Learning Media Development of Web-Blog E-learning on Respiratory System Material in Class VIII SMP

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Abstract. This research is motivated by the use of powerpoint media which continues to be repeated in the learning process resulting in students feeling bored and unenthusiastic in learning. In addition, schools also have not maximized the use of school internet facilities (wifi) in learning, therefore innovation in technology-based learning media is needed. This study aims to evaluate the validity of an e-learning media-based web blog on respiratory system material. The method used in this study is the research and development (R&D) method and the ADDIE model consists of 5 stages namely analyze, design, develop, implement, and evaluate. The sample of the research is class VIII C students of SMP which consisted of 39 students. The instrument used in this study is the form of media validation. The eligibility of an e-learning media-based web blog is measured through a validity test by 6 validators consisting of material and media experts. The materials expert consisted of 2 lecturers of biology education and 1 science teacher. Media experts consist of 2 lecturers of media specialists and 1 teacher of information communication technology. The research results showed that an e-learning media-based web blog on the respiratory system material is appropriate to be used as a learning medium and become a new alternative media for science teachers with an average score of material expert validation at 3.45 and a media expert validation at 3.84.

Keywords: E-learning; Web blog; Respiratory system

Introduction

In the current era of technological development, the use of technology is considered important for students in the learning process. Technology can allow students to learn by collaborating with each other to exchange ideas and even solve a problem. The use of technology in learning is necessary and teachers. In addition, current and future teachers must face the demands of technological development and they are expected to be able to use and even develop technology to improve the effectiveness of the learning environment, can develop knowledge, and involve students through the technology used (Uerz et al., 2018; Lesmono, 2018). According to Al-Hariri & Al-Hattami (2016), technology helps students become independent, proficient members, and researchers. One strategy related to the use of technology in learning is to use learning media. As is well known, the media is a tool used to convey information/messages (Oktariyanti et al., 2021). The information obtained by students will be more meaningful if students carry out their own activities to obtain
information. This is based on the theory of constructivism, that a person will often accommodate and assimilate information obtained with concepts/knowledge that previously existed within him (Adita et al., 2017).

In the world of education, technology can be integrated into the learning process, one of which is in the form of e-learning media or online-based learning. According to Korhonen et al. (2018); Lawrence et al. (2019) & Kurniawan et al. (2022), e-learning is a learning system that uses technology, especially the web, where the storage media is in a server container with a specific capacity, apart from that according to Gilbert & Jones (2001) cit. Nugraheni & Dina (2017) e-learning is the delivery of learning material through an electronic medium such as the internet, intranet/extranet, satellite, broadcast, audio/video tape, interactive television (TV), compact disk read only memory (CDROM), and computer-based training (CBT). E-learning is learning that can take place anytime and anywhere, so it doesn't have to be in one dimension of time and space, meaning it can happen at any time. E-learning is the use of information technology and computers that contribute to changes in student learning activities that no longer listen to material descriptions from the teacher in the classroom (Nugraheni & Dina, 2017; Oktariyanti et al., 2021; Logan et al., 2020). Furthermore, Daud & Rahmadana (2015); Batuthoh et al. (2020), learning that supports the student-centered learning approach is the use of e-learning-based learning media in the form of a website. The use of the web even gives educators the opportunity to implement various practices in teaching, thus providing a new experience in the learning process (Kanbar & Hameed, 2018).

Web blogs are one of the choices for e-learning media that are innovative, creative, relatively inexpensive, and reduce paper usage. Benicsky et al. (2020) and Batuthoh et al. (2020), state that web-based e-learning media is a learning media that utilizes internet technology in the form of a site (blogspot) in the learning process. Blogs can provide a set of tools that can enrich knowledge so that they can respond to the challenges of globalization. Many things can be done in the development of a learning blog, Rokhman et al. (2015) mentioned that with blog media it is easy to provide learning material after receiving lessons or before lessons are carried out. With some of these aspects, media blogs are needed to cover and complete the lack of teaching time.

