JIPF (JURNAL ILMU PENDIDIKAN FISIKA)
p-ISSN: 2477-5959 | e-ISSN: 2477-8451 *Vol. 9 No. 3, September 2024, Page 318-329*

Developing Web Based Learning Media Using Wordpress in Light Material at SMP/MTS

Pajrianor [1], Atin Supriatin [2], Nur Inayah Syar [3*)], Jhelang Annovasho [4]
IAIN Palangkaraya, Indonesia[1,2,3,4]
[*)]Corresponding E-mail: nur.inayah.syar@iain-palangkaraya.ac.id

Received: February 15th, 2024. Revised: July 19th, 2024. Accepted: July 22nd, 2024

Keywords :
Learning Media; Web; Wordpress; Media Feasibility

ABSTRACT
The purpose of this research was to find out the result of development and feasibility of web based learning media in light material. The method used in this research was Research and Development (R&D) with 4D development model namely the stage of define, design, develop, and disseminate. The subjects of this study were material expert validators, media expert validators, teachers and 26 students at Islamic Junior High School (MTS) of Darul Ulum Palangkaraya. This research gained the result namely first, the media developed in the form of web based learning media in light material has components such as menu, animation picture, practice simulation, example of question, glossary, and evaluation question which can be accessed through website via online. The second, the feasibility of web based learning media seen from the suitability measured through media validation, material validation, teachers' response, and students' response. The result of media validation gained total average score 80 in excellent criteria. The result of material validation gained average score 76,5 in excellent criteria. The result of teacher's response on web based teaching material gained total score 67 in excellent criteria. The result of students' response concerning the web based teaching material gained total score 36,52 in excellent criteria. Based on the results of the study, it can be implied that this web-based teaching material is valid and can be used to improve the quality of student learning.

INTRODUCTION

In line with the era development, learning technology continuosly experience development [1]. Until to date, technology development has entered digital stage all over the world included Indonesia such as technology utilization in job field and also in education field [2]. The more rapid the technology development to date, then it will also impact on the advance of learning media [3]. Therefore, education can utilize technology as the helping tool for the learning implementation [2].

Learning process can be implemented with learning media as the medium in the learning process to attract the students' attention, ability, and learning skill in order to encourage the occurrence of teaching and learning process [4]. Based on the observation result at Islamic Junior High School of Darul Ulum Palangka Raya, the learning media used was in the form of learning video, website, and students' worksheet book. Technology utilization was not optimal yet. The result of need analysis showed that 100% of the students like Integrated Natural Science Learning and 80% of the students experienced difficulty in Integrated Natural Science Learning because there are calculation and formula. Other data showed that 85% of the students were interested if Integrated Natural Science learning used technology such as computer and internet and 85% of students were interested if the learning was combined with video, animation picture, and practice simulation.

Learning media is one of assisting tool which can become an important role in teaching and learning process because it can be used in delivering the message among the teacher and the students. Through this learning media, teacher and students can communicate well and interact in many directions. Learning media can grow motivation and spirit to learn for students to achieve the learning goals and to eliminate bored feeling during the learning process [4]. One of learning media that can be used is web based learning media.

Web based learning is a collection of information connected from one to another in internet network. Web can be made as a more attractive and varied learning media in teaching and learning process [5]. With web based learning media, the students can be more active because it can be made as the learning source and can be accessed wherever without any time limitation [6].

Learning media in the form of web-based teaching materials can improve student learning outcomes [7] and provide opportunities for students to interact with learning resources and obtain information widely [8]. Web-based teaching materials have the advantage that students can learn by adjusting their characteristics because the web can make learning individual [8]. The web can encourage students to be more active and independent in learning.

Web based learning media can be done by using wordpress application. Wordpress is a software to make web for free or paid [9]. As a learning source, web based learning media is expected to become a support for students in reaching knowledge easily and capable of solving the teaching and learning problem [10]. Some other reasons are the ease of use of the features provided and the availability of many free themes to beautify the appearance of the web [11]. On wordpress light material can be made interesting by beautifying the appearance of the material by utilizing features such as themes and image displays provided by wordpress so as to stimulate the attention, thoughts and feelings of students in learning [12].

