Development and assessment study on web-based chemistry apperception media for teacher

F Susilowati
Universitas Islam Negeri Walisongo Semarang, Indonesia

Corresponding author: fitria_susilowati@walisongo.ac.id

Abstract. Learning process is the most important part which will influence for the next hour of learning. This study aims to develop assess the quality of bilingual web-based of chemistry apperception in acids bases and buffer topics. The model used was a descriptive procedural model. Developed product was guided by two supervisors and got input from content experts, media experts, and peer reviewers. The quality of product was assessed by six high school chemistry teachers, based on 4 assessment components: 1) feasibility of contents, 2) linguistic, 3) aesthetics, and 4) software engineering. The result of this assessment was qualitative data, which tabulated and analyzed using the standard of ideal assessment criteria to determine the quality of product. The result of this research is a chem apperception website, containing chemistry apperception in acids bases and buffer topic. The quality of the product scored 119.167 with percentage 85.12%. As listed on ideal assessment criteria, a very good quality ranged on score $\bar{X} > 117.601$, so it could be concluded that the product has a very good quality. Thus, it can be used as an alternative reference for chemistry teacher to find ideas, to design, and to do their chemistry apperception in the learning process.

Introduction
The main role of a teacher as a manager of learning demands them to organize and facilitate the process. A teacher should give a stimulus, guidance, direction, and encouragement to the students [1]. This kind of stimulus should be given at the beginning of the learning process in order to attract interest, attention and to motivate the students so that the learning process could take place effectively afterward.

A special stimulus at the beginning of the learning process that aims to attract student’s attention is called apperception [2]. This apperception activities not only to create the atmosphere but also aims as a hook, which links the concepts that have been earlier known by the students with the new concepts to be learned. The knowledge that has been earlier owned by the students is called preconception. It is obtained from various student’s experiences, events, and phenomena outside the classroom that built personally [3]. This is in accordance with the constructivism theory which explains that a teacher should facilitate the students to develop new concepts based on their old concepts (preconceptions) [4].

Chemistry is a science which its application demands a number of activities and expertise in memorizing, calculating, and conducting experiments. Most students do not have preferences in chemistry because it is considered something abstract and often requires complex calculations [5]. Chemicals such as acids-bases and buffer solutions have interesting topics and applicable to daily life,
new compounds for students to learn, and also have abstract calculation material. Therefore, the teacher needs proper apperception for each meeting to attract students’ interest and attention.

Rapid technological advancement in the era of disruption 4.0 has brought numerous opportunities for all aspects of human life, including education. Technology presents multimedia technology in the learning process. A well-designed media will greatly help students in understanding the subject hence improve the quality of the outcomes [6]. The internet has become a great opportunity for teachers to get sources of teaching materials through sites such as websites.

Given the important role of apperception, the development and assessment study on web-based chemistry apperception media for teachers is needed. The product is a chemistry apperception website which provides various alternative apperception media to help the teacher to find, design, and present the apperception. This website provides alternative and various chemistry apperception on the topic acids-bases and buffer solutions. The utilization of websites gives easiness and accessible media. Additionally, it supports the teacher’s professionalism in the era of disruption.

Methodology

The development model used in this study was a descriptive procedural model, which outlines the steps that must be followed to produce a product. The development and assessment study of the website passed through four main stages: (1) planning (pre-design and literature study); (2) development (manuscript, product development, product review by subject expert, media expert, and 3 peer reviewers); (3) assessment (product assessment by 6 high school chemistry teachers, data analysis); (4) revision. The research instrument was in the form of a checklist sheet which covers content feasibility, linguistic, aesthetic, and software engineering. The qualitative data were then converted into a quantitative data then analyzed using ideal evaluation criteria to determine the quality of the product.

Result and Discussion

The result was a chem-apperception website that contains various alternative apperception media on the topic of acids-bases and buffer solutions for senior high school teachers. The apperception media were made varied and innovative in the form of electronic images, short videos, national songs, rhymes, metaphores, powerpoint slides, and others. This aims to support teachers to connect the topics with student’s pre-conception. Additionally, the use of various media in such an interesting way can attract students’ attention and motivates them.

| Reviewer | I    | II   | III  | IV   | Total Score |
|----------|------|------|------|------|-------------|
| 1        | 61   | 24   | 16   | 16   | 117         |
| 2        | 56   | 24   | 13   | 12   | 105         |
| 3        | 61   | 28   | 18   | 17   | 124         |
| 4        | 60   | 24   | 16   | 13   | 113         |
| 5        | 67   | 25   | 18   | 19   | 129         |
| 6        | 66   | 27   | 17   | 17   | 127         |
| Total    | 371  | 152  | 98   | 94   | 715         |
| Average Score (\(\bar{X}\)) | 61,833 | 25,334 | 16,333 | 15,667 | 119,167 |
| Range    | \(\bar{X}\) | \(\bar{X}\) | 13.6 < \(\bar{X}\) | 13.6 < \(\bar{X}\) | \(\bar{X}\) |
| Quality Category | Very Good | Very Good | Good | Good | Very Good |
| Percentage | 88.33% | 84.44% | 81.67% | 78.33% | 85.12% |
Based on the assessment of the reviewers, the total score obtained for all components was 119.167 with the percentage 85.12%. In the ideal assessment criteria the category of “Very Good” has the score range $X > 117.601$; so that the chem-apperception website was categorized “Very Good”. A summary of the score obtained could be seen in Table 1 and Figure 1.