Respiratory system material is one of the materials studied in class VIII even semester. The scope of the material for the respiratory system includes respiratory organs, respiratory mechanisms, disorders of the respiratory system, and efforts to maintain the health of the respiratory system. According to Utama (2014), material on the human respiratory system is one of the materials that is difficult to understand because of the abstract nature of the material, which is difficult to see directly, so it requires a medium in its delivery. Based on research conducted by Agustina et al. (2014); Batuthoh et al. (2020) and Yuwanti (2013) it is hoped that the use of web blog-based e-learning media on respiratory system material for grade VIII junior high school will be able to provide an understanding of material concepts that are abstract in nature and become real and the explanations can be more comprehensive. Therefore, the development of blogs in this study displays information in the form of a combination of the use of text, images, animations, photos, videos, games, and online forums.

Some research results state that the use of web blog media positively impacts learning, including research conducted by Agustina et al. (2014). The developed blog multimedia product is suitable for use in learning and is relevant to gaining skills in connecting concepts to human food digestion material for class XI IPA at SMA Negeri 3 Pontianak. Web blog media has also received a positive response and can improve the critical thinking skills of class XI IPA students in research of Batuthoh, et al. (2020). Other than that, Yuwanti (2013) states that web blogs can improve student learning outcomes by 83.54% in large group trials on the development of web blogs as learning media in the
subject of smoking addictive substance chemistry for class VIII students of SMPN 1 Prambon Sidoarjo. Based on previous research proves that web blogs have been successfully applied to learning and can improve the quality of student learning.

Based on the results of interviews with science teachers in class VIII SMP Kristen Immanuel II Kubu Raya, the learning process in class uses PowerPoint media. From the results of observations during the delivery of respiratory system material in class VIII C, the repeated use of PowerPoint media in the learning process resulted in students feeling bored and unenthusiastic in learning, this was shown by the behavior of students daydreaming, sleeping, chatting with friends next to them, and doing assignments from another subject when the teacher delivers material on the respiratory system using PowerPoint media. These things can happen because students are less involved in the learning process. PowerPoint has been a tool used to assist educators in teaching for the past two decades. However, PowerPoint was not originally designed to be used in the learning process but only for business presentations. The concise way of presenting PowerPoint and only conveying the core of the presentation material is considered not in accordance with the needs of teachers, especially in delivering learning materials (O'Connor & Donovan, 2018; Baker et al., 2018). Therefore, teachers should be able to make presentations more interesting for students by utilizing tables, pictures, graphs, sound effects, visual effects, clips, and other elements that can be used in more complex presentations (Adonu et al., 2021). The number of elements in PowerPoint and the material to be delivered can be a factor that causes the use of PowerPoint to be not maximized. The school also has facilities in the form of wifi (wireless fidelity) but it has not been utilized in learning, especially science lessons. This is because learning media that requires the use of the internet has not been used. In fact, learning using the internet gives students the opportunity to learn in a flexible and personalized way (Cidral et al., 2017).

In terms of facilities and infrastructure, the school has a computer laboratory with 46 computers equipped with internet and wifi facilities, so that the existence of the internet is familiar to students at school. From the observation results, it can also be seen that the percentage of teachers who already have laptops is 100% and class VIII students who already have laptops is 83%, then the percentage of teachers who already have smartphones is 100% and class VIII students who already have smartphones is 87%. These gadgets or devices are allowed by the school to be brought to school with specific rules and are only used to support learning at school such as finding material or reference material from the internet and presenting the results of group assignments. The completeness of facilities and amenities at the school will make it easier for teachers and students which play a vital role in e-learning success to access and use web blogs as learning media from their respective devices (Amalia & Brata, 2018; Sumardi & Hinas, 2022; Al-Fraihat et al., 2019).

Based on this description, the researcher is interested in conducting this research with the hope that this blog-based e-learning media can be appropriate for use as a learning medium and as well as become a new alternative media for science teachers in carrying out teaching in schools. Based on the description above, this research was carried out to develop a web blog-based e-learning media so that its feasibility could be determined in class VIII respiratory system material.

