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Design of e-module based on eXe-Learning on human movement system material

Safira Kamisna[1], Samsul Kamal[2], Eva Nauli Taib[3*]

[1] Universitas Islam Negeri Banda Aceh,
Jl. Syeikh Abdur Rauf No. 1, Kopelma Darussalam, Banda Aceh, 23111, INDONESIA

[2]Universitas Islam Negeri Banda Aceh,
Jl. Syeikh Abdur Rauf No. 1, Kopelma Darussalam, Banda Aceh, 23111, INDONESIA

[3]Universitas Islam Negeri Banda Aceh,
Jl. Syeikh Abdur Rauf No. 1, Kopelma Darussalam, Banda Aceh, 23111, INDONESIA

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ABSTRACT

The human movement system material is one of the most difficult materials, this requires the use of certain media so that the teacher's ability to master technology is required to develop a learning media. This research aims to design or develop E-Module media based on eXe-Learning on human movement system material intended for class XI Science students in order to increase motivation and learning outcomes. The method used is the Research and Development (RnD) method which applies the development model from Alessi and Trollip, which includes the planning, design and development stages. The research results show that the E-Module design for planning starts from identifying the problem, studying the problem, determining sources and components, and brainstorming. The design stage consists of downloading and installing the application, selecting the format, changing the main title of the E-Module, determining the appearance design, creating a product design, collecting sources and components, preparing a draft of the E-Module and creating a storyboard. The development stage includes the stage of bringing together the concept, the editing process. The E-Module media design is designed to help teachers prepare teaching materials that have difficulty with high scientific language.

1. Introduction

Biological material is part of science education which is used to study living things and phenomena. Biology is not only studied by memorizing material, an in-depth interpretation process is still required. This interpretation process can run optimally if it is supported by appropriate learning media, namely a media that can be an intermediary between communication and interaction between educators and students in a learning activity [1]. Learning media is basically anything that is used to convey and channel messages that can stimulate students' thoughts, feelings and attention in order to achieve learning objectives [2]

Learning media has now entered the 21st century which is marked by the development of digital media. Learning media in the 21st century is media that utilizes the existence of information and communication technology as a means of media and learning

*Corresponding author: evanaulitaib@ar-raniry.ac.id

resources to gain knowledge [3]. Learning media that is integrated with information technology aims to provide convenience for educators and students. One form of change from technological advances is the presentation of teaching materials that were originally printed, turning into digital teaching materials, such as the change from printed modules to electronic modules [4]

E-Modules are teaching materials in the form of modules that are electronic and packaged digitally. The use of E-Modules can help educators in delivering material and facilitate students so they can learn independently [5]. The advantage offered by teaching materials in the form of E-Modules is the ease of access with various electronic devices including smartphones, laptops or computers [6]. Students can use smartphones to access teaching materials anywhere and anytime when needed. The e-Module is designed with an attractive and practical design so that it can help students to learn independently and is interesting to read again [7]).

Based on the results of interviews conducted with one of the biology teachers at SMA Negeri 1 Idi Tunong, it was found that the human movement system material was one of the most difficult materials, this happened because there were many scientific language terms which required students to have high-level thinking skills. The limited availability of learning facilities or media in a school causes the learning process to experience obstacles. This requires the use of certain media so that the teacher's ability to master technology is required to develop a learning media. The results of interviews conducted with students showed that the human movement system material was material that had a fairly extensive description so that students found it difficult to understand the material in the limited time. Students also expressed that they need independent learning media that is attractive to read and can be easily accessed anywhere and at any time.

Therefore, a digital-based learning media design is needed that can be easily used by teachers. one of them is by using the eXe-Learning application. The eXe-Learning application is an open-source application that can be used to compile teaching materials in the form of e-learning (E-Modules). The eXe-Learning application was chosen because this application can be operated for free and can be used even without an internet connection, the application is easy to use by beginners because there is no need to know the HTML programming language, it has a simple design, users can set the language they want to use and it is software that can adapted to Windows or Linux operating systems [8]. This application can also help teachers in designing the learning process easily, this can be started by providing video apperception and learning materials, summaries and exercises or quizzes so that the use of technology can support the achievement of learning objectives [9]

This research aims to design E-Module media based on eXe-Learning on human movement system material intended for class XI Science students in order to increase motivation and learning outcomes. Several studies related to this research stated that in designing E-Modules using eXe-Learning, educators are not required to understand the HTML programming language [10]. This makes it easier for educators to design learning media because the final results developed will be the same as the results displayed during the media design and development process revealed that educators can design E-Modules easily because they can insert various texts, images, videos and questions in multiple choice form, so that educators can update the E-Modules as well as possible[11].