Several previous studies have been conducted to determine the effect of the application of web-based teaching materials. Nuraini has E-module physics based on WordPress CMS on the material of concepts and quantum phenomena of SMA class XII as a learning multimedia and the trial results show that the media is very feasible to use as an independent learning multimedia for students [13] [14]. In addition, web-based teaching materials have also been implemented at the elementary school level by Simon and the results show that web-based teaching materials are very feasible and very practical to use by teachers and students during the online learning process. Similar research was also conducted by Sadikin in the form of Web-based interactive biology multimedia and the results obtained were interactive multimedia based on website biology is suitable for biology learning [15]. Some of these studies have a number of differences with the media developed by researchers in terms of grade level, material and type of platform used.

Based on the observation above, then the researcher conducted the research of developing web based learning media on light material with the purpose to find out the result of development and feasibility of web based learning media in light material.

METHOD

This research employed Research and Development (R&D) Method. According to Sugiyono in Trisniawati et al [16], Research and Development method is a method which results certain product and test its effectiveness until it can be used widely.

This research was conducted at Islamic Junior High School of Darul Ulum Palangka Raya. The subjects of this research and development consisted of two media expert validators and a material expert validator. In addition, a trial was also conducted to determine the response of science teacher and 26 students to the results of the development of web-based teaching materials. The research model was 4Ds namely the stage of define, design, develop, and disseminate [5]. This research was conducted until development stage with the purpose to see the feasibility of the developed product.

The data collection techniques in this research were qualitative-descriptive technique and quantitative-descriptive technique. In qualitative data collection technique, the research procedure resulted was descriptive data such as the words written or the people's oral observed through observation, interview, and part of suggestion, comment, and validation questionnaire. In quantitative data collection technique, the analysis employed statistics calculation such as percentage from material and media expert questionnaire to find out the media feasibility level conducted at the end of the data collection [17].

Feasibility assessment used likert scale in media expert instrument and material expert instrument. The aspects used to assess the feasibility of teaching materials by media experts are language, implementation, appearance, usability, application of media in learning. While those used to assess the feasibility of teaching materials by material experts are content quality, language, implementation, material display and visual display.

After the media has been valid according to media experts and material experts, then a trial of teaching materials is carried out involving teacher and student respondents. The aspects of assessment carried out by teachers are content quality, media display, technical quality, evaluation, language and criteria for teaching material. While the assessment carried out by students involves aspects of material, media and technical use of teaching materials.

The assessment then would be converted into scale score 1-4 as showed in table 1.

Table 1. The Criteria of Likert Scale [18]

Score Criteria	Score
Excellent	4
Good	3
Fair	2
Poor	1

The data analysis technique used by the researcher was average technique to analyze the data of media expert validation and material expert validation result. The following was the formula used by the researcher.

$$\overline{X} = \frac{\Sigma X}{n} \quad (1)$$

Information [19]:
$\bar{X}$ = Average score
ΣX = Number of answer in validator's assessment
n = Number of Statements

According to Khasanah in Sitepu & Herlinawati [20] the validity criteria of media expert analysis and material expert analysis are showed in table 2 which had been modified.

Table 2. Feasibility Criteria of Media and Material Expert (Modified based on lowest and highest score ranges)

Score Range	Criteria	Follow up
68,25<x≤84	Excellent	Could be applied without revision
52,5<x≤68,25	Good	Could be applied with some revision
36,75<x≤52,5	Bad	Could be applied with revision suitable with the note
21<x≤36,75	Very Bad	The Media must be revised or reviewed

The validity criteria of teacher and student responses analysis are showed in table 3 and table 4 which had been modified.