**Methods**

The research method used is research and development (R&D) using the ADDIE model consists of 5 stages, namely: analysis, design, development, implementation, and evaluation. The analysis phase is carried out by analyzing the problems found in the field, namely the repeated use of powerpoint media, student learning motivation, and internet and wifi (wireless fidelity) facilities that have not been used
optimally. The design phase includes the preparation of a web blog-based e-learning media structure framework; determining the systematic presentation of material, illustrations, and visualization of web blog-based e-learning media; and writing initial product drafts of web-based e-learning media, blogs, and storyboarding.

The development stage of web-based e-learning media includes: creating and assembling blog web pages (blog templates or backgrounds), writing respiratory system material, installing images, videos, and animations, creating groups, installing hyperlinks, games, uploading digital books, writing glossaries, making, and installing questions), carrying out formative evaluations, and preparing research instruments in the form of student response questionnaires which are then validated by the validator. The implementation stage is by utilizing or using learning media in learning activities. At this stage, a limited trial was carried out in small groups of class VIII students to find out student responses to e-learning media. The response questionnaire was carried out after students finished accessing web-blog-based e-learning media directly through computers in the school's computer laboratory.

The evaluation phase is carried out during the development and implementation stages. The evaluation stage includes formative and summative, namely formative evaluation is carried out to determine product quality. The formative evaluation in this study was validation from material experts and media experts while the summative evaluation was intended to determine student responses to the use of web blog-based e-learning media. Data collection techniques in this study were indirect communication techniques in the form of material and media validation sheets. Then analyzed using stages that refer to Khabibah (2006) and Yamasari (2010).

The sampling technique used in this study was purposive sampling. The considerations used in determining the sample are based on the class with the lowest score on the respiratory system material and the completeness of facilities and infrastructure at the school. The sample in this study was class VIII C students at SMP Kristen Immanuel II Kubu Raya. Data collection techniques used in this study are observation and interview. From the results of observations and interviews during the delivery of respiratory system material in class VIII C, the use of PowerPoint media which continues repeatedly in the learning process causes students to feel bored and unenthusiastic in learning, this is indicated by the behavior of students who are daydreaming, sleeping, chatting with friends next to them, and doing assignments from other subjects when the teacher delivers material on the respiratory system using PowerPoint media.

The analysis technique used in this study is the validity analysis of web blog-based e-learning media. To calculate the validity of the material and the validity of the media, the data is first converted into quantitative data, and analysis of web-based e-learning media is carried out with the following procedure Khabibah in Yamasari (2010). If it is "valid", then the web-based e-learning media is suitable for use, if "valid enough" then the web-blog-based e-learning media is suitable for use with improvements, and if it is said to be "invalid" then the media is not suitable for use.

**Results and Discussion**

The feasibility referred to in this study is a web blog-based e-learning media that is suitable for use as a learning medium in class VIII respiratory system material. The feasibility of web blog-based e-learning media as a learning medium on respiratory system material is seen from the validation carried out by the validator (Panjaitan et al., 2019; Panjaitan et al., 2020). Following are the results of material validation of web blog-based e-learning media on respiratory system material which can be seen in Table 1.
Table 1. Data analysis validation of web-based e-learning media blog respiratory system material by material experts

