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DEVELOPMENT OF E-MODULE WITH PROFESSIONAL 3D PAGEFLIP APPLICATION TO IMPROVE LEARNING OUTCOMES

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Abstract. *The purpose of this study was to determine the effectiveness of developing an E-Module with the 3D PageFlip Professional application to improve learning outcomes in science learning in 5th grade elementary school. This type of research is Research and Development with a nonrandomized experimental method subject pre-test post-test control group design. With the number of respondents, the students of Public Primary School Gugus Sunan Muria, Demak District, were 280 students. This study uses a quantitative approach. The results of this study showed the highest score obtained in the control group was 84 and the lowest score was 55 with an average of 67. The highest value obtained in the experimental group was 93 and the lowest value was 67 with an average value of 80, indicating that the average value of the experimental group was greater than the control group, which experienced a significant difference. The data from the t test shows that t count > t table, which is 26,041 > 1,6503 and the N-Gain value is in the high category and the interpretation is very effective. Data from the normality test based on Kolmogorov-Smirnov obtained a significance value > = 5%. The experimental group pre-test 0.093, post-test 0.081 and control group pre-test 0.022, post-test 0.200. This shows that the data values in the experimental group and control group are normally distributed. From the homogeneity test results obtained significant 0.433 > 0.005, it can be concluded that Ho is accepted and the data is homogeneous (same) the existing data is homogeneous.*

Keywords: *E-Module, science learning, motivation to learn.*

Main provisions of the article. From the results of research on the development of PageFlip 3D Professional based learning assessments to improve student learning outcomes in the Public Primary School Sunan Muria cluster, Demak sub-district, it can be concluded that the results of the effectiveness of PageFlip 3D Professional based learning assessments on natural science subject matter proved to be effective in evaluating learning.

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Introduction. In the face of the 21st century the emergence of the phenomenon of digital society which is often called revolution 4.0, namely the change of civilization towards a knowledge society. According to teachers and students to master 21st century skills, namely being able to understand and utilize information and communication technology (ICT Literacy Skills). The industrial revolution 4.0 has become a topic of discussion for people in various worlds, including Indonesia. Facing the era of technology, it is necessary to have skills that must be possessed [1]. For that we as teachers must be able to follow and take advantage of the development of ICT Literacy skills so that our students are more advanced and develop their knowledge.

The learning process cannot be separated from the role of ICT (Information and Communication Technology). The use of technology used in educational activities can support the quality of education. As opinion Budiana, Sjafirah, & Bakti [2], The development of advances in Information and Communication Technology (ICT) today has had a major influence in all aspects of life, including the world of education.

Based on the results of a survey conducted by researchers on respondents of 100 5th grade students in three elementary schools in Sunan Muria, Demak District, Demak Regency on August 31, 2020 regarding the use of ICT, most of the 5th grade students in three elementary schools in the Sunan Muria Cluster, Demak District, Demak Regency, were familiar with ICT and use it in everyday life as a means of information and as a source of learning. The use of ICT is very necessary in learning from home, especially in times of covid pandemic 19. The development of science and technology encourages changes that occur in people's lives, both relationships, perspectives, habits, economic, social, cultural levels and even education levels [3].

Farley Et Al. [4] stated, the paper concludes with the proposal of the same practical, low-cost tactics that educators could potentially employ to begin engaging with mobile learning, leveraging what students already do". What this means is that the paper concludes with a proposal on practical, low-cost tactics that educators could potentially use to start engaging with mobile learning, leveraging what students are already doing".

Lane & Stagg [5] argue, upon analysis, these data demonstrate that students are predominantly using laptop computers to support their learning, but their use of smart phones and tablets are also used for a number of specific learning activities. Further analysis indicates that in spite of the limitations in the formal university infrastructure, many students would like to use their mobile devices for formal learning as well as informal learning".

Ased on the results of interviews with three grade 5 teachers at Public Primary School number 1 Kedondong, Public Primary School number 2 Kedondong, and Public Primary School number 3 Kedondong, Demak about independent learning materials for students, they stated that the printed books used in schools did not help students to do independent learning. The teachers' views on the printed books used in their schools have an unattractive appearance, the language is difficult to understand, and the illustrations in the printed books do not properly reflect the concept. In carrying out the learning process the teacher still does not use interesting teaching materials. Currently, printed books are still not the main material in the learning process, this causes learning to tend to be boring. In retrospect, printed books are quite expensive and cannot display video, motion pictures, animation and audio. In fact, using interesting teaching materials can improve student learning outcomes and keep learning

from boredom. Technological advancements address problems that require a teacher to innovate in applying models, strategies, and learning media so that students are not easily bored and create new learning motivations [6]. In implementing the 2013 curriculum, teachers need interesting learning materials to support learning with a scientific approach.