Table 3. Score Category of Teacher Response (Modified based on lowest and highest score ranges)

Score Range	Criteria	Follow up
65<x≤80	Excellent	Could be applied without revision
50<x≤65	Good	Could be applied with some revision
35<x≤50	Bad	Could be applied with revision suitable with the note
20<x≤35	Very Bad	The Media must be revised

Table 4. Score Category of Students Response (Modified based on lowest and highest score ranges)

Score Range	Criteria	Follow up
32,5<x≤40	Excellent	Could be applied without revision
25<x≤32,5	Good	Could be applied with some revision
17,5<x≤25	Bad	Could be applied with revision suitable with the note
10<x≤17,5	Very Bad	The Media must be revised

RESULTS AND DISCUSSIONS

The result of this research is in the form of web based learning media in light material. The researchers selected web because it can become a popular learning with its ease nowadays and also it can be accessed wherever and whenever until it can become a learning source for students. This web based learning media can become a solution when there is learning time limitation and can adjust with users' need in teaching and learning process.

Define stage

Define stage aimes to decide the thing which becomes the problem and define the provision required in the learning based on the front end analysis, students' analysis, concept analysis, task analysis, and learning purpose [21]. The results of web based teaching material for defining stage are as follows:

1. Front End Analysis

The purpose of front end analysis was to formulate the basic problem which will be faced by the teacher and students to gain the fact description of the problem and alternative problem completion [22].

The following is the observation result on front end analysis at Islamic Junior High School of Darul Ulum Palangka Raya namely: (1) in odd semester of academic year 2021/2022 the learning was conducted limited face to face and online learning, (2) in odd semester of academic year 2022/2023 the learning was carried out normally again until the learning process was conducted without any limitation in the class, (3) the learning facility is still not optimal yet, (4) integrated Natural Science laboratory was not available yet.

2. Students' Analysis

The purpose of students' analysis was to gain description and students' characteristic and interest in following the learning [23]. The result of need analysis showed that 80% of the students like Integrated Natural Science learning and 80% of the students experienced difficulty in Integrated Natural Science learning because there were calculation and formula.

Other data showed that 85% of the students were interested if Integrated Natural Science learning used technology such as computer and internet and 85% of students like it more if combined with video, animation picture, and practice simulation.

3. Concept Analysis

The purpose of concept analysis was to identify the design described in developed learning media [22]. The material contained in this web based learning media was light material at Islamic Junior High School of Darul Ulum with Curriculum 2013 (K13).

The basic competencies used were 3.12 analyzing the characteristics of lights and shadow formation on flat and curved field along with its explanation, 3.13 presenting the experimental result concerning the shadow formation in mirror and lens.

4. Task Analysis

Task analysis aims to determine the form of questions or exam questions that will be used in the learning media which has been adjusted with the containing material [23]. In this web based learning media, the materials have been adjusted including animation picture, example question, question exercise, and glossary.

5. Learning Purpose Analysis

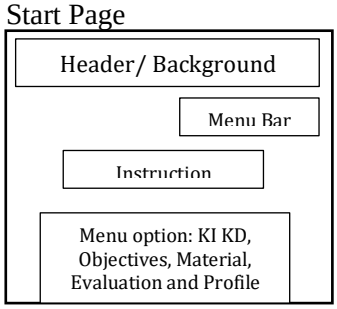
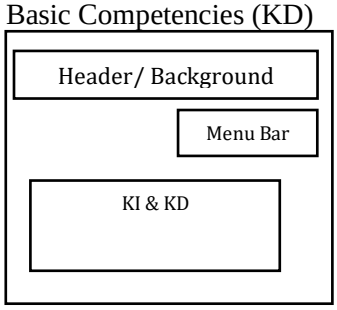
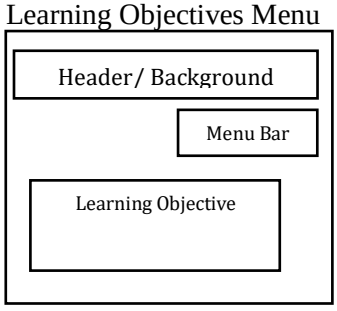
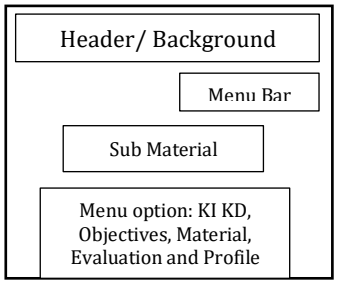
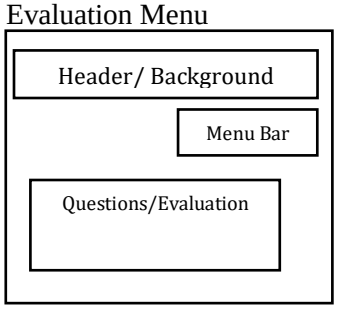
The purpose of this purpose analysis is to summarize the result of task analysis and concept analysis and made as the basic of design into the learning media [24]. The learning purpose contained in light material learning media are namely, (1) the students can recognize and observe light as the regularity of God's creation well, (2) after given some explanations, the students can define light correctly, (3) the students can remember the characteristics of light and shadow formation in the mirror after reading some sources correctly, (4) given some questions, the students can mention at least two examples of lens in daily life.