<table>
<thead>
<tr>
<th>Aspect</th>
<th>Criteria</th>
<th>Ki</th>
<th>Ai</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Format</strong></td>
<td>1. Appropriate display of animations, videos, images, and writing on web blog-based e-learning media with teaching materials.</td>
<td>3.67</td>
<td>3.67</td>
</tr>
<tr>
<td></td>
<td>2. Conformity of color, the appearance of images, and writing.</td>
<td>3.67</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1. The suitability of the concept with the indicators in the syllabus.</td>
<td>3.33</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2. The ability of web blog-based e-learning media to accommodate scientific approaches (observing, asking questions, gathering information, processing information, and communicating) according to the 2013 curriculum.</td>
<td>3.00</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3. The ability of web blog-based e-learning media to accommodate learning domains (affective, cognitive, and psychomotor).</td>
<td>3.33</td>
<td>3.44</td>
</tr>
<tr>
<td></td>
<td>4. The ability of web blog-based e-learning media to be able to assist teachers in explaining respiratory system material.</td>
<td>4.00</td>
<td></td>
</tr>
<tr>
<td></td>
<td>5. Level of interest and involvement.</td>
<td>3.33</td>
<td></td>
</tr>
<tr>
<td></td>
<td>6. Complete information presented by web blog-based e-learning media.</td>
<td>3.67</td>
<td></td>
</tr>
<tr>
<td><strong>Content</strong></td>
<td>1. Readability of the language used in web-based e-learning media for junior high school students.</td>
<td>3.33</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2. Freedom of language used in web-based e-learning media against double meanings.</td>
<td>3.33</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3. The ease of understanding sentences, the effectiveness of sentences, and the completeness of sentences/information in web blog-based e-learning media.</td>
<td>3.33</td>
<td>3.25</td>
</tr>
<tr>
<td></td>
<td>4. Appropriateness of the use of words displayed in web blog-based e-learning media with Enhanced Spelling (EYD).</td>
<td>3.00</td>
<td></td>
</tr>
<tr>
<td><strong>Language</strong></td>
<td>1. Simplicity of the material presented in the web blog-based e-learning media.</td>
<td>3.33</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2. Ease of understanding of the material presented in web blog-based e-learning media.</td>
<td>4.00</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3. The suitability of the material presented in the web blog-based e-learning media on student characteristics.</td>
<td>4.00</td>
<td>3.78</td>
</tr>
<tr>
<td><strong>Cohesiveness</strong></td>
<td>1. Appropriateness of the order in the presentation of web blog-based e-learning media.</td>
<td>4.00</td>
<td>4.00</td>
</tr>
<tr>
<td><strong>Emphasis</strong></td>
<td>1. Communicating information clearly, effectively, and accurately.</td>
<td>4.00</td>
<td>4.00</td>
</tr>
<tr>
<td></td>
<td>1. The ability of web blog-based e-learning media to engage students in new learning experiences, invite students to think, and ask questions.</td>
<td>4.00</td>
<td>4.00</td>
</tr>
<tr>
<td><strong>Interactivity</strong></td>
<td>1.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Information:
(Ki) = The average of each criterion
(Ai) = The average per aspect
RTVTK = Total validation average

Based on validation analysis data by material experts in Table 1, it is known that the Ai value (average of each aspect) in the format aspect is 3.67, the content aspect is 3.44, and the language aspect is 3.25, so the RTVTK value obtained is 3.45. Thus the validation of the material on the web blog-based e-learning media is declared valid and suitable for use as a learning medium. Following are the results of the validation of web blog-based e-learning media on respiratory system material which can be seen in Table 2.

Table 2. Data validation analysis of web-based e-learning media blog respiratory system material by media experts

<table>
<thead>
<tr>
<th>Aspect</th>
<th>Criteria</th>
<th>Ki</th>
<th>Ai</th>
</tr>
</thead>
<tbody>
<tr>
<td>Simplicity</td>
<td>1. The simplicity of the material presented in the web blog-based e-learning media.</td>
<td>3.33</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2. Ease of understanding of the material presented in web blog-based e-learning media.</td>
<td>4.00</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3. The suitability of the material presented in the web blog-based e-learning media on student characteristics.</td>
<td>4.00</td>
<td>3.78</td>
</tr>
<tr>
<td>Cohesiveness</td>
<td>1. Appropriateness of the order in the presentation of web blog-based e-learning media.</td>
<td>4.00</td>
<td>4.00</td>
</tr>
<tr>
<td>Emphasis</td>
<td>1. Communicating information clearly, effectively, and accurately.</td>
<td>4.00</td>
<td>4.00</td>
</tr>
<tr>
<td></td>
<td>1. The ability of web blog-based e-learning media to engage students in new learning experiences, invite students to think, and ask questions.</td>
<td>4.00</td>
<td>4.00</td>
</tr>
</tbody>
</table>

