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Website-Based E-Module Development to Improve Students' Cognitive Learning Outcomes on Fish Product Production Materials

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ABSTRACT

Decreased learning motivation and enthusiasm of students of class XI APHP at SMKN 2 Cilaku Cianjur in the learning process during the Covid-19 pandemic, causing a decrease in value in the cognitive aspect. In addition, the limited materials and learning media used by teachers contain students difficulty in understanding the material taught. Efforts made by researchers to overcome these problems are to develop website-based e-modules that can be accessed online to improve student learning outcomes. The purpose of this research a study was carried out titled 'Development of Website-Based E-Modules to Improve Students'. The development of this website-based e-modules uses an ADDIE model research design with several stages, including Analysis, Design, Development, Implementation, and Evaluation. Website-based e-modules developed are then implemented with distance learning to determine students' learning outcomes via Whatsapp video call connected to the Facebook application using quasi experiment research- nonequivalent control group design. The result showed that the website-based e-modules were declared "Viable" by a media expert, declared "Very Viable" by a material expert and linguist expert, and the results of product trials were declared "Very Viable" by students.

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1. INTRODUCTION

At the beginning of 2020, Indonesia was shocked by a coronavirus (Covid-19) outbreak, which began to infect many people in Indonesia. The spread of the Covid-19 virus does not only impact health but also social, economic, and educationally (Karakaya et al., 2021; Srivastava & Agarwal, 2020). One of the efforts made by the Indonesian government to reduce the spread of the coronavirus in the education sector is by carrying out school activities through online/distance learning. The Minister of Education and Culture of the Republic of Indonesia issued a circular regarding guidelines for organizing learning during the Covid-19 pandemic. Circular letter No. 4 of 2020 explains that the learning process in schools is carried out at home through online/distance learning to provide a meaningful learning experience for students without being burdened with the demands of completing all curriculum achievements for grade promotion and graduation. The definition of distance learning is when the learning process does not occur face-to-face contact between the teacher and the learner so that communication is carried out in two directions and is bridged by the media (Munir, 2009). Distance learning is an effective learning method to implement during a pandemic (Dilmac, 2020; Johan et al., 2020; Selvaraj, 2021). This learning method can increase students' motivation and interest in learning. This is to the results of Septantiningtyas (2019) research entitled "The Effect of Distance Learning with the Google Class Application on Student Learning Outcomes," which states that there is a significant increase in student motivation and interest in learning by applying google class model with the distance learning method.

Based on the author's experience when implementing the Education Unit Field Introduction Program (PPLSP) for the 2019-2020 school year, the writer experienced a problem in the learning process. This is due to the Covid-19 pandemic that is being experienced by the whole world. The State of Indonesia enforces the Large-Scale Social Restrictions (PSBB) regulations set on March 31, 2020, for the entire community, so people are not allowed to carry out activities outside the home. Therefore, the existence of the Covid-19 pandemic is an obstacle to the learning process (Makhrus et al., 2021; Priatmoko et al., 2021), so the learning process cannot be carried out face-to-face between teachers and students at school (Gherheș et al., 2021; Susilana et al., 2022; Widodo et al., 2020). When the author taught during the Covid-19 pandemic in the 2019-2020 academic year, the learning process would only have occurred with remote communication media. The author uses the Whatsapp Messenger application to support communication in the learning process (La Hanisi et al., 2018; Linda & Ri'aeni, 2018). The author gives structured assignments in each WhatsApp group; after that, students send assignments that have been done to the author personally. The learning process could be more conducive. This is because students are less enthusiastic, unenthusiastic, tend to be passive, and have limited learning resources that hinder the learning process. In addition, many students do not do the assignments given due to decreased motivation to learn. This is also to the results of the author's interview with the teacher of the Animal Products Processing Production subject, which stated that there were still many students who rarely submitted assignments and received incomplete grades due to the decreased enthusiasm for student learning during the current Covid-19 pandemic.