Design Stage

The purpose of design stage was to prepare the form of developed media. The design stage consists of some selections such as media selection, format selection, and making initial design [25]. First, media selection, the researchers selected learning media which can be used easily by teachers and students namely web based learning media on light material. The web making is assisted by wordpress.

Second, format selection, in this selection the researchers designed the web based learning media so that it is more attractive by containing light material, animation picture, example question, question exercise, and practice simulation with PHeT. The third, making initial design, in initial design the researchers made storyboard to ease the making of web based learning media. The following is a storyboard of web-based teaching materials.

Table 5. Storyboard

No.	Storyboard	Information
1.	Start Page 	Start Page is the earliest page that appears when the web is opened. On this page there is a Home menu (there are instructions for use and other menu explanations), KI KD, Objectives, Material, Evaluation and Profile.
2.	Core Competencies (KI) and Basic Competencies (KD) 	The KI - KD menu is a page that contains Core Competencies (K1 to K4) and Basic Competencies (3.12) as well as indicators of competency achievement (3.12.1 to 3.12.4).
3.	Learning Objectives Menu 	The learning objective menu is a page that contains learning objectives.
4.	Material Menu 	The material menu is a page that contains learning materials, namely light material. In this material menu there is a sub menu of material, namely the definition of light, the nature of light, the formation of shadows on mirrors, lenses and shadows on lenses.
5.	Evaluation Menu 	The evaluation menu is a page that contains practice questions and quizzes that can be done by students.

Development Stage

The purpose of development stage is producing a developed product after the validations by competent experts in theif field [21]. In the development stage, there are some process done such as media expert validation and material expert validation in order to gain assessment and revision from validators until the learning media can be applied and tested.

The following is the parts of web developed based on the design result.

1. *Home display of web based learning media*

In figure 1 initial display of home menu, Core Competence and Basic Competence menu, purpose menu, material menu, evaluation menu, and profile menu. There is also the usage instruction and function of each menu.

2. *The display of purpose and learning material menu*

In figure 2 is the menu of learning purpose and light material and display of material menu, picture and icon of light sub material such as definition of light, characteristics of light, shadow formation in the mirror, lens, and shadow in lens, and glossary of light material.

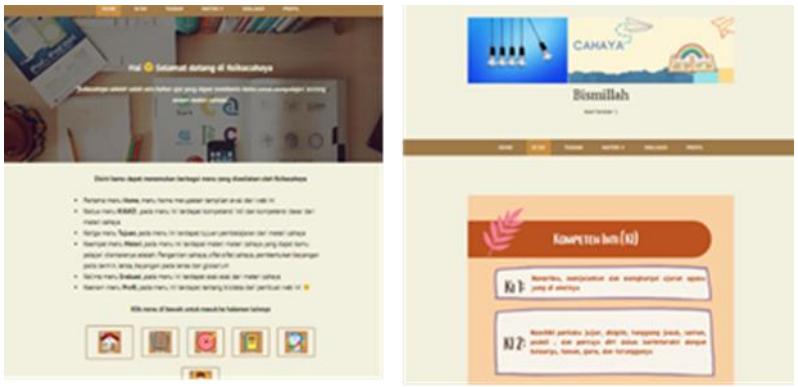


Fig 1. *Display of Home Menu of Core Competence and Basic Competence in Web Based Learning*

Fig 2. *Menu of Purpose and Learning Material*

3. *Display of practice simulation menu, evaluation, and author's profile in web based learning media*

In figure 3, there is simulation and video of practice evaluation with PHeT assistance where students can directly operate the web based learning media.

