalitas Media Pembelajaran Interaktif Pada Proses Pembelajaran Rangkaian Listrik. INVOTEK 2019;19(1):75–82.