Other research findings from Ende et al, states that E-Modules can be designed using the Canva application. The Canva application is an application that offers convenience in designing E-Modules. Canva design can help educators to design E-Modules according to what they want without having to re-design them so that educators can design E-Modules easily and of course can produce E-Modules that are more interesting for students to use[12]. This is in line with opinion Taufan that the Canva application or website provides various conveniences for educators in designing E-Module media. This application or website provides various animations and templates that can be used, has very good quality image uploads, and has a drag and drop feature which makes the process of designing the E-Module that is being worked on easier[13].

The differences between previous research and the research to be carried out are in the selection, material in biology subjects, research location and development model of the learning media that will be designed. Based on the background above, researchers are interested in conducting research with the title "E-Module Design Based on eXe-Learning on Human Movement System Material". With this eXe-Learning based E-Module design, it is hoped that educators can use it to design and present media so that they can produce varied learning media in the classroom.

2. Materials and Methods

The research method used in this research is the Research and Development method. The Research and Development method aims to produce a new product or improve an existing product and test the effectiveness of the product[14]. The development model adapted is the development model from Alessi and Trollip. The Alessi and Trollip development model was chosen because this development model is relevant to the development of information and communication technology (ICT). The development of ICT-based learning has several advantages, including ease of accessing teaching materials anywhere and anytime, having a more attractive appearance and features, low operational costs, and saving students' learning time [15]. This research applies the Alessi and Trollip development model with several stages including planning, design and development stages.

This research adapts a development procedure that refers to the Alessi and Trollip development model. The Alessi and Trollip development model consists of three stages, including planning, design and development. In general, the three stages of these steps are as follows.

The planning stage is the stage used to provide direction that contains a planned description of the product to be developed. The planning stage is also the stage in formulating plans for the program appearance and material content to be developed. The design stage is the stage of the process of combining instructional content and interactivity perspectives. The result of the design stage is a storyboard and collecting supporting sources. The development stage is the stage of pouring the design concept into a product that is ready to be used [16]. The development procedure can be seen in Figure 1.