Fig 3. *Menu of Simulation and Evaluation of Light Material*

Beside that there is evaluation menu display containing questions of light material which can be done in learning media and has afterwards the students can directly see their score. The last, there is profile menu display containing photo and biodata of the author and maker of the developed media.

1. Media Validation

The purpose of media validation is to find out the learning media feasibility which covers aspects [26] such as language, implementation, media display, visual display, usage, and learning media criteria. Media validation was conducted by two (2) lecturers of Physics study program as media validators. The following is the result of media expert validation in web based learning media development as showed in table 6.

Table 6. Recapitulation of Media Expert

No	Assessment Aspect	Total	Average	Category
1	Language	16	8	Excellent
2	Implementation	24	12	Excellent
3	Media Display	38	19	Excellent
4	Visual Display	22	11	Excellent
5	Usage	38	19	Excellent
6	Learning Media Criteria	22	11	Excellent
Total Score		**160**	**80**	**Excellent**

Table 6 showed the result of media validation. It was conducted on six aspects with 21 indicators. In language aspect gained total score 16 with average score 8 until it is included into excellent category. In implementation aspect gained score 24 with average score 12 until its included into excellent category. In media display aspect gained total score 38 with average score 19 in excellent category.

Visual display aspect gained total score 22 with average score 11 until it is included into excellent criteria. Usage aspect gained total score 38 with average score 19 until its included into excellent criteria. Learning media criteria gained total score 22 with average score 11 until it is included into excellent category.

Thus from those five aspects obtained total score 160 with average score 80 until it is included into excellent category and could be tested without revision. This is in line with previous research conducted which concluded that web-based learning media is attractive and informative until it is strongly feasible to be used in the learning process [27].

Media validation got some revision from media expert validation namely in the beginning of web page (home) namely adding the flow chart and instruction of how to use the web in order to ease the users, making more interactive teaching material by adding simulation until the students can directly operate the learning media.

Adding more detail explanation on shadow material in lens until it is easier for the students to

understand when reading it, making glossary so that in order to add the students' knowledge, and buying hosting on this web based teaching material in order to make it faster and eliminating the advertisement which appears in the web based learning media.

2. Material Validation

The purpose of material validation is to find out the feasibility of material in learning media [26] which covers the aspects of content quality, language, implementation, and material display. Material validation is done by two (2) lecturers of Physics study program as material validator. The following is the result of material expert validation in web based learning media development as showed in table 7 below.

Table 7. Recapitulation of Material Assessment

No	Assessment Aspect	Total	Average	Category
1	Content Quality	55	27,5	Excellent
2	Language	28	14	Excellent
3	Implementation	23	11,5	Excellent
4	Material Display	47	23,5	Excellent
Total Score		**153**	**76,5**	**Excellent**

Table 7 is the result of material expert validation carried out by two lecturers of Physics study program. Material validation was carried out with 21 indicators divided into 4 aspects. Content quality aspect gained total score 55 with average score 27,5 until it is included into excellent category. Language aspect gained total score 28 with average score 14 until it is included into excellent category.

Implementation aspect gained total score 23 with average score 11,5 until it is included into excellent category. Material display aspect gained total score 47 with average score 23,5 until it is included into excellent category. Thus from four aspects gained total score 153 and average score 76,5 which means that until it is included into excellent category and it can be tested without revision. This is inline with the research [28] which confirmed that web based learning media can ease in improving students' understanding because the concept is presented systematically, attractively, and not boring.

Material validation gained some revisions from material expert validation such as fixing the learning purpose with abcd formula in order to make it more precise and suitable with Core Competence and Basic Competence (KI & KD), clarify the picture description on light refraction so that the students can understand the presented picture and fix the question example which got missing when accessed until it can help the students' focus when working and understand the question example in web based learning media.

The following is the result of material expert validation in web based learning media development as showed in table 8 below.