The success of the learning process is influenced by several factors [7]. From several studies that have been carried out by several researchers, namely Kustijono & Watin [8], The research aims to describe the use of E-Books with Flip PDF Professional to practice science process skills. The use of E-Books with Flip PDF Professional is very effective to practice science process skills. and have the opportunity to be developed into a good learning media [9].

Other research conducted by Yelianti et al. [10] the purpose of this research is to develop electronic learning media on plant physiology subject matter based on 3D PageFlip. PageFlip 3D is software that can display learning materials, such as: power points, text, images, photos, animations, worksheets and videos that are integrated in one package. It was concluded that the electronic learning media in the Photosynthetic Plant Physiology course material was very well used both in the classroom and individually.

Based on the analysis, this data shows that students mostly use laptop computers to support their learning, but the use of smartphones and tablets is also used for a number of certain learning activities. Further analysis shows that despite the limitations in the formal infrastructure of the university, many students wish to use their mobile devices for both formal and informal learning.

With the problems that have been described, the teacher is highly required to be able to make interesting teaching materials that are able to provide results in student learning so that learning is far from boring. Teachers are also required to innovate interactive learning media so that learning is more varied [10]. With media innovation, learning will be more interesting so that it can foster students' learning motivation [11]. Learning media must pay attention to the development of the religious spirit of students because this factor is the target of learning media [12]. Facts on the ground show that educators lack the use of developed media [13].

Based on these facts, it is necessary to have learning media in the form of new and interactive software. One of the innovations that can attract students' attention in the learning process is to use creative and innovative media [14]. An effort to create interesting teaching materials is to develop an electronic module. The ability of teachers to manage learning using interactive teaching materials based on E-Module is very influential on learning outcomes. Teachers play an important role in learning, therefore the quality of teachers still plays a key role [15]. According to Hesty's opinion in Puspita [16], that learning success is influenced by factors including teacher quality, student characteristics, availability of facilities and infrastructure and environmental factors.

According to Hamzah & Mentari [17], E-module is a learning material that are systematically designed based on a particular curriculum and packaged in a certain time unit which displayed with electronic devices such as computer or android. One of the uses of technology that can support the creation of this e-module is to use the 3D PageFlip Professional application. Teaching materials using *3D* PageFlip Professional can contain text, animations, videos, and simulations that can be used by educators in the preparation of mods [18]. Electronic

modules are media that can display images, videos and animations to improve students' understanding [19].

According to Triwahyuningtyas, Ningtyas, & Rahayu [20] states that the electronic module has several advantages including: a very effective learning media and can facilitate learning and improve the quality of learning, can improve learning outcomes, can be used as direct and immediate feedback effectively to students, strongly supports individually learning, trains students to skilled in choosing that desired parts of learning content, enabling students to get to know and be familiar with computers which are increasingly important in modern society, and become more interesting because they are equipped with facilities for colors, songs, pictures, graphics and animations so that they are able to present learning in an interesting way.

From this description, the use of electronic modules has advantages such as being able to be integrated with the internet, if using a supporting application, and being able to directly play videos and music within the application. Based on the experience of researchers carrying out online learning during the emergency period for the spread of the Corona Virus (COVID 19) starting Tuesday, March 17, 2020, learning is carried out online, it is very important to feel the importance of electronic learning media. Online learning (on the network) cannot use print modules, students and teachers are connected electronically. PageFlip 3D Profesional according to Sugianto et al. [21] is software designed to convert PDF files to digital publication pages, this software can convert PDF files into a more attractive display like a book, not only that PageFlip 3D Professional makes PDF files into magazines or comics, teaching materials modules, company catalogs, and so on by using software so that the media display is more varied, not only in the form of text, this software is also displayed with video. Images, and audio can also be added to the software so that the learning process will be more interesting. Electronic modules are media that can convey images, videos and animations to improve student understanding [19].