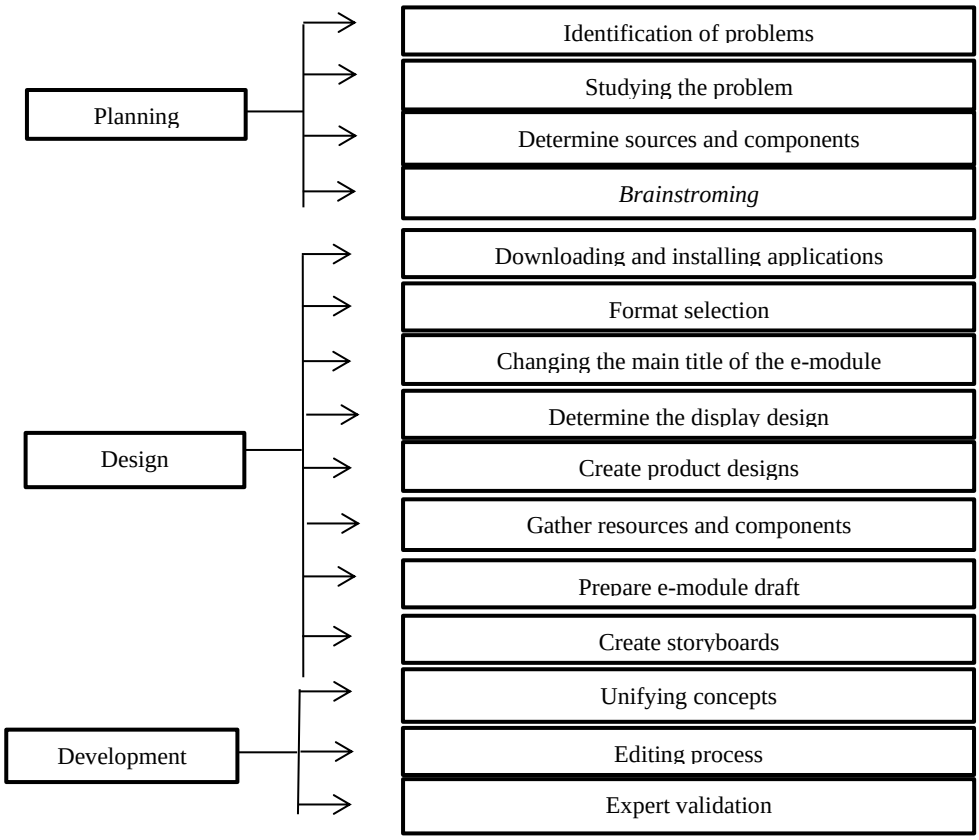

Fig. 1 Stages of the eXe-Learning Based E-Module Development Process

3. Results and Discussion

3.1 Planning Stage

The design of this eXe-Learning based E-Module starts from the planning stage which consists of the problem identification stage and studying the problems that occur between educators and students during teaching and learning activities. After studying the problem, the sources and components needed to design the media are determined and brainstorming activities are also carried out between researchers and teachers to obtain solutions to problems that occur in schools. The planning stage can be seen in Table 1.

Table 1 eXe-Learning Based E-Module Planning Stage

Identification of problems	Studying the problem	Determine sources and components	*Brainstorming*
1) Initial observations at SMA Negeri 1 Idi Tunong	1) The learning process experiences obstacles due to limited learning facilities and media at school	1) Syllabus for class XI Biology	1) Determine the product to be developed
2) Conducting an interview with the teacher at SMA Negeri 1 Idi Tunong	2) The teacher reveals that one of the most difficult materials is the human movement system material	2) SMA/MA Class XI Biology textbook and other supporting books	2) Determine the material to be used
3) Conduct interviews with students at SMA Negeri 1 Idi Tunong	3) Students are less able to absorb material on the human movement system in a short time	3) Image/ illustrations and learning videos	
4) The results of observations and interviews showed that the facilities in the form of LCD projectors and	4) Students need learning media that can be used independently and is easy to access		

Identification of problems	Studying the problem	Determine sources and components	*Brainstorming*
1) Initial observations at SMA Negeri 1 Idi Tunong	1) The learning process experiences obstacles due to limited learning facilities and media at school	1) Syllabus for class XI Biology	1) Determine the product to be developed
2) Conducting an interview with the teacher at SMA Negeri 1 Idi Tunong biology textbooks were inadequate so that it became an obstacle in the learning process, namely limited learning media facilities.	2) The teacher reveals that one of the most difficult materials is the human movement system material	2) SMA/MA Class XI Biology textbook and other supporting books	2) Determine the material to be used

3.2 Design Stage

The next stage is the design stage. The design stage is largely determined by the teacher's role in determining the success of learning activities through the teaching materials developed [17]. The design stage begins with downloading and installing the application that will be used. An application is a computer program designed to organize and carry out special tasks for users [18]. The eXe-Learning application can be downloaded on laptop devices for free on the official website provided, namely https://exelearning.net/en/downloads/ .The downloaded eXe-Learning application can be adapted to the operating system on the laptop used, including GNU/Linux, Microsoft Windows, and Apple. The downloaded application is then installed so that it can be used to create learning media.



Fig. 2 Display of options for installing the eXe-Learning application

After the installation process is complete, the next step is to select the format that will be used in creating the E-Module. The choice of format is intended as a form of application of the specified teaching materials [19]. The application format is available in the Styles item. The E-Module display provided consists of Base, CEDEC, Docs, INTEF, Kids, Presentation and UDL formats. The choice of format can be adjusted to the teacher's wishes in designing the media to be developed.

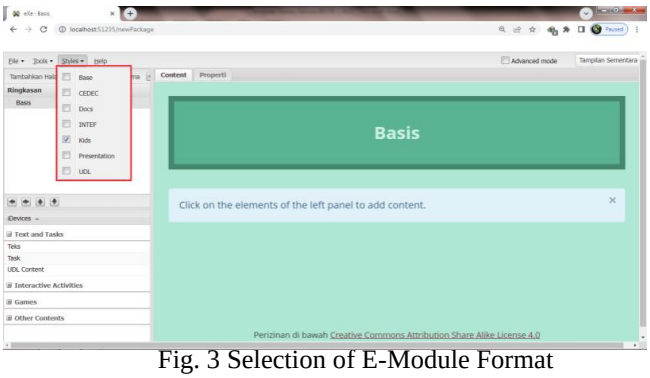

Fig. 3 Selection of E-Module Format

After selecting the format, then change the name of the Basis section to Class XI High School Biology. Changing the Base name can be done by right-clicking on the laptop touchpad so that the Change Name section is visible. The name change was carried out to show the competencies contained in the syllabus and RPP used [20].