Table 8. Recapitulation of Teacher Response Results

No	Assessment Aspect	Total	Category
1	Content Quality	18	Excellent
2	Media Display	19	Excellent
3	Technical Quality	11	Excellent
4	Evaluation	6	Excellent
5	Language	6	
6	Criteria for teaching material	7	
Total Score		**67**	**Excellent**

Based on the graph shown in table 8, the aspects of the assessment that get the highest score in the teacher's response are the content quality aspects and the media display aspects. In the aspect of

content quality, the web-based teaching materials developed are in accordance with the core competencies and basic competencies, the material presented is interesting to learn and the cases presented are in accordance with reality so that they can provide experience to students, and can increase students' understanding. This is in line with Uno & Ma'ruf [29] which explains that the success of the web or suitability with the material so that teaching materials can improve student learning outcomes. According to Solihudin's research [30] about Web-based E-Module has received responses from educators that web-based teaching materials are easy to use, can be accessed anywhere and anytime, so that they can be utilized as a tool for the teaching and learning process.

Table 9. Recapitulation of Students Response Results

No	Assessment Aspect	Total	Category
1	Materia Aspect	14,75	Excellent
2	Media Aspect	21,77	Excellent
Total Score		**36,52**	**Excellent**

Based on the graph shown in table 9, the assessment aspects that get the highest score on student responses are aspects of content quality and aspects of media display which consist of several indicators such as the use of color, text, images, and evaluation, student interest, ease of use. The highest indicator is the ease of use of web-based teaching materials. This is in line with Uno & Ma'ruf [29], which found that web-based learning is easy to use anytime and anywhere so that it can make students interested in teaching and learning.

Dissemination Stage

The purpose of dissemination stage is to promote or deploy the product until it can be used and utilized by users [31]. Deployment stage consisted of validation testing, packaging, diffusion, and adaption [32]. In validation testing conducted revision process, validation process, and trial process on the web based learning media.

In packaging stage, the media which has been developed completely then was packaged in the form of web until it can ease the users in accessing the learning media. The learning media packaging can be accessed in the following link: https://fisikacahaya.wordpress.com/.

In diffusion and adaption stage, the web based learning media could have been accessed through the link and then spread widely so in order to be understood (diffusion) and used (adoption) by users namely the teacher and students with social assistance from WhatsApp and also could be accessed through platform such as google search.

As for the limitations of this study, this research was only conducted at the stage of seeing the responses of educators and students. Teaching materials developed by researchers can only be accessed online and cannot be offline, and the use of these teaching materials requires devices such as cellphones and laptops so that students must have one of these devices. The use of technology in schools is still not optimal so that web-based teaching materials in schools still cannot be used thoroughly.

CONCLUSION AND SUGGESTION

The following is the conclusion of result and discussion. First, the media developed in the form of web based learning media with wordpress assistance completed with the supporting component such as home menu, core competence and basic competence menu, learning purpose menu, material menu, animation picture manu, practice simulation, glossary, question example, and question exercise. The material used was light material for Junior High School/Islamic Junior High School level. The learning media can be used through smartphone and computer which can be accessed online. Second, the web based learning media feasibility on light material has been inline with the development

product produced namely the validation result from media expert gained total score 160 with average score 80 until it is included into excellent criteria which means it can be tested without revision and the result of material expert validation gained total score 153 with average score 76,5 until it is included into excellent criteria which means it can be tested without revision. The result of teacher's response and students' response concerning web based teaching material gained total score 67 and 36,52 with excellent category.

There are some things that become the suggestion from this research results such as the teacher is expected to be capable of utilizing web based learning media in online learning process or face to face learning process in the class. For students, this learning media is expected to becomea learning source and an alternative to study at home. This web based learning media is expected to be made and developed with many more learning materials.