Conceptual framework. This research and development (R&D) refer to the results of previous research that been carried out by several people, namely about the development of learning media. Some of the studies relevant to this research development are as follows research conducted by Nirmala [22]. The research aims to determine the results of the development of flipbook learning media in terms of the validity and practicality of the media in the metamorphosis of science subjects for grade IV elementary school. In results of the study showed the validity of the media with a percentage of 97.6%, material validity 87%, and the results of student and teacher questionnaires with an average acquisition of 91%. The results of this study can be concluded that the Flipbook learning media is very valid and very practical to use as a science learning medium for the fourth-grade metamorphosis material in Elementary School.

Research conducted by Kurniawan & Dewi [23], the research aims to develop learning media and increase affective learning productivity in the digital era by developing teaching materials in the form of electronic modules using the PageFlip 3D Professional application on the ecosystem theme.

Research conducted by Suyoso & Nurohman [24], the research aims to produce a WEB-based electronic module in a mobile version format as a physics learning medium that can be accessed via a smartphone with an Android platform. Based on the research, a web-based electronic module is produced in a mobile version format which was developed by utilizing

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the Wordpress. Com blog provider service. Based on the assessment of material experts and media experts it was stated that it was very feasible to use and field test showed that the product in the form of a web-based electronic module in the mobile version format could improve student learning achievement as indicated by the acquisition of a normalized score of 0.32.

Research objectives. This study was conducted to determine the effectiveness of developing E-Modules with the 3D PageFlip Professional application to improve learning outcomes in science learning in 5th grade Elementary School.

Methodology

Research design. The research design carried out was a pre-test and post-test control group design. The population in this study were students of grade 5 Public Primary School in the Sunan Muria Cluster, Demak District, 2020/2021 school year.

The design of this study used an experimental method of nonrandomized subject pre-test post-test control group design, in which there was an experimental group and a control group that were not randomly selected [25]. This design is described as follows.

$$\frac{O_1 \; x \; O_2}{O_3 \quad O_4} \tag{1}$$

Information:

O_1 : Pre-test results of the experimental group

O_2 : Post-test results of the experimental group

O_3 : Pre-test results of the control group

O_4 : Post-test results of the control group

X : Treatment of use

Respondents of the study. The research samples were students of Public Primary School number 1 Sedo, Public Primary School number 2 Sedo, Public Primary School number 3 Sedo, Public Primary School number 1 Kedondong, Public Primary School number 2 Kedondong, Public Primary School number 3 Kedondong, Public Primary School number 1 Mulyorejo, Public Primary School number 2 Mulyorejo, Public Primary School number 1 Turirejo, and Public Primary School Raji, Demak District, Demak Regency. The selection of sampling in this study is the purposive sampling technique. The independent variable in the form of treatment is the use of professional 3D PageFlip-based learning assessments. The dependent variable is in the form of student science learning outcomes. The research instrument was a test. The data collection techniques used were observation and written test. Data analysis includes instrument test (validity and reliability test) data description, prerequisite analysis test (normality and homogeneity test) hypothesis testing using t test and N-gain test.

Data Collection Techniques. Data and information can be obtained through an analysis of teacher needs for the development of E-Modules with the PageFlip 3D Professional application in the 2013 curriculum theme 1, theme 2, theme 3, theme 4 and theme 5 in grade 5 Elementary School. The instruments used in data collection were interview, observations, questionnaires and documentation.

Research Instruments. The instrument used to collect data in this study was at the need analysis stage and the trial stage. The following are the instruments used in each stage of the

research: Instrument questionnaire needs E-Module PageFlip 3D Professional application, Student response instruments to the PageFlip 3D Professional application E-Module, Teacher response instrument to the PageFlip 3D Professional application E-Module, Media expert instrument E-Module PageFlip 3D Professional application, and Material expert instrument E-Module PageFlip 3D Professional application.

Data Analysis Techniques. Data from the results of the questionnaire distribution to be tested for product feasibility, then the results from the analysis can be seen whether the product is suitable for use or revised first. After that, test the level of validity and feasibility of the product to be implemented in learning.

Qualitative data. The results of the E-Modul questionnaire with the PageFlip 3D Professional application in this case is a self-assessment sheet by the validator and 5th grade teacher in the form of qualitative data. Qualitative data in the of values categorized: very good (SB), Good (B), Not Good (SB), Good (B), Enough (C), Not Good (TB), Very Not Good (STB) (according to Walker and Hess in Kustandi & Sutjipto [26].

Quantitative data. Quantitative data from the questionnaire quality assessment instrument in the form of an assessment score.