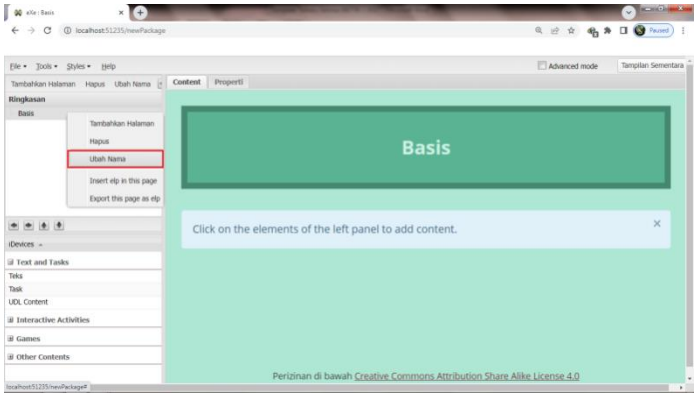

Fig. 4 Changing the Main Title of the E-Module

Then, changing the Base section to High School Biology Class Selection of fonts and icon images in the material presented to provide visualization of the content in the E-Module so that it can help students remember the material [21]. Determining the display design can be done by clicking on the Text section, and the image icon and font display will be visible. The eXe- Learning application provides various image icons, types, sizes and colors of writing fonts that can be adjusted to the teacher's wishes.

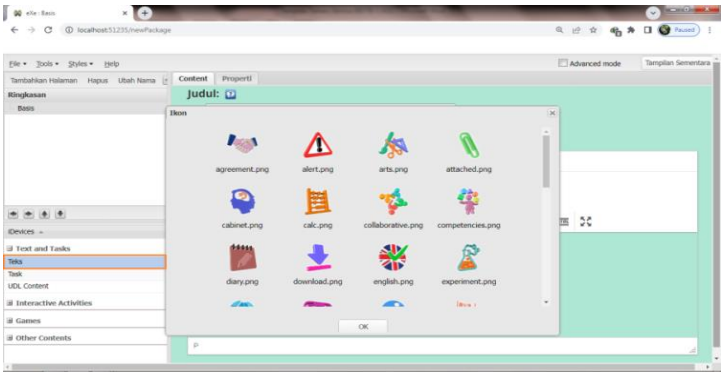

Fig. 5 Selection Icon Image in E-Module Title

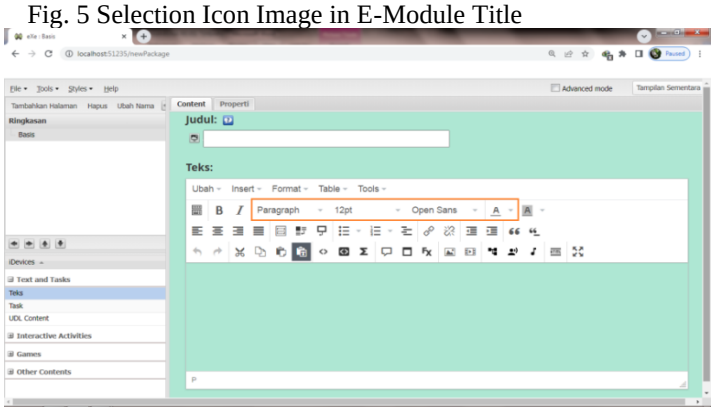

Fig. 6 Selection of Type, Size and Color of Writing Font

After determining the appearance design, the sources and components that have been determined at the planning stage are collected. The sources and components needed are material on the human movement system from various references, including Biology textbooks or other supporting books, pictures, animations and learning videos. Then a draft E-Module is created where the preparation of the draft E-Module begins by determining the scope of material that will be provided in the E-Module [22]. This draft is used to compile the topics or main points of discussion of the E-Module starting from the cover to the bibliography. An E-Module draft can be created by clicking on the Add Page section, so that the sections that have been arranged in the E-Module can be designed in the form of a draft.



Fig. 7 Draft on E-Module

After the e-module draft has been prepared, the next step is to create a storyboard for the e-module. Storyboards are used to guide what materials are used during the process of designing learning media.

The storyboard is the initial design plan to describe the appearance of the E-Module that will be developed [23].