One of the interactive learning media that is effectively used in the distance learning process that can increase learning interest and student learning outcomes is a website-based e module. Based on the results of Eldarni's (2019) research, entitled "Development of Web-Based E-Modules Using the Moodle Application in Library Management Courses," after conducting a pre-test and post-test on 38 students, significant results were obtained, so it

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can be concluded that Web-based e-modules affect learning outcomes in library management courses. In addition, another study conducted by Fitriani & Indriaturrahmi (2019), entitled "Implementation of Web Based Indonesian Subject E-Modules," revealed that the results of questionnaire calculations carried out on material experts, media experts, and trials on students were classified as eligible criteria. In this way, the Indonesian language e-module can improve the quality of learning and can increase student learning interest, especially in Indonesian language subjects.

Production of Animal Products is one of the subjects in the Agribusiness Processing of Agricultural Products (APHP) expertise program at SMKN 2 Cilaku, Cianjur. Animal Products Processing Production is a science that studies animal product materials with unique properties and a variety of characteristics (Widyanti, 2020). One of the materials in the subject of Animal Products Processing Production, which is the focus of this research, is the production of fish products. This material was chosen because, based on the results of student scores on this material in the 2019-2020 school year, 43% of students had not reached the KKM. This can be caused because the content of the material presented needs to be simplified. Therefore, this material must be packaged more straightforwardly, innovative, and interactive to improve students' cognitive learning outcomes.

Based on the explanation of the background above, the author feels the need to develop learning media that can support the distance learning process, improving students' cognitive learning outcomes at SMKN 2 Cilaku Cianjur.

2. METHODOLOGY

This research was conducted using research and development methods with the ADDIE research model (Analysis, Design, Development, Implementation, and Evaluation). ADDIE is one of the research models used to design and develop a product that can be accounted for with a research and development approach (Research and Development). According to Molenda (2015), ADDIE is a learning model that is general and suitable for research and development (Ranuharja, 2021; Widyastuti, 2019). The product to be developed in this study is a website-based e-module using the Wix platform as a learning medium on fish production materials.

The sample used in this study included class XII APHP 1 SMKN 2 Cilaku Cianjur, as many as 25 students for the media trial stage, also class XI APHP 1 and XI APHP 2, as many as 73 students for the stage of implementing website-based e-module media which aims to measure results student learning. The sampling technique at the trial stage of the developed media used a purposive sampling technique, while at the application stage, the developed media used a total sampling technique. The research instrument used to collect data on website-based e-module development is a questionnaire/questionnaire in the form of validation sheets for media experts, material experts, linguists, and student respondents. In addition, other instruments used were questioned assessment questionnaires used to validate questions by the Animal Product Processing Production teachers and cognitive assessment test instruments in the form of pre-test and post-test questions to determine students' cognitive learning outcomes.

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3. RESULTS & DISCUSSION

3.1. Learning Media Development

3.1.1. Potential and Problem Analysis

At the potential and problem analysis stage, the researcher collected information in the form of problems with the teaching and learning process through observation when carrying out the Education Unit Field Experience Practice (PPLSP) at SMKN 2 Cilaku Cianjur and based on interviews with the Head of the Agribusiness Processing Study Program of Agricultural Products (APHP) at the time implementation of learning during the Covid-19 pandemic. The results of observations and interviews include: a) it is difficult for students to understand the material presented by the teacher; (2) the learning media used in the learning process does not attract students' attention; (3) decreased student interest and motivation in learning during the Covid 19 pandemic; and (4) There are 43% of students who still score below the KKM on Fish Product Production. The potential was discovered during the observation, that is, almost all students in the APHP SMKN 2 Cilaku Cianjur Study Program have smartphones and internet data packages which have been provided free of charge by the Ministry of Education and Culture and Research and Technology since September 2020, so that students can easily access the internet to support the learning process. This potential is an excellent opportunity for researchers to develop an interactive learning media product in the form of a website-based e-module to make it easier for students to access learning materials online. This is to Arif Sudirman's statement (1989) quoted by Sasmita (2020) that everything outside of students that allows the learning process to occur is referred to as a learning resource, namely internet technology which provides flexibility in exploring knowledge.