Score analysis. Score analysis can be done by dividing the score obtained by the maximum score then multiplied by 100%. So, it can be expressed in a formula.

$$P = \frac{\Sigma X}{\Sigma XI} \times 100\% \quad (2)$$

Information:
P : Percentage level of eligibility
Σx: Total score obtained
Σxi : Total maximum score

Validity. Validity is a measure that shows the level of validity or validity of an instrument, an instrument that is valid or true has high validity. On the other hand, an instrument that is less valid means it has low validity. An instrument is said to be valid id it is able to measure what is desired. An instrument is said to be valid if it can reveal data from the variables studied appropriately. The high and low validity of the instrument shows the extent to which the data collected does not deviate from the description of the variable in question. To analyze the data obtained through a questionnaire, the researcher used statistical analysis techniques, namely the product moment correlation analysis technique. According to Arikunto [27] the validity test is specifically carried out with the formula:

$$rx = NXY-(X)(Y)NX2-(X)2N \quad (3)$$

Information:
rxy : Product moment correlation coefficient
N : Number of respondents
ΣX : Score for item
ΣY : Total score

Reliability. Reliability is an instrument that is reliable enough to be used as a data collection tool because the instrument is good enough. Reliability test is a measure that shows

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the consistency of the measuring instrument in measuring the same symptoms on other occasions. In the SPSS program, this method is carried out using the Cronbach Alpha method, where the questionnaire is said to be reliable if the Cronbach Alpha value is greater than 0.60. The Cronbach Alpha Formula. As follows:

$$r11=nn-11-\sigma i2\sigma 2t \quad (4)$$

Information:

$r1.$: Instrument Reliability

: The number of questions

$\sigma i2$: Number of question item variants or number of questions

$\sigma 2t$: total variance

Findings and Discussion. To test and describe the effectiveness of the E-Modul with the 3D Pageflip Professional application, a product trial was conducted by giving treatment to the experimental group. The treatment was given to grade 5 students at Public Primary School number 1 Sedo, grade 5 at Public Primary School number 2 Sedo and grade 5 at Public Primary School number 3 Sedo as a limited experimental group, grade 5 student at Public Primary School number 1 Kedondong, Public Primary School number 2 Kedondong and Public Primary School number 3 Kedondong as a control group. Public Primary School number 1 Mulyorejo, Public Primary School number 2 Mulyorejo, Public Primary School number 1 Turirejo, Public Primary School Raji as the wider experimental group. In the experimental group after completion of treatment, students were given posttest questions, in the control group only posttest questions were given without treatment. The results of the pretest and posttest can be seen in table 1 which shows the data on the results of activities before and after learning activities in the control class and the experimental class.

Table 1 - Value Data of Experimental Group and Control Group

Descriptive Statistics					
	N	Minimum	Maximum	Mean	Std. Deviation
Pre-test	280	55.00	84.00	67.1214	5.36746
Post-test	280	67.00	93.00	80.3571	5.55464
Class	280	1.00	2.00	1.6429	.48002
Valid N (listwise)	280				

Source: SPSS Researcher 25

Based on table 1, it is known that the control class with conventional learning with a sample size of 280 students. The mean was 67.1. a maximum value of 84, a minimum value of 55 and a standard deviation of 5.3. The mean post-test value is 80.36, the maximum value is 93.0, the minimum value is 67 and the standard deviation is 5.5. This shows that PageFlip Professional 3D based learning is able to improve student learning outcomes in science subject content.

Normality test.

Table 2 - Normality Test for Experimental Group and Control Group

Test of Normality							
	Kelas	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
		Statistic	Df	Sig.	Statistic	Df	Sig.
Pre-test	Control	.097	100	.022	.953	100	.001
	Experiment	.090	180	.093	.976	180	.004
Post-test	Control	.150	100	.200	.941	100	.000
	Experiment	.131	180	.081	.943	180	.000
a. Lilliefors Significance Correction							

Source: Researcher (Class 5 Normality Test) SPSS 25

Based on table 2, the data obtained based on Kolmogorov-Smirnov obtained a significance value> α = 5%. The experimental group pre-test 0.093, post-test 0.081 and the control group pre-test 0.022, post-test 0.200. This shows that the value data in the experimental group and the control group are normally distributed.

Homogeneity Test. The homogeneity test was carried out to show whether the experimental group and the control group had the same variant or not. The homogeneity test can be in Table 3.