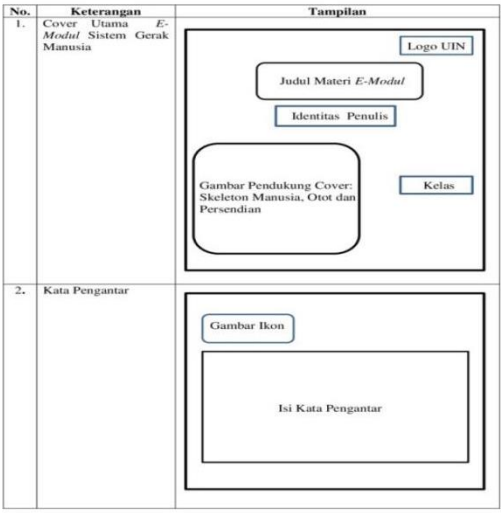

Fig. 8 View of one of the storyboards

3.3 Development Stage

After the storyboard has been designed, the next stage is the development stage where the development stage will be a stage in the process of unifying the concepts contained in the E-Module and then the editing process is carried out. The stage of unifying this concept starts from including the required sources and components in the E-Module in the eXe-Learning application. Sources and components that have been collected in the design stage will be combined and edited along with the necessary concepts. Unification of concepts and editing in the e-module includes unification of text in the form of human movement system material, images, animations and learning videos [24]

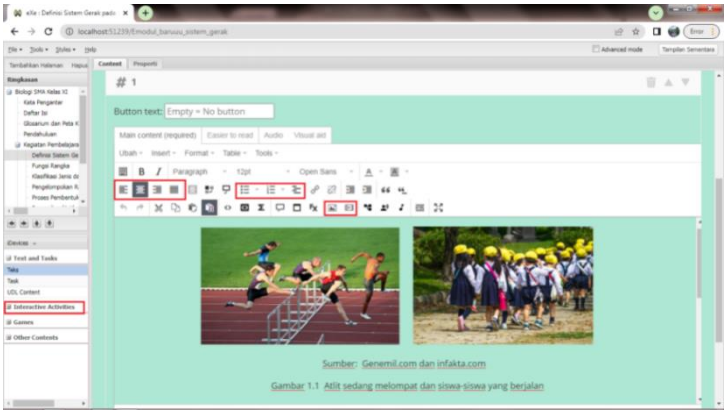

Fig. 9 Items used during the Editing Process

For each part of the E-Module development that has been carried out, don't forget to press the File section so that the Save section appears. If you feel that the E-Module is completely ready, then click on the Export section and select the Web Site section, to be able to export the E-Module that is ready to be developed. E-Modules in Website format will display the entire combination

of material text information, images, animations and videos which will be interconnected and connected in a network of pages [25].

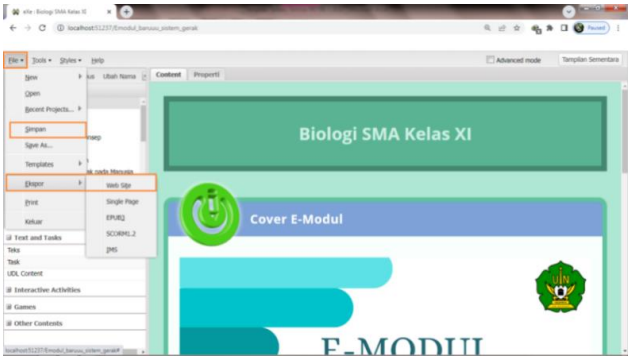

Fig. 10 File View Menu on E-Module

Then, the E-Module has been exported in the form of a web site, then log in to Google Drive and upload the E-Module folder that has been saved and exported to Google Drive. Google Drive provides access rights to share files or folders by pressing the Share button, access rights for document settings and editing and can share URL links according to needs [26]. After completing the upload process, then right-click on the laptop touchpad and select the Share section. In this share section, general access is then set with the choice of who has the link, and then the link you want to create in web form is copied.