3.1.2. Material Analysis

The researcher interviewed the teacher of the Animal Product Processing Production subject to discuss the material the researcher would use to develop a website-based e-module. Based on the discussion results, fish production material is one of the materials selected to be loaded in the website-based e-module because this material is quite difficult for students to understand. Lack of mastery of the material results in low scores obtained by students. According to Khoir (2008) in Awang (2015), several external factors indicate the causes of students' difficulties in understanding learning material, including too many foreign terms, too dense material, students who seem like they have to memorize material, limited learning media, students it seems complicated to understand the material without the availability of media, the teacher tends to dominate learning, the teacher's mastery of the material is weak, and the way of learning is too monotonous.

One way to increase students' understanding of learning material is by creating a learning media that contains concise and creative material. This is to the statement of Utomo et al. (2021), which states that during online learning, the teacher should not provide material and assignments that make students feel bored but rather develop creative material, such as activities that train children to learn independently without feeling bored.

3.1.3. Product Needs Analysis

The product needs analysis aims to analyze functional requirements and determine the platform used to develop website-based e-module learning media products. The platform used in the development of this website-based e-module is the Wix platform. The use of this platform was chosen because Wix is a platform that is very attractive, user friendly, and has many additional features that can be used to support the development of content in website-

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based e modules. Kusuma & Pribadi (2018) stated that with the drag and drop concept and various user friendly tools, all users could create high-quality flash websites easily, quickly, attractively, and according to the desired design.

Suanah (2019) in her research stated that the selection of a media platform for learning geometric materials using the Wix web design was based on the consideration that Wix can provide several advantages, namely the operation of making the web does not require specific skills so it can provide convenience for users. The completeness of the content and the available features are of various types that can be used free of charge in the available application content templates, which can be used easily by simply copying and pasting in the feature content to be created, the choice of text, animation, images, or available templates can be replaced and adapted to the design of the development of learning media that will be made. The Wix media platform is perfect for beginners who cannot yet develop a website. Therefore, Wix provides 800+ free template features that make it easier for users to choose the design they want and a drag-and drop feature that makes it easier for users to arrange the display layout.

3.2. Design

3.2.1. Determining the Content of Website-Based E-Modules

In general, the content of the website-based e-module developed includes information on Core Competency (KI) and Basic Competency (KD), a glossary, learning modules, training and evaluation quizzes, practicum modules, learning videos, uploading assignment forms, assistance using e- website-based modules, discussion rooms, and communication rooms that subject teachers directly connect via the Whatsapp application.

3.2.2. Making an Outline of the Content of Website-Based E-Module (Flowchart)

The next stage is making a flowchart. The flowchart functions as a design model for the flow of thinking about the contents of the program to be developed. The flowchart's contents are charts containing symbols that indicate the direction of navigation flow on website-based e module learning media. According to Santoso and Nurmalina (2017), a flowchart is a symbolic representation of an algorithm or procedure for solving a problem; using a flowchart will make it easier for users to check for forgotten parts in problem analysis. In addition, flowcharts can also make it easier to communicate the course of the program to others.

3.2.3. Creating a Website-Based E-Module Framework Visualization (Story Board)

After making the flowchart, the next step in designing the website-based e-module learning media is making a storyboard. The storyboard is a sketch made as a design drawing containing every page of the e-module. The storyboard serves to visualize ideas from learning media that will be developed in detail so that they can provide an overview of the media more easily to readers. According to Mahardika & Destiana (2014), a storyboard is a graphic organizer, for example, a series of illustrations or images displayed sequentially for the initial visualization of a file, animation, or sequence of interactive media, including interactivity on the web. The sketching of this storyboard consists of 11 main pages, including the home page, which contains discussion forums and chats features with subject teachers, the main menu, KI and KD, a glossary, learning modules that contain learning materials, training, and evaluation, practicum modules, learning videos, task upload forms, help, and developer profiles.