REFERENCES

[1] Jamun, Y. M. (2018). Dampak teknologi terhadap pendidikan. *Jurnal Pendidikan dan Kebudayaan Missio*, *10*(1), 48-52.
[2] Lestari, S. (2018). Peran teknologi dalam pendidikan di era globalisasi. *EDURELIGIA: Jurnal Pendidikan Agama Islam*, *2*(2), 94-100.
[3] Nahariah, N., & Armita, D. (2022). Pemanfaatan teknologi pembelajaran di masa pandemi COVID-19. *Jurnal Al-Qiyam*, *3*(1), 68-72.
[4] Tafonao, T. (2018). Peranan media pembelajaran dalam meningkatkan minat belajar mahasiswa. *Jurnal komunikasi pendidikan*, *2*(2), 103-114.
[5] Rijal, A. S. (2020). Pengembangan media pembelajaran berbasis web untuk meningkatkan kreativitas guru. *Ideas: Jurnal Pendidikan, Sosial, dan Budaya*, *6*(1), 81-96.
[6] Ayu, M., Sari, F. M., & Muhaqiqin, M. (2021). Pelatihan guru dalam penggunaan website grammar sebagai media pembelajaran selama pandemi. *Al-Mu'awanah*, *2*(1), 49-55.
[7] Saputra, M. R. A. (2021). *Pengembangan bahan ajar sejarah berbasis WEB*. Penerbit YLGI.
[8] Januarisman, E., & Ghufron, A. (2016). Pengembangan media pembelajaran berbasis web mata pelajaran ilmu pengetahuan alam untuk siswa kelas VII. *Jurnal Inovasi Teknologi Pendidikan*, *3*(2), 166-182.
[9] Feta, N. R., Wiliani, N., & Hesananda, R. (2021). Penggunaan dan pemanfaatan wordpress dalam upaya meningkatkan daya jual untuk pelaku umkm karang taruna bojongkulur. *Jurnal AbdiMas Nusa Mandiri*, *3*(1), 1-8.
[10] Wiranata, A. A. (2021). Pemanfaatan Forum Web Teknologi Komputer Jaringan (TKJ) Sebagai Sumber Belajar di SMKN 22 Jakarta. *Educate: Jurnal Teknologi Pendidikan*, *6*(2), 102-109.
[11] ST Krisianto, A. (2014). *Jago WordPress*. Elex Media Komputindo.
[12] Oktova, R., Imam, I., & Devi, D. P. (2018). Pengembangan website pembelajaran dengan Wordpress untuk materi laser pada mata kuliah fisika modern untuk mahasiswa S-1 Pendidikan Fisika. In *Prosiding Seminar Nasional Fisika (SNF)* (Vol. 2, pp. 15-20).
[13] Nuraini, E., Susila, A. B., & Sunaryo, S. (2022, January). Pengembangan E-Modul Fisika Berbasis CMS Wordpress Pada Materi Konsep dan Fenomena Kuantum SMA Kelas XII. In *Prosiding Seminar Nasional Fisika (E-Journal)* (Vol. 10).
[14] Fernando, S., Sabri, T., & Suparjan, S. (2022). Pengembangan bahan ajar berbasis web pada materi sistem pencernaan manusia kelas V sekolah. *Jurnal Tunas Bangsa*, *9*(1), 18-31.
[15] Sadikin, A., Johari, A., & Suryani, L. (2020). Pengembangan multimedia interaktif biologi berbasis website dalam menghadapi revolusi industri 4.0. *Edubiotik: Jurnal Pendidikan, Biologi Dan Terapan*, *5*(01), 18-28.
[16] Trisniawati, T., Muniroh, A. A. N., & Utaminingsih, R. (2021). Pengembangan Media Power Point Interaktif Pada Pembelajaran Tematik Siswa Kelas V. *Perspektif Ilmu Pendidikan*, *35*(2), 130-139.
[17] Putri, D. M., & Riswandha, M. N. (2019). Sistem Informasi Pengaduan (Komplain) Pelayanan Kesehatan Pada Puskesmas Bangil Menggunakan Metode Kuantitatif dan Kualitatif. *Insand*