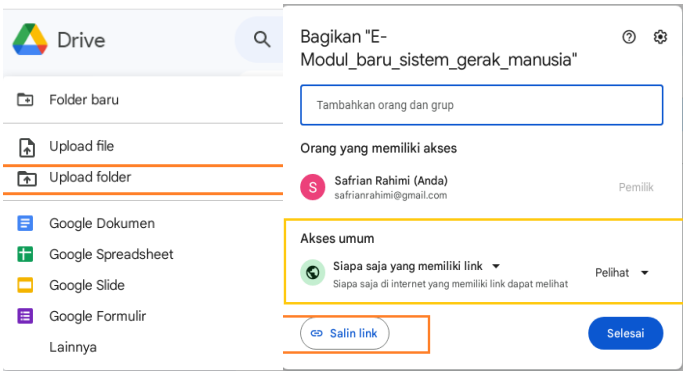

Fig. 11 E-Module Upload and Share View

The next process after completing access to the distributed E-Module is to log back into DriveToWeb (https://drv.tw/index.html). DriveToWeb is a hosting service that can produce links via a web browser which can be accessed using a smartphone or laptop using the internet network [27]. This was done so that the E-Module that has been exported in web format can have the form of a Web Site and the E-Module can also be used in the learning process. Before logging in, select Host on Google Drive and log in again with the Google Drive account used to upload the E-Module folder. Once you have finished logging in then select allow DriveToWeb to access the E-Module. After waiting a moment, select the E-Module link at the top visible on the DriveToWeb display.

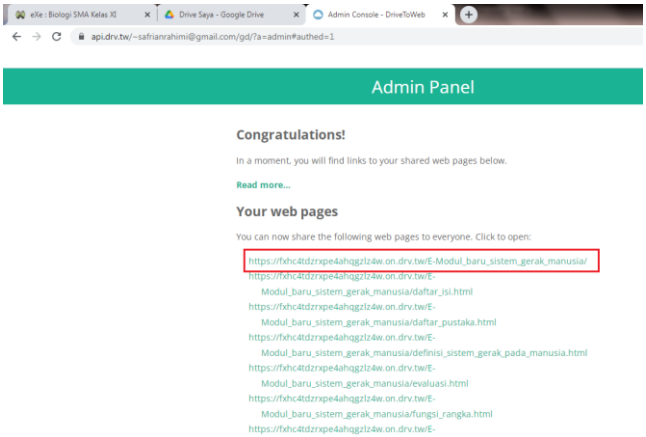

Fig. 12 E-Module Link Display in Web Form

Copying the E-Module link which already has Web form, distributing the E-Module link can be simplified by using Bit.ly https://bit.ly.com/ by logging in again with your Gmail account and selecting the link section. The E-Module link that has been copied from DriveToWeb is then placed in the section available on bit.ly and given the name of the link, according to the teacher's

wishes and needs. The E-Module link used should clearly contain the material contained in the E-Module that has been developed [28].

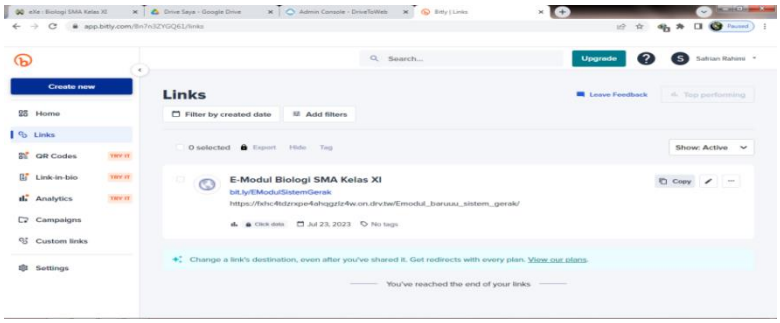

Figure 13 Display of links that have been shortened with Bit.Ly

The shortened E-Module link using bit.ly can be distributed to students via WhatsApp Group. The WhatsApp Group itself can be used as a source of learning and convey important announcements that many people need to know [29]. The E-Module link that has been distributed is ready to be used by educators and students in teaching and learning activities on human movement systems material in class XI Science.

6. Conclusions

The research concludes that the E-Module design process involves three main stages: planning, designing, and development. The planning stage focuses on identifying and analyzing problems, determining necessary sources and components, and brainstorming ideas. The design stage includes installing the application, selecting appropriate formats, customizing the module's title, designing the layout, drafting the content, and creating a storyboard. The development stage involves integrating concepts and refining the module through an editing process. This E-Module is designed to assist teachers in preparing teaching materials, particularly for topics with complex scientific language.

References

[1] Syamsurizal, S., Syarif, E. A., Rahmawati, R., & Farma, S. A. Developing human movement system booklet as a biology teaching material suplement for XI grade students. *JPBI (Jurnal Pendidikan Biologi Indonesia)*, 2021, *7*(1), 95–103. https://doi.org/10.22219/jpbi.v7i1.12828

[2] Pasaribu, O. L.. *Pengembangan Media Pembelajaran Bahasa Indonesia*. Penerbit Adab. 2021.