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3.3. Development

3.3.1. Website Based E-Module Development

In the development stage, the website-based e-module product was then developed based on the results of the flowchart and storyboard previously designed. Website-based e-module media is created using a website platform called Wix. This platform is straightforward to use by ordinary people who need to gain specific knowledge in developing a media website by coding. This is because the Wix platform provides an easy way to develop a media website using an intuitive drag-and-drop. Drag and drop is to move an object or a desired feature by clicking and dragging it (drag), then placing it at the desired location (drop), as for how to create and use website-based e-modules using the Wix platform.

3.3.2. Website Based E-Module Validation and Assessment

This Website-Based E-Module Validation and Assessment includes Media Expert Validation, Material Expert Validation and Language Expert Validation. There are five aspects assessed in the validation of media experts, including the display of screen design, ease of use, consistency, usefulness, and graphics. The results of the analysis of media validation calculations can be seen in Table 1.

Tabel 1. Calculation Analysis of Media Expert Validation Results

Aspect	Number of Questions	No Items	Score	Score Total	Score Max	%
Display	3	1	3	9	12	75
Design		2	3			
Screen		3	3			
Ease of Use	3	4	3	11	12	91,7
		5	4			
		6	4			
Consistency	3	7	3	9	12	75
		8	3			
		9	3			
Benefits	3	10	3	9	12	75
		11	3			
		12	3			
Graphics	3	13	2	8	12	66,7
		14	3			
		15	3			
Total	**15**		**46**	**46**	**60**	**76,7**

Based on the table above, the calculation results on the display design display aspect get a feasibility percentage of 75%, the ease of use aspect gets a percentage of 91.7%, the consistency aspect gets a feasibility percentage of 75%, the usability aspect gets a feasibility percentage of 75%. The aspect of graphics gets a feasibility percentage of 66.7. Thus, overall the feasibility percentage of the developed website-based e-module learning media obtains an average percentage value of 76.7% which is included in the "Easy" category. So the website-based e module is suitable for use by students in the distance learning process with the condition that the revisions are according to the suggestions. The validation assessment

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p- ISSN p. ISSN 1693-5276 e-ISSN 2579-7700

of the material is seen from aspects of content feasibility, presentation, language, and encouraging curiosity. The results of the analysis of material validation calculations can be seen in Table 2.

Tabel 2. Calculation Analysis of Material Expert Validation Results

Aspect	Number of Questions	No Items	Score	Score Total	Score Max	%
Content Eligibility	3	1	4	12	12	100
		2	4			
		3	4			
Presentation	3	4	3	14	16	87,5
		5	4			
		6	3			
		7	4			
Language	3	8	3	11	12	91,7
		9	3			
		10	3			
Encourage Curiosity	2	11	3	7	8	87,5
		12	4			
Total	**12**		**44**	**48**	**48**	**91,7**

Based on the table above, the calculation results on the feasibility aspect of the content get a feasibility percentage of 100%, the presentation aspect gets a percentage of 87.5%, the linguistic aspect gets a feasibility percentage of 91.7%, and the aspect of encouraging curiosity gets a feasibility percentage of 87.5 %. Thus, overall the percentage of the feasibility of the material in the developed website-based e-module learning media obtains an average percentage value of 91.7% which is included in the "Very Eligible" category. So the material in the website-based e module is appropriate and appropriate for use in the remote learning process without revision.