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Web blog-based e-learning media in this study is learning media on respiratory system material for class VIII which displays information in the form of a combination of the use of text, images, animations, photos, videos, and online forums that require internet and devices such as computers, laptops, smartphones or tablets in accessing it. The contents contained in this web-based e-learning media consist of a home menu, blog instructions, KI-KD (core competency-basic competence), material menu, evaluation menu, forum menu, gallery menu, games menu, downloads menu, and glossary. The use of media in the learning process can increase student learning motivation as well as help students more easily understand abstract concepts (Arsyad, 2015; Wahyuni et al., 2022).

Web blog-based e-learning media was created and then validated by media experts and material experts. According to Sugiyono (2015), validation is the process of assessing product design rationally so that it is more effective than the previous one. Learning media validation aims to measure the validity (feasibility) of the developed web blog-based e-learning media.

### Material Validation Results

Web blog-based e-learning media whose feasibility is measured by the material expert validator consists of 3 aspects, namely format, content, and language. From the three aspects and 12 criteria, the average value of the 3 material expert validators was 3.45 and classified as valid. This shows that this blog-based web-based e-learning media is suitable for use as a learning medium on respiratory system material. Based on the aspects assessed, the following average values are obtained:

1. **Format Aspect**

   The format aspect consists of 2 criteria, namely the suitability of the appearance of animation, video, images, and writing on web blog-based e-learning media with teaching materials and color suitability, display of images, and writing. The average validation value of web blog-based e-learning media in the format aspect is 3.67 or classified as valid.
The first criterion gets an average value of 3.67 with a valid category. This states that the appearance of animation, video, images, and writing on web blog-based e-learning media is in accordance with the development of teaching materials. According to Shavab & Gurdjita (2017) and Oktariyanti et al. (2021) the use of media and technology can develop dynamic learning resources, as well as appeal to different senses and diverse student learning styles.

The second criterion gets an average value of 3.67 with a valid category. Web blog-based e-learning media display design and content design must clarify decorative elements such as text, images/photos, and colors contained in web-blog-based e-learning media in order to influence student interest. This is in line with what was stated by Smaldino et al. (2012) and Batuthoh et al. (2020), that visuals can increase motivation and attract students' attention so as to create involvement in the learning process.

2. Content Aspect

The average validation value of web blog-based e-learning media on the content aspect is 3.44 and is declared valid. The content aspect consists of 6 criteria, namely the suitability of the concept with the indicators in the syllabus; the ability of web blog-based e-learning media to accommodate a scientific approach (observing, asking questions, gathering information, processing information, and communicating) according to the 2013 curriculum; the ability of web blog-based e-learning media to accommodate learning domains (affective, cognitive, and psychomotor); the ability of web blog-based e-learning media to be able to assist teachers in explaining respiratory system material; level of interest and involvement; and the completeness of the information presented by web blog-based e-learning media.

The first criterion obtained an average value of 3.33 or stating that the material contained in the web blog-based e-learning media had been prepared and adapted to the core competencies, basic competencies, indicators, and learning objectives contained in the 2013 Curriculum syllabus. According to Lutfi et al. (2007); Wahyunings et al. (2015) and Rijal & Sofiarini (2019), the inclusion of indicators and learning objectives is important because the success of the learning process is influenced by the use of media that is suitable for certain goals.

The second criterion has an average value of 3 or states that web blog-based e-learning media has the ability to accommodate a scientific approach (observing, asking questions, gathering information, processing information, and communicating) according to the learning approach expected in the 2013 curriculum. Through e-media -learning web-based blogs, students can observe the process of breathing and its organs. In addition, students can ask questions after or during the use of web-based e-learning media and collect information about the factors that affect the respiratory process in humans. For the stages of processing information, the teacher can direct students to analyze the relationships and links between organs that play a role in the respiratory system and disorders that occur in the respiratory system.