Table 3. Homogeneity Test of the Experimental Group and the Control Group

Test of Homogeneity of Variances					
		Levene Statistic	df1	df2	Sig.
Post-test	Based on Mean	**4.332**	1	278	.038
	Based on Median	3.068	1	278	.081
	Based on Median and with adjusted df	3.068	1	277.869	.081
	Based on trimmed mean	3.769	1	278	.053
Pre-test	Based on Mean	7.032	1	278	.008
	Based on Median	5.939	1	278	.015
	Based on Median and with adjusted df	5.939	1	268.848	.015
	Based on trimmed mean	6.672	1	278	.010

From the results of the homogeneity test, it is obtained that it is significant 0.433> 0.005, it can be concluded that Ho is accepted and the data is homogeneous (same).

N-Gain test. The N-Gain test was conducted to analyze the results of the pretest and post-test, to determine whether there were differences in the learning outcomes of the experimental group and the control group. The N-Gain test can be seen in table 4.

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Table 4 - N-Gain Test for Experiment Group and Control Group Descriptive

	Class			Statistic	Std. Error
N-Gain Present	Experiment	Mean		74.5411	
		95%Confidence Interval for Mean	Lower Bound	51.2970	
			Upper Bound	57.7851	
		5% Tim med Mean		55.2822	
		Median		59.6875	
		Variance		272.782	
		Std. Deviation		16.51610	
		Minimum		16.00	
		Maximum		80.95	
		Range		64.95	
		Interquartile Range		24.41	
		Skewness		-613	239
		Kurtosis		-568	474
	Control	Mean		30.6352	99898
		95% Confidence Interval for Mean	Lower Bound	28.6638	
			Upper Bound	32.6067	
		5% Tim med Mean		30.9157	
		Median		31.7857	
		Variance		177.637	
		Std. Deviation		13.32804	
		Minimum		18.00	
		Maximum		67.50	
		Range		75.50	
		Interquartile Range		17.30	
		Skewness		-290	.182
		Kurtosis		022	.362

Source: Researcher (N-Gain Test) SPSS 25

Based on the results of the calculation of the N-Gain test score above, it shoes that the average N-Gain score for the control class is 30.6352 or 30.64% in the moderate category. With an N-Gain score of at least 18% and a maximum of 67.5%. Meanwhile, the average N-Gain score for the experimental class is 74.5411 or 75% is in the high category. With a minimum N-Gain score of 16.00 or 16% and a maximum value of 80.95 or 81%.

Table 5 - t-test (source of SPSS 25 results)

Paired Samples Test									
		Paired Differences					t	Df	Sig. (2-tailed)
		Mean	Std. Deviation	Std Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
Pair 1	Pret-test Control Post-test Control	-18.13000	7.55940	.75594	-19.62995	-16.63005	-23.983	99	.000
Pair 2	Pret-test Experiment Post-test Experiment	-10.51667	5.41823	.40385	-11.31359	-9.71974	-26.041	179	.000

The results of the calculation in the table, it is known that t count> t table, namely 26.041>1.6503, it can be concluded that Ho is rejected and Ha is accepted. This means that professional PageFlip 3D-based learning assessments are effectively used to evaluate learning. Research conducted by Ailiyah, Supriana, & Hidayat [28], this study aims to develop and determine the feasibility of an interactive digital module based on professional PageFlip 3D with a contextual teaching and learning (CTL) approach to assist students in applying the law of static fluid. The advantage of this module with modules that have been developed is that the display of this module is in 3 dimensions, equipped with interactive multimedia and problem-solving video tutorials and formative quizzes.

The effectiveness of using 3D PageFlip Professional is another [29]. This research and development aims to produce a Learning Module using PageFlip 3D Professional in Graphic Design Subjects Class X Computer and Network Engineering at Vocational School number 1 Muhammadiah, Padang. The results of the validity test by the experts as a whole on the Learning Module Using PageFlip 3D Professional in Graphic Design Subjects were 91.09% with a very valid interpretation used. The results of the overall practicality test assessment are 89.38%, with very practical interpretations used, and the overall effectiveness test assessment results are 89.11% with very effective interpretations used. Thus, the learning module using PageFlip 3D Professional in Graphic Design Subjects has been tested to be very valid, very practical and very effective to use, so that it can be used in the learning process of Graphic Design subjects at Vocational School number 1 Muhammadiah, Padang.