[3] Mulyono, & Ampo, I. Pemanfaatan Media dan Sumber Belajar Abad 21 dalam Dunia Pendidikan di Indonesia. *Jurnal Paedogogia*. 2020, *9*(2), 93–112. https://doi.org/10.24239/pdg.Vol9.Iss2.72

[4] Kustini, S., & Zahra, A. *Pengembangan Modul Elektronik Menggunakan Pendekatan Pembelajaran Kontekstual Untuk Siswa Kelas X Madrasah Aliyah Negeri 1 Pangkalpinang*. 2022, *5*(2), 56–65.

[5] Rusmansyah, R., Hamid, A., Misbah, M., Rahmawati, L., Sugianti, R., Baihaqi, A., Parida, E., Mahda, M., & Kirana, G. F. A.). Pelatihan Pembuatan E-Modul Menggunakan eXe-Learning di Lingkungan Lahan Basah. *Bubungan Tinggi: Jurnal Pengabdian Masyarakat*, 2021, *3*(4), 457. https://doi.org/10.20527/btjpm.v3i4.4334

[6] Rambe, K., & Ristiono. *Pengembangan Modul Elektronik (E-Modul) Berbasis Smartphone tentang Materi Sistem Ekskresi pada Manusia untuk Peserta Didik Kelas XI SMA*. 2022, *17*(2).

[7] Faridah, A., & Afridiani, W. Meningkatkan Hasil Belajar Mahasiswa Melalui E-Modul Berbasis Android. *Mimbar Ilmu*, 2021, *26*(3), 476–482. https://doi.org/10.23887/mi.v26i3.39008

[8] Manulang, E., Linda, R., & Noer, A. M. Pengembangan E-Module Kimia Berbasis eXe-Learning pada Materi Laju Reaksi. *Jurnal Pendidikan Kimia Universitas Riau*, 2020/ *5*(2), 70. https://doi.org/10.33578/jpk-unri.v5i2.7773

[9] Rianto, & Mascita, D. E. *Pengembangan Media Pembelajaran Modul Elektronik Berbasis Web Menggunakan Aplikasi Exe Learning*. 2022, *6*(1), 220–229.

[10] Rahmat Musfikar, Ichsanul Akbar, Sarini Vita Dewi, & Aulia Syarif Aziz. E-Module Bahasa Pemrograman Java Berbasis Exe-Learning. *Jurnal PROCESSOR*, 2023, *18*(1), 1–7. https://doi.org/10.33998/processor.2023.18.1.704

[11] Muzijah, R., Wati, M., & Mahtari, S. Pengembangan E-modul Menggunakan Aplikasi Exe-Learning untuk Melatih Literasi Sains. *Jurnal Ilmiah Pendidikan Fisika*, 2020, *4*(2), 89. https://doi.org/10.20527/jipf.v4i2.2056

[12] Nillofa Ende, A. M., Jasril, I. R., & Jaya, P. Perancangan dan Pembuatan E-Modul Interaktif Berbasis Canva Pada Mata Pelajaran Dasar Listrik dan Elektronika. *JTEV (Jurnal Teknik Elektro dan Vokasional)*, 2022, *8*(2), 193. https://doi.org/10.24036/jtev.v8i2.117118

[13] Taufan, A., Astutik, S., Muhammad Asyroful Mujib, Elan Artono Nurdin, & Bejo Apriyanto. Pengembangan E-Modul Interaktif Berbasis Aplikasi Canva Pada Materi Pengelolaan Sumber Daya Alam Indonesia Siswa SMA.

Jurnal Pendidikan Geografi Undiksha, 2023, *11*(2), 133–143. https://doi.org/10.23887/jjpg.v11i2.61947

[14] Okpatrioka. Research and Development (R&D) Penelitian yang Inovatif dalam Pendidikan. *Dharma Acariya Nusantara: Jurnal Endidikan, Bahasa Dan Budaya*, 2023*1*(1), 86–100.

[15] addam Akbar, J., Ariani, M., Zulhawati, Haryani, Zani, B. N., Husnita, L., Bayu Firmansyah, M., Sa'dianoor, Karuru, P., & Hamsiah, A. *Penerapan Media Pembelajaran Era Digital* (1st ed.). PT. Sonpedia Publishing Indonesia. 2023.