In the communicating stage, the teacher can ask students to present the information they get after using the blog-based e-learning media. According to McFarlane & Sakellariou (2002) and Oktavian & Aldya, 2020 cit. Hafizah et al., 2022 ICT media play a role in helping students develop scientific process skills such as observation, communication, measurement, experimentation, and others. In addition according to Purwaningsih (2014), the formation of a positive attitude towards the biology learning process with a scientific approach after using the media is actualized in the form of student performance achievements. Web blog-based e-learning media is also equipped with an evaluation menu that contains exercises on respiratory system material and is done online as a complement to the scientific approach process. Online practice questions are made in the form of multiple choice and the assessment of the results of the practice questions can be known directly through the process of proofreading by the web blog program.
The third criterion obtained an average value of 3.33 or stating that web blog-based e-learning media has the ability to accommodate all three learning domains (cognitive, affective, and psychomotor). This cognitive domain can be obtained by students by processing material and information contained in web blog-based e-learning media. The affective domain in question is the attitude of students actively participating in the learning process using e-learning media based on web blogs. The psychomotor domain in question is knowledge about students' skills in operating/accessing web-based e-learning media blogs. According to Hartatik & Umar (2014) the learning process using media that is designed in accordance with needs analysis which emphasizes the activeness of students both physically, mentally intellectually, and emotionally, can obtain maximum learning results both from cognitive, affective, and psychomotor aspects.

The fourth criterion obtained an average score of 4 and stated that web-based e-learning media can assist teachers in explaining respiratory system material. This is supported by the existence of a material menu on the web blog media which contains concept maps and material about the respiratory system for class VIII, besides that the material presented is also equipped with pictures, videos, and animations. According to Arifin & Herman (2017); Rijal & Sofiarini (2019), e-learning allows students to become active learners (student-centered), and the teacher functions as a facilitator to create fun learning.

The fifth criterion obtained an average value of 3.33 or stated that web blog-based e-learning media can increase student interest and involvement to be active in learning respiratory system material. This is supported by web blog-based e-learning media that has been equipped with a games menu. The game's menu consists of crossword puzzles (TTS) and puzzles about the respiratory system. According to Yeni & Yokhebed (2015), students who are directly involved in operating interactive media can build their own knowledge because it is adjusted to the pace of learning of each student. In addition, according to Hadjerrouit (2010) and Batuthoh et al. (2020) learning by utilizing the web has the potential to support student learning environments.

The sixth criterion obtained an average value of 3.67 or stating that the information presented in the web blog-based e-learning media is complete, accurate, up-to-date, and concise. Complete information on web-based e-learning media is shown on the home menu. The home menu is the page that first appears when accessing the web blog containing information about the respiratory system in general and the home feature contains articles on the respiratory system for class VIII. This page can be updated by the teacher at any time. The information conveyed in the web blog-based e-learning media is presented in full. According to Sitepu (2015), the information is presented in full so that the learning objectives that have been made can be achieved.

3. Language Aspect

The average validation value of web blog-based e-learning media on the language aspect is 3.25 or declared valid. The language aspect consists of 4 criteria, namely the readability of the language used in web blog-based e-learning media for junior high school students; the freedom of language used in web-based e-learning media against double meanings; the ease of understanding sentences, the effectiveness of sentences, and the completeness of sentences/information in web-based e-learning media blogs; and suitability of the use of words displayed in web blog-based e-learning media with the Indonesian spelling guidelines (PUEBI).

The first criterion obtained an average value of 3.33 or stating that web blog-based e-learning media has text that can be read quickly, easily understood, and remembered by class VIII students. The elements that affect readability according to Sitepu (2015) are word and sentence composition, word writing procedures, paragraph structure, and word choice.
The second criterion obtained an average value of 3.33 and stated that the sentences used in web blog-based e-learning media do not cause double interpretations and misunderstandings. According to Risandi & Panjaitan (2015), good media is media that uses Indonesian and readability is appropriate for students so that it is easy to understand and free from double meanings.

The third criterion obtained an average value of 3.33 or stating that web blog-based e-learning media has language that is easy to understand, effective, complete, and clear. According to Nurdin & Adriantoni (2016), the structure of sentences and words used should be simple, easy to understand, concise, and clear.