The results of the material validation did not get suggestions because the material validator felt they needed to be more sufficient. This is because the material used in the website-based e module is adapted from textbooks and special modules for material on the production of fish products. The website-based e-module learning media is complete and sufficient and can be presented directly to students. This is to the principle of adequacy in selecting learning materials, which means that the material provided should be sufficient to assist students in mastering the essential competencies being taught (Arum, 2006). According to Arum (2006), the material presented should be manageable. After all, it will not help achieve competency standards and essential competencies and not too much because it will save time and energy studying it.

The validation assessment of language is seen from straightforward, communicative, dialogic, and interactive aspects, conformity with student development, Indonesian language rules, and the use of terms, symbols, or icons. The results of the media validation calculation analysis can be seen in Table 3.

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Tabel 3. Calculation Analysis of Linguist Validation Results

Aspect	Number of Questions	No Items	Score	Score Total	Score Max	%
Straightforward	3	1	3	8	12	66,7
		2	3			
		3	2			
Communicative	1	4	4	4	4	100
Dialogic and	2	5	4	8	8	100
Interactive		6	4			
Suitability With	2	7	3	6	8	75
Student Development		8	3			
Conformity With The	2	9	3	6	8	75
Rules Of The		10	3			
Indonesian Language						
Use Of Terms, Symbols	2	11	3	6	8	75
Or Icons		12	3			
Total	**12**		**37**	**37**	**48**	**91,7**

Based on the table above, the calculation results on specific aspects get a feasibility percentage of 100%, communicative aspects get a percentage of 87.5%, linguistic aspects get a feasibility percentage of 91.7%, dialogic and communicative aspects get a feasibility percentage of 100%, aspects suitability with student development gets a feasibility percentage of 75%, aspects of conformity with Indonesian language rules get a feasibility percentage of 75%, and the use of terms, symbols or icons gets a feasibility percentage of 75%. Thus, overall the percentage of the feasibility of the material in the developed website-based e-module learning media obtains an average percentage value of 81.9% which is included in the "Very Eligible" category. So the language used in the website-based e-module is appropriate and suitable for use by students in the learning process, provided that revisions are made according to suggestions.

3.4. Implementation

Implementation is a small-scale test trial stage for using website-based e-module learning media with the Wix platform, which is included for class XII APHP 1 students who have attended lessons on fish production. Students were asked to open the website link sent by the researcher in the Whatsapp group. Students are asked to try using a website-based e-module that experts have validated. Students are given a questionnaire via the Google form link to assess the response from using the media. The questionnaire contains 4 aspects: ease of use and navigation, clarity of presentation, aesthetics or beauty, and instructional quality.

Tabel 4. Calculation Analysis of Student Response Questionnaire Results

Aspect	Number of Questions	No Items	Score	Score Total	Score Max	%
Ease of use	5	1	89	426	500	85,2
and		2	81			

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Aspect	Number of Questions	No Items	Score	Score Total	Score Max	%
navigation		3	85			
		4	86			
		5	84			
Clarity of presentation	9	6	91	764	900	84,9
		7	83			
		8	86			
		9	81			
		10	84			
		11	84			
		12	83			
		13	87			
		14	85			
Aesthetic or beauty	5	15	86	428	500	85,6
		16	85			
		17	86			
		18	82			
		19	89			
Instructional quality	4	20	89	343	400	85,8
		21	86			
		22	82			
		23	86			
Total	**23**		**1961**	**1961**	**2300**	**85,3**

Based on the table above, the calculation results on the aspects of ease of use and navigation get an eligibility percentage of 85.2%, the clarity of presentation aspect gets a percentage of 84.9%, and the aesthetic aspect or beauty gets a feasibility percentage of 85.6%. The aspect of instructional quality gets a feasibility percentage of 85.8%. Thus, overall the feasibility percentage of the website-based e-module learning media developed gets an average percentage value of 85.3% which is included in the "Very Eligible" category. So the website-based e-module is suitable for use in the learning process with the condition that it is revised according to the suggestions. The suggestions put forward by students in developing website-based e-modules are adding a search feature to make it easier to find the desired information in the e-module. According to Handiwidjojo and Ernawati (2016), learnability relates to how easy an application or website is to use, measured by the available functions and features.