[16] Ningtyas, S., Akbar, M. R., Usanto, Khairunnisa, Azis, F., Sepriano, Rini, F., Hasanuddin, Putra, I. N. A. S., Adhicandra, I., Novita, R., Metra, R., & Junaidi, S. *Multimedia (Teori dan Aplikasi dalam Dunia Pendidikan)*. PT. Sonpedia Publishing Indonesia. 2023

[17] Munawaroh, S., Sunandar, A., & Qurbaniah, M. Developing e-modules based on scientific literacy in bamboo ethno-taxonomy. *JPBI (Jurnal Pendidikan Biologi Indonesia)*, 2023, *9*(2). https://doi.org/10.22219/jpbi.v9i2.24057

[18] Sukatmi, S., & Pitri. Aplikasi Absensi Siswa Berbasis Web Dengan Dukungan Sms Gateway Pada SMK Kridawisata Bandar Lampung. *Jurnal Informasi dan Komputer*, 2018, *6*(1), 20–29. https://doi.org/10.35959/jik.v6i1.58

[19] Cheva, V. K., & Zainul, R. Pengembangan E-Modul Berbasis Inkuiri Terbimbing pada Materi Sifat Keperiodikan Unsur untuk SMA/MA Kelas X. *EduKimia*, 2019, *1*(1). https://doi.org/10.24036/ekj.v1i1.104077

[20] Triono, S. *Dinamika Penyusunan E-Modul*. Penerbit Adab. 2021

[21] Adhim, M. F., & Arianto, F. *Pengembangan E-Modul Citra Bitmap untuk Siswa Kelas XI Multimedia di SMK Informatika "Sumber Ilmu" Tulangan*. 2020, *10*(21), 1–8.

[22] Umbara, D. M. A. Pengembangan E-Modul Berbasis Stem Untuk Meningkatkan Hasil Belajar Siswa Pada Materi Limbah Hasil Hewani. *Jurnal Pendidikan*, 2022, *13*(1), 32–50.

[23] Hayanum, R., Permana Sari, R., & Nurhafidhah. Pengembangan Media Pembelajaran E-Modul Interaktif dengan Menggunakan Aplikasi Exe-Learning. *KATALIS: Jurnal Penelitian Kimia dan Pendidikan Kimia*, 2023, *5*(2), 7–17. https://doi.org/10.33059/katalis.v5i2.6970

[24] Syahrial, Asrial, Kurniawan, D. A., & Piyana, S. O. (2019). E-Modul Etnokontruktivisme: Implementasi Pada Kelas V Sekolah Dasar Ditinjau Dari Persepsi, Minat Dan Motivasi. *JTP - Jurnal Teknologi Pendidikan*, *21*(2), 165–177. https://doi.org/10.21009/jtp.v21i2.11030

[25] Faulina, S. T., Lestari, N., & Anggraini, A. Penerapan Metode Waterfall pada Aplikasi Pemesanan Soundsystem dan Organ Tunggal Jefri. *Jurnal Teknologi Informasi Mura*, 2019, *12*(2), 56–64. https://doi.org/10.32767/jti.v11i02.629

[26] Trilaksono, A. R. Efektivitas Penggunaan Google Drive Sebagai Media Penyimpanan Di Kalangan Mahasiswa. *Jurnal Digital Teknologi Informasi*, 2018, *1*(2), 91–97. https://doi.org/10.32502/digital.v1i2.1651

[27] Dirgantara, I. W., Suyasa, P. W. A., & Mertayasa, I. N. E. Pengembangan Media Pembelajaran Bangun Ruang Sisi Datar Berbasis Articulat Storyline 3 Pada Mata Pelajaran Matematika Kelas VIII di SMP Lab Undiksha. *Kumpulan Artikel Mahasiswa Pendidikan Teknik Informasi*, 2023, *12*(1), 67–77.

[28] Sudiatmika, I. P. G. A., Artana, W. W., & Pramartha, I. N. B. Optimalisasi Penggunaan Google Form dan Bit.Ly pada Annika Linden Centre. *Widyabhakti Jurnal Ilmiah Populer*, 2021, *3*(2), 66–74.

[29] Rohman, F. N., & Dani, H. (2020). Validasi Media Sketchup Dan Perangkat Pembelajaran Materi Menghitung Volume Pondasi Dan Sloof. *Jurnal Kajian Pendidikan Teknik Bangunan*, *06*(01), 1–9.

[30] Tutiasri, R. P., Santoso, W., & Rahmawati, A. Pemanfaatan Whatsapp Grup sebagai Media Komunikasi di Daerah Pedesaan. *Jurnal Ilmu Komunikasi*, 2021*11*(1), 79–92. https://doi.org/10.15642/jik.2021.11.1.79-92