The fourth criterion obtained an average value of 3 or stated that the words displayed in the web blog-based e-learning media are in accordance with PUEBI. According to Nurdin & Adriantoni (2016), the use of language, sentence structure, vocabulary, level of difficulty, clarity, and linguistic rules must be appropriate.

**Media Validation Results**

The results of the feasibility test of web blog-based e-learning media by media expert validators are composed of 15 criteria and cover 7 aspects namely simplicity, cohesiveness, emphasis, interactivity, balance, shape, and color. Of the seven aspects, the average value is 3.84 and is classified as valid. Based on the aspects assessed, the following average values are obtained:

1. Simplicity Aspect

The first aspect of media validation in this study is the simplicity aspect. The simplicity aspect that is measured in this validation consists of 3 criteria, namely the simplicity of the material presented in the web-based e-learning media, the ease of understanding the material presented in the web-based e-learning media, and the suitability of the material presented in the web-based e-learning media. web blog on student characteristics. The average value for the simplicity aspect is 3.78 and is classified as valid.

The first criterion obtained an average value of 3.33 or stating that the visualization of the content of the material presented in the web blog-based e-learning media has been made simple without reducing the clarity of the material content and not complicated. According to Arsyad (2015), one of the criteria that should be used in selecting media is that it is supported by the content of learning materials and the ease of obtaining them.

The second criterion with an average of 4 states that the material presented in the web blog-based e-learning media is easy to understand. In line with the opinion of Afgani, et al. (2008); Haleem, et al. (2022) stated that learning using computer media is necessary because it can improve understanding of subject matter, improve student achievement, develop students’ computer literacy abilities, and improve students' attitudes toward learning.

The third criterion obtained an average score of 4 or the material presented in the web blog-based e-learning media is appropriate to the characteristics and learning needs of students. According to Adita et al. (2017) ideally in accordance with the demands of the 2013 curriculum, learning in schools has integrated learning using technology and information-based media. In addition, according to Soeparno (1987) cit. Wahyuni (2012) that the reason for choosing media in learning must be adjusted to the characteristics of students.

2. Cohesiveness Aspect

The aspect of cohesiveness consists of 1 criterion, namely the conformity of the order in the presentation of web blog-based e-learning media with an average value of 4 or declared valid. This means that the blog-based e-learning media has been systematically arranged and adapted to the flow and sequence of material on the media which is the reference for the content. According to Sutarman (2016), computer-based learning materials can be organized according to goals, needs, simple, and coherent without fear of
being missed and the possibility of displaying various examples that cannot be described in ordinary learning.

3. Emphasis Aspect

The emphasis aspect consists of 1 criterion, namely communicating information clearly, effectively, and accurately with an average value of 4 or declared valid. This means that web blog-based e-learning media can communicate information or content on the respiratory system clearly, effectively, and accurately. Web blog-based e-learning media is equipped with a glossary menu that contains important terms regarding respiratory system material. According to Sudjana & Ahmad (2007) cit. Risandi & Panjaitan (2015) state that media often requires an emphasis on only one element which actually requires the attention and interest of students.

4. Interactivity Aspect

The interactivity aspect consists of 1 criterion, namely the ability of web blog-based e-learning media to engage students in new learning experiences, invite students to think, and ask questions with an average value of 4 or otherwise valid. This means that web blog-based e-learning media is able to involve students in new learning experiences, invite students to think, and ask questions. This is supported by the existence of a forum menu on web blog-based e-learning media so that students can actively ask questions and discuss online respiratory system material on web blogs. In accordance with the opinion of Peng et al. (2008) good media is media that can bring up two-way communication (interactivity).

5. Balance Aspect

The balance aspect consists of 4 criteria, namely the suitability of the size of the animation and text displayed in the web blog-based e-learning media; the suitability of the size of the video and text displayed in the web blog-based e-learning media; the suitability of the size of the images and text displayed by the web blog-based e-learning media; and the balance of the layout of the writing used in e-learning media based on web blogs with an average value of 3.50 or declared valid.