3.5. Evaluation

After making improvements based on suggestions from experts and students, a website based e-module learning media was obtained on fish production material that had been declared feasible to be implemented in the remote learning process. In addition, the website-based e module learning media has been tested and implemented in a small group of class XII APHP, 1 student at SMKN 2 Cilaku Cianjur, to find out the usefulness of media products developed as learning media.

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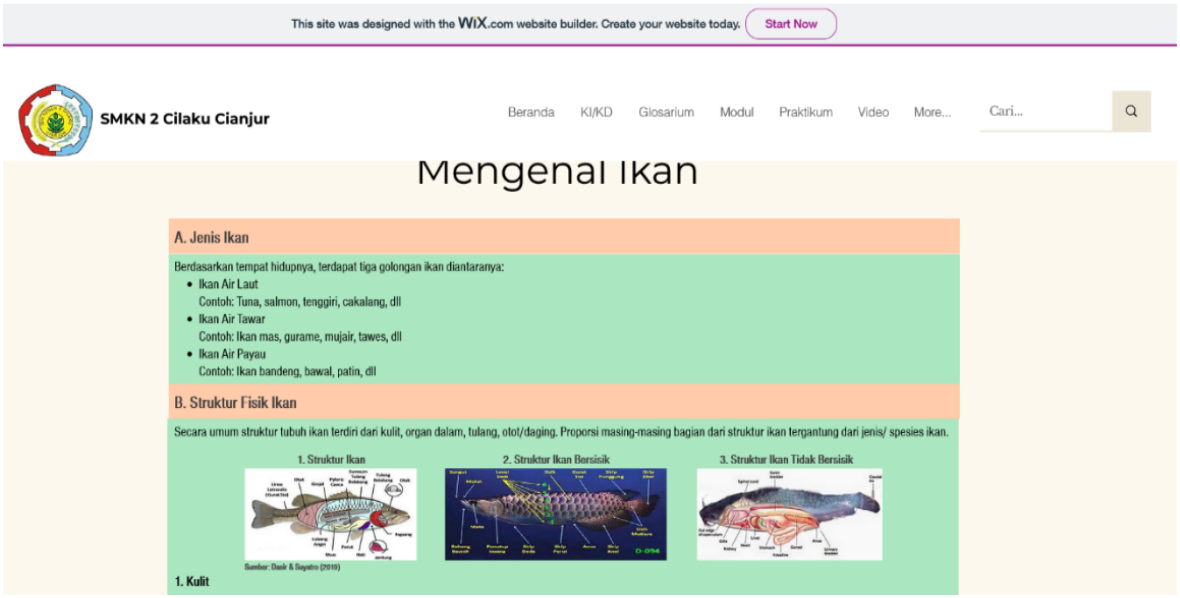

Figure 1. Material Page on E-Module

The website-based e-module learning media has been improved based on suggestions from experts and respondents. The final results of the website-based e-module learning media product can be accessed via the link: https://dindinganicilaku.wixsite.com/my-site-8

3.6. Application of Distance Learning Using Website-Based E-Modules

3.6.1. Initial Ability Learning Outcomes Cognitive Aspects of Students (Pre-test)

Students' pre-test results were obtained before being given treatment using a website based e-module in the experimental class and using power point in the control class. This pre-test aims to determine students' initial abilities regarding material for fish production before being taught in class with distance learning. Students will be given 10 multiple-choice questions. Results. The average comparison of pre-test values in the experimental and control classes can be seen in Table 5.