The component of feasibility of content covers five subcomponents (apperception scope, apperception accuracy, conformity of content, curiosity encouragement, and sophisticated) obtained average score of 61.833 with percentage 88.33% that could be seen in Table 1. In the assessment ideal criteria the category of “Very Good” has the score range $X > 58.799$; so that the feasibility of content is categorized “Very Good”. Apperception media was developed in accordance with the learning outcomes of the topics (acids-bases and buffer solution). Based on the reviewer’s assessment, the developed product concluded could be use (very feasible) as an apperception alternative for teachers.

The linguistic component includes 2 subcomponents assessment criteria: (1) dialogical and interactive; (2) straightforward subcomponents. The results of this linguistic component which assessed by 6 reviewers got an average score of 25.333 with a percentage of 84.45% could be seen in Table 1. In the ideal assessment criteria the category “Very Good” has a range of scores $(X) > 25.200$; so the component of content eligibility is categorized Very Good. Based on the scores obtained, the language used in the media is dialogical, interactive, and straightforward. The language used makes the apperception easier to understand.

The aesthetic component includes 4 assessment criteria, consisting of presentation, color selection, typography, and layout. The results obtained an average score of 16.333 with a percentage of 81.66% could be seen in Table 1. In the ideal assessment criteria the category of “Good” has a score range of $13.6 < X \leq 16.8$; so the aesthetic component is categorized to be “Good”. It could be concluded that the overall appearance present on the chem-apperception website is interesting and appropriate in color, typography, and layout. This means that the appearance of fonts, images, videos, layout, and colors builds in harmony to form an interesting presentation.

The software engineering component includes 4 assessment criteria: (1) instructions; (2) completeness of the menu; (3) easiness of operation; (4) usefulness of the media. The result of this component obtained the average score of 15.667 with a percentage of 78.33% that could be seen in Table 1. In the ideal assessment criteria the “Good” category has a score range of $13.6 < X \leq 16.8$; so the software engineering component is categorized to be Good. Based on the quality, the component is considered to be good. However, this component has the lowest average score compare to other components, so that the improvements were made. The autorun system was used to help users operate the website.
offline. It means that the website will appear automatically after the compact disk (CD) is inserted into the CD drive.
The final product of this study was a chemistry apperception website contains 38 alternative apperception media that could be use to help teacher to find apperception media in the learning process. The website could be accessed offline which is packaged on a CD.

Conclusion
A web-based chem-apperception media was succeeded developed through forur main procedural steps, planning, development, assessment, and revision. The quality of the website was assessed by six senior high school teachers (reviewers) and achieved the category Very Good with an average score of 119.167; percentage of 85.12%; so that it can be used as an alternative reference for teachers to find and do apperception in the learning process.

References
[1] Mamin Suparmin. (2010). Makna Psikologis Perkembangan Peserta Didik. *Jurnal Ilmiah SPIRIT* 10(2): 28-68.
[2] Munif Chatib. (2009). *Gurunya Manusia*. Bandung: Kaifa.
[3] Gunstone, R.F. (1990). Children’s Science A Decade of Developments in Constructivist Views of Science Teaching and Learning. *Australian Science Teacher Journal* 36(4): 9-19.
[4] Srini M. Iskandar. (2001). Penerapan Konstruktivisme dalam Pembelajaran Kimia di SMU. *Jurnal Media Komunikasi Kimia*. (2): 1-12.
[5] Bennet, Stuart W and O’Neale, Katherine. (1998 ). “Skills Development and Practical Work in Chemistry”. *University Chemistry Education*. 2: 58.
[6] Ali Muhson. (2010). Pengembangan Media Pembelajaran Berbasis Teknologi Informasi. *Jurnal Pendidikan Akuntansi Indonesia* VIII(2): 1-10.
[7] Ida Bagus Putu Arnyana, I Wayan Sukra Warpala, Made Hery Santosa. (2009). Pengembangan Model Pembelajaran Bilingual Preview-Review dengan Seting Kooperatif GI pada Mata Pelajaran Biologi Siswa SMA BI. *Jurnal Pendidikan dan Pengajaran* (3): 178–186.
[8] Eko Putro Widoyo. (2006). *Evaluasi Program Pendidikan*. Yogyakarta: Pustaka Belajar.