The first criterion obtained an average value of 3.33 which states that the size of the animation and writing displayed in the web blog-based e-learning media is appropriate and appropriate. According to Anggraeni & Kustijono (2013), media development must pay attention to the arrangement of animation and writing on each page. The use of the appropriate layout and size makes the media look neat, structured, and attractive. In addition, according to Smaldino et al. (2012) important visual elements, especially words, must be in good contrast with the background.

The second criterion obtained an average value of 3.33 or stated that the size of the video and writing contained in the web blog-based e-learning media was appropriate and appropriate. According to Arsya (2015) in making audio-visual-based media, it is better if the written narrative is short, concise, and simple, and each sentence is no more than 15 words.

The third criterion is to obtain an average value of 3.67. This shows that the size of the images and text presented in the web blog-based e-learning media is appropriate and appropriate. According to Smaldino et al. (2012) stated that the text style used should be consistent and in harmony with other visual elements. In addition, for conveying information it is recommended to use a frank style, plain text style (no decoration).

The fourth criterion obtained an average value of 4 and is classified as valid. This shows that in this web blog-based e-learning media, most of the writing layouts are well arranged so that students can know and understand the information presented easily. This is in line with the opinion of Nurdin & Adriantoni (2016) that writing layouts should be able to help students understand the material by showing a logical and systematic sequence of activities and showing the parts that have been followed from beginning to end.
6. Shape Aspect

The form aspect consists of 4 criteria, namely the attractiveness of the animation displayed in the web blog-based e-learning media; the attractiveness of videos displayed in web-based e-learning media blogs; the attractiveness of images displayed in web-based e-learning media blogs; and readability of the form of letters used in e-learning media based on web blogs. The average validation value obtained by this aspect is 3.58 or classified as valid.

The first criterion obtained an average value of 3.33 and is classified as valid. An animation must be presented as attractive as possible in order to increase students' understanding of the material being taught. According to Yarden & Danton (2006) cit. Sugianto (2015) learning about biology material using animation media helps students store information in long-term memory.

The second criterion obtained an average value of 3.67 and is classified as valid. The use of video in learning is very helpful for conveying material that is abstract in nature so that learning in class becomes more fun because students can imagine real objects. According to Suprijanto (2009) cit. Wahyuningsih, et al. (2015); Kang & Park (2023) the advantages of audiovisual media in learning, namely providing the correct concept, encouraging interest, increasing understanding and intellectual curiosity, completing learning resources, adding variety to teaching methods, reducing unnecessary speech and repetition of words, making the memory of lessons longer, and can give a new concept of something outside the ordinary experience. A collection of videos in this blog web-based e-learning media are presented in the gallery menu. The function of the video collection on the gallery menu is to make it easier for students to access all the respiratory system material video files contained in the web blog-based e-learning media.

The third criterion obtained on this criterion is 3.33 and is classified as valid. This shows that the images in the web blog-based e-learning media are functioning well, in addition to making it easier for students to understand the concepts presented, the images displayed on the gallery menu are quite varied. According to Wahyuningsih (2012), pictures help clarify material descriptions so students understand more quickly and can remember them well.

The fourth criterion obtained an average value of 4 and is classified as valid. This shows that the use of font size, typeface, and spacing is appropriate for readability. According to Arsyad (2015) so that students can easily catch messages from a media, words must use simple letters with an easy-to-read font style.

7. Color Aspect

The color aspect consists of 1 criterion, namely the suitability of the color on each page in web blog-based e-learning media with an average value of 4 and declared valid. This means that color can clarify the appearance of web blog media so that it helps students understand the material. According to Novitasary (2014), varied colors in visual media can help readers understand the message being conveyed.

Conclusion

Based on the results of the research conducted, the average material validation value was 3.45 and the media validation average value was 3.84, which means that web-based e-learning media is appropriate to be used as a learning medium and as well as become a new alternative media for science teachers in carrying out teaching in schools in the material. respiratory system in class VIII.
References