Tabel 5. Average Comparison of Experimental and Control Class Pre-test Values

	Class	N	Average
Pre-test score	Experiment	31	37,42
	Control	29	37,24

Based on the table above, it can be seen that the results of the comparison of the average pre-test values of the experimental and control classes are not much different. The average value of the pre-test in the experimental class with 31 students is 37.42, while in the control class the average pre-test value with 29 students is 37.24, so that the difference between the two class average values is 0.18. Therefore, it can be concluded that the average comparison of the pre-test values of the experimental and control classes is not significantly different.

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3.6.2. Final Ability Learning Outcomes of Cognitive Aspects of Students (Post-test)

After carrying out learning using a website-based e-module in the experimental class and using power point in the control class, students are given a post-test which aims to determine the final ability of student learning outcomes regarding the material for producing fish products that have been taught. Students are given the same questions as the pre-test questions in the form of multiple choices regarding 10 items of fish production. The average post-test results comparison of the experimental class and the control class can be seen in Table 6.

Tabel 6. Rata-rata Perbandingan Nilai Post-test Kelas Eksperimen dan Kontrol)

	Class	N	Average
Post-test score	Experiment	31	37,42
	Control	29	37,24

Based on the table above, the results of the comparison of the average post-test values of the experimental and control classes have a difference of 6.41. The post-test average score in the experimental class with 31 students was 77.10, while in the control class, the post-test average value with 29 students was 70.69. So, the average comparison of the post-test scores of the experimental and control classes has a significant difference.

Based on the results of hypothesis testing on the pre-test data, the pre-test results in the experimental and control classes did not have a significant difference. These results indicate that the two classes have the same ability. These results are corroborated by the homogeneity of the pre-test data in Table 10, which shows that the initial abilities in the two classes have the same/homogeneous variance. This is so that the results obtained are not biased and have no errors. Then, based on the results of the post-test data analysis, a significance value of 0.030 is obtained, which is smaller than the 0.05 significance level used in the analysis. So based on the decision-making criteria, H0 was rejected, which means there was a significant difference in learning outcomes between the experimental class using e-modules based on the website and the control class using PowerPoint. This can be seen from the average score obtained by students in the experimental class, which is higher than the control class.

Before using the website-based e-module learning media, students still had difficulty understanding the material. This is because, according to the students, the material for the production of fish products is one of the materials that is difficult to understand, and the subject matter discussed is very much. The use of a website-based e-module developed is one of the best solutions to increase students' understanding of fish production material. This is because the website-based e-module is an interactive learning media that contains various multimedia facilities such as pictures, learning videos, exercises, and evaluation questions, etc., so that students feel enthusiastic about participating in the learning process and make it easier for students to understand the material. This is to the statement that using learning media is a supporting tool that can increase the efficiency and effectiveness of learning success. In this case, media and technology contribute to improving the quality of teaching in the classroom and can also awaken the best potential of students (Johan et al., 2020; Sutrisno, 2016; Yolanda & Rizal, 2021).

Electronic learning media can help improve learning programs in Indonesia in realizing the development of science from technological results in the learning process. Teachers are

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also one of the most essential intermediaries involved in developing innovations in learning media products to perfect the learning process. Therefore, the website-based e-module learning media developed is one of the innovative learning media to be used in the learning process. Thus, the use of innovative learning media based on information technology has great potential to improve the quality of learning because it is an effective and efficient way of conveying information (Bhakta et al., 2016; Gunawan et al., 2021; Imansari & Sunaryantiningsih, 2017; Qazi et al., 2021).

4. CONCLUSION

Based on the results of research and development of website-based e-module learning media on fish product production material, it can be concluded that the website-based E-Module was declared "Appropriate" by media experts and declared "Very Eligible" by material experts and linguists. Then, the results of the product trials were declared "Very Eligible" by students. There is an increase in student learning outcomes in the experimental class, which is higher than in the control class. The N-gain value in the experimental and control classes is classified in the same category: "Medium." There are significant differences in learning outcomes between the experimental class using e-modules based on the website and the control class using PowerPoint.

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