Comtech: Information Science and Computer Technology Journal, *4*(2).
[18] Rahmawati, R., Achdiani, Y., & Handayani, M. N. (2021). Pengembangan Media Pembelajaran Berbasis Website WIX Pada Mata Pelajaran Produksi Pengolahan Hasil Nabati Di SMKN 2 CILAKU Cianjur. *EDUFORTECH*, *6*(2), 109-119.
[19] Octaria, D., & Isroqmi, A. (2022). Pengembangan Media Pembelajaran Berbasis Web Google Sites Pada Materi Turunan Fungsi. *Jurnal Derivat: Jurnal Matematika Dan Pendidikan Matematika*, *9*(2), 123-135.
[20] Sitepu, D. S. B., & Herlinawati, H. (2022). Pengembangan media pembelajaran berbasis web google sites pada materi ikatan ion dan kovalen untuk SMA kelas X. *Educenter: Jurnal Ilmiah Pendidikan*, *1*(5), 333-344.
[21] Hikmawati, H., Sahidu, H., Kosim, K., & Gunawan, G. (2020). Tahap Define dalam Pengembangan Perangkat Pembelajaran Berbasis STEM untuk Meningkatkan Keterampilan Berpikir Tingkat Tinggi Mahasiswa. *Kappa Journal*, *4*(2), 149-157.
[22] Guci, S. R. F., Zainul, R., & Azhar, M. (2018). Pengembangan Media Pembelajaran Berbasis Tiga Level Representasi Menggunakan Prezi pada Materi Kesetimbangan Kimia Kelas XI SMA/MA. *Artikel Skripsi Prodi Pendidikan Kimia, Universitas Negeri Padang*, *November*.
[23] Hakiki, M., & Fadli, R. (2021). Pengembangan Media Pembelajaran E-Learning Berbasis Web Pada Matakuliah Profesi Kependidikan Stkip Muhammadiyah Muara Bungo. *Jurnal Muara Pendidikan*, *6*(2), 182-189.
[24] Lestari, A., Lianah, L., & Hidayat, S. (2019). Pengembangan modul pembelajaran biologi berbasis kearifan lokal di Kawasan Wisata Goa Kreo pada materi ekosistem kelas X SMA negeri 16 Semarang. *Phenomenon: Jurnal Pendidikan MIPA*, *9*(1), 1-9.
[25] Cheva, V. K., & Zainul, R. (2019). Pengembangan e-modul berbasis inkuiri terbimbing pada materi sifat keperiodikan unsur untuk SMA/MA kelas X. *Jurnal Edukimia*, *1*(1), 28-36.
[26] Husniah, L., Prihatiningtyas, S., & Putra, I. A. (2020). Pengembangan media pembelajaran video stop motion materi fluida statis. *Jurnal Riset Dan Kajian Pendidikan Fisika*, *7*(1), 15.
[27] Rahmawati, R., Achdiani, Y., & Handayani, M. N. (2021). Pengembangan Media Pembelajaran Berbasis Website WIX Pada Mata Pelajaran Produksi Pengolahan Hasil Nabati Di SMKN 2 CILAKU Cianjur. *EDUFORTECH*, *6*(2), 109-119.
[28] Haloho, K. H. (2019). *Rancangan media pembelajaran fisika berbasis website pada materi pokok fluida dinamis kelas xi* (Doctoral dissertation, UNIMED).
[29] Uno, H. B., & Ma'ruf, A. R. K. (2016). Pengembangan media pembelajaran IPS berbasis website untuk siswa kelas VII Madrasah Tsanawiyah Negeri. *JTP-Jurnal Teknologi Pendidikan*, *18*(3), 169-185.
[30] Solihudin, T. (2018). Pengembangan e-modul berbasis web untuk meningkatkan pencapaian kompetensi pengetahuan fisika pada materi listrik statis dan dinamis SMA. *WaPFi (Wahana Pendidikan Fisika)*, *3*(2), 51-61.
[31] Musril, H. A., Jasmienti, J., & Hurrahman, M. (2020). Implementasi teknologi virtual reality pada media pembelajaran perakitan komputer. *Jurnal Nasional Pendidikan Teknik Informatika: JANAPATI*, *9*(1), 83-95.
[32] Sumardjo, S., Pratama, G. N. I. P., & Vemantyasto, T. N. (2020). Efektivitas Modul Estimasi Biaya Konstruksi Jalan pada Mata Pelajaran Estimasi Biaya Konstruksi Di SMK N 1 Purworejo. *Jurnal Pendidikan Teknik Sipil*, *2*(2), 104-116.