The ease of use of professional PageFlip 3D maker-based assessments has a good effect on learning outcomes, in line with the opinion [30, 31]. Based on the results of a study entitled PageFlip 3D Professional maker: Aa assessment Tool Accommodating The Generation-Z Student Learning Needs, it was stated that after comparing the scores on the PageFlip 3D Professional maker and the Mid-Semester Examination, it was found that the students' scores increased significantly after the assessment with the PageFlip 3D Professional maker. Research conducted by Pratama et al. [32]. The research aims to develop learning media and increase effective learning productivity in the digital era by developing teaching materials in the form of electronic modules using the Professional 3D PageFlip application on the ecosystem theme [33].

Based on the N-Gain score test above, it shows that average N-Gain score for the control class is 30.4480 or 30.45%, including in the moderate category. With an N-Gain score of at least 20% and a maximum of 67.5%. Meanwhile, the average N-Gain score for the experimental class was 75.5411 or 75.5% in the high category. With a minimum N-Gain score of 16.00 or 16% and a maximum value of 80.95 or 81 %. This means that PageFlip 3D Professional based learning assessments are very effectively used to improve to learning outcomes of science subject content.

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Based on the results of research and discussion of PageFlip 3D based learning assessments, it can be concluded that it can improve the learning outcomes of first semester 5th grade science learning at Public Primary School Sunan Muria Cluster.

Conclusions and recommendations. From the results of research on the development of PageFlip 3D Professional based learning assessments to improve student learning outcomes in the Public Primary School Sunan Muria cluster, Demak sub-district, it can be concluded that the results of the effectiveness of PageFlip 3D Professional based learning assessments on natural science subject matter proved to be effective in evaluating learning. The t test result in the experimental and control groups was 26.041. The data from the t test shows that t count> t table which is 26.041> 1.6503 then Ha is accepted. Based on the t test, it can be concluded that the use of PageFlip 3D Professional based learning assessment media has a significant difference, so that the PageFlip 3D Professional based learning assessment is effective and feasible for use in Natural Science subject matter to improve student learning outcomes in the Sunan Muria Cluster, Demak sub-district. The suggestion given by the author is that the teacher should use PageFlip 3D Professional based assessment media to improve learning outcomes of science subject matter because it is effective and efficient, it can be used over and over again.

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ОҚЫТУ НӘТИЖЕЛЕРІН ЖАҚСАРТУ ҮШІН КӘСІБИ 3D PAGEFLIP ҚОЛДАНБАСЫ БАР ЭЛЕКТРОНДЫҚ МОДУЛЬДІ ӘЗІРЛЕУ

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Аңдатпа. *Бұл зерттеудің мақсаты бойынша бастауыш мектептің жаратылыстану пәндерін оқытуда оқу нәтижелерін жақсарту үшін 3D PageFlip Professional қолданбасымен Е-Модуль әзірлеудің тиімділігін анықтау болды. Зерттеудің бұл түрі кездейсоқ белгіленбеген эксперименттік әдіспен зерттеу және әзірлеу болып табылады. Автордың ұсынысы мұғалімнің жаратылыстану пәндерін оқыту нәтижелерін жақсарту үшін PageFlip 3D Professional негізіндегі бағалау құралдарын пайдалануы керек, өйткені олар тиімді және тиімді, оларды қайта-қайта қолдануға болады.*

Түйін сөздер: *E-Module, жаратылыстану ғылымдарын оқыту, оқу мотивациясы*.

РАЗРАБОТКА ЭЛЕКТРОННОГО МОДУЛЯ С ПРОФЕССИОНАЛЬНЫМ ПРИЛОЖЕНИЕМ 3D PAGEFLIP ДЛЯ УЛУЧШЕНИЯ РЕЗУЛЬТАТОВ ОБУЧЕНИЯ

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Резюме. *Целью данного исследования было определить эффективность разработки электронного модуля с помощью приложения 3D PageFlip Professional для улучшения результатов обучения естественным наукам начальной школы. Этот тип исследований представляет собой исследования и разработки с нерандомизированным экспериментальным методом, предполагающим предварительное и после тестовое контрольное планирование группы. Предложение, данное автором, заключается в том, что учитель должен использовать средства оценки на основе PageFlip 3D Professional для улучшения результатов обучения по предмету науки, потому что они эффективны и действенны, их можно использовать снова и снова.*

Ключевые слова: *E-Module, изучение естественных наук, мотивация к обучению.*

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