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The Effectiveness of MPI BeWe to Improve the Learning Quality of Prospective Elementary School Teachers in the Elementary Teacher Education Study Program (PGSD) FKIP Unsri

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Abstract

The Web-Based Interactive Learning Multimedia (MPI BeWe) has been successfully developed for students of the Elementary School Teacher Education Study Program (PGSD) for the subject of Science Basic Concepts. 1. The problem raised in this research is how to develop Web-Based Interactive Learning Multimedia (MPI BeWe) to improve the quality of learning for elementary school teacher candidates in the PGSD Study Program FKIP Unsri. This study aims to improve the quality of the learning process for the Basic Science Concept course in the Elementary School Teacher Education Study Program (PGSD). The method used in this research is a quasi-experimental method. The research design used is the One-Group Pretest-Posttest Design. The sampling technique used is the Cluster Random Sampling (CRS) technique. The instruments used in this study were pretest and posttest with multiple choice techniques, observation sheets, and questionnaires in the form of student responses to learning using web-based interactive multimedia learning (MPI BeWe). The application of web-based interactive multimedia learning (MPI BeWe) shows the effectiveness of learning for first semester students of the PGSD study program. This can be seen from the increase in the percentage results of the average value of the pretest and posttest results and the increase in the results of the average gain <g>. Thus, it can be concluded that there is an effective application of web-based interactive learning multimedia (MPI BeWe).

Keywords: Interactive Learning Multimedia, Web, Basic Concepts of Science, ICT

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INTRODUCTION

One of the main problems with the education system in Indonesia is the issue of quality (Pramana et al, 2021; Shaturaev, 2021; Sulisworo, 2016). This problem relates to the provision of learning materials that can be accessed widely without being limited by distance and time constraints. If these obstacles can be overcome, then the mission to implement lifelong education at all levels of society can be realized. Realizing this requires a change in the paradigm of the teaching and learning process that has been applied so far (Ali, 2005).

According to Widhiartha (2009), in the traditional paradigm, the teaching and learning process generally takes place in the classroom and is marked by the presence of educators in front of the class. Educators have full responsibility for the course of the teaching and learning process and can be considered the most important resource in a

teaching and learning process (Buchari, 2018). In contrast to the new paradigm, students must be facilitated according to their respective needs. Each student is unique and has different learning needs (Koster et al, 2010; Marteney & Bernadowski, 2016).

The teaching and learning process must focus on "learning" activities and not on "teaching" activities as in the old paradigm. With this paradigm, the existence of educators is no longer the only important factor in the learning process. The existence of educators can be replaced by learning materials in the form of modules, instructions, or educational software that can be used for independent learning by students (Azmi, 2015).

Due to the presence of information and communication technology, the new paradigm that encourages students to become active learners is presently receiving the necessary tools to be applied in the Indonesian educational system (ICT) (Pohan & Rambe, 2022). ICT may contribute to the creation of numerous learning materials that are easier for students to understand, have a high level of interactivity, and are much more fascinating to study (N. Winda, 2016). All these advantages can accelerate their learning process. Additionally, by using the internet as a medium, ICT can put a variety of educational resources in front of pupils without regard to time or location constraints (Eliza et al, 2019).

From the author's visit to neighboring Malaysia, information was obtained that Malaysia is currently developing ICT-based learning or e-Learning. This is in line with research conducted (Alias et al, 2012) that in Malaysia has widely implemented the use of e-Learning in higher education institutions as facilities and infrastructure for access to education and content/subject materials have become available through the internet network.

The government through Commission X of the House of Representatives (DPR) has ratified the implementation of the 2013 curriculum, one of which is demanding teacher mastery to integrate Information and Communication Technology (ICT) or ICT in all lessons. Based on research conducted (R. Winda & Dafit, 2021), in the field there are still a lot of teachers, especially elementary school teachers who have not mastered ICT. Even in other circumstances, many teachers have not held it yet (the author's experience when teaching ICT-based PJJ PGSD students who came from elementary school teachers (the Dikti project), the author's experience teaching at the Open University (UT) as a Tutor, The author's experience when he became a PLPG instructor for elementary school teachers).

And the current reality is that PGSD is still considered a lower study program compared to other undergraduate study programs. The students are also still seen as students who are not well versed in ICT. Inevitably, a teacher will be able to deliver learning materials when a teacher does not master ICT because at college they were never taught this.

To answer and solve these problems, of course, the government in this case universities must prepare facilities and infrastructure to support learning. While the author as a lecturer at FKIP Unsri has prepared a syllabus and lecture program units, due to the unavailability of Web-Based Interactive Learning Multimedia (MPI BeWe), and MPI BeWe it is very important to make this because apart from being useful for prospective elementary school teachers at Sriwijaya University , but can also be used and beneficial for student teacher candidates throughout Indonesia. So based on the discussion above, this research generally aims to produce an interactive multimedia website for Science Basic Concepts, to improve the quality of the learning process for prospective teachers in the PGSD Study Program FKIP Unsri. Specifically, this research aims to improve: 1) Basic Science Concept Understanding for PGSD FKIP Unsri Education Students, 2) Students' ability to use ICT to address the challenges of implementing the 2013 curriculum, 3) Students' ability to use web-based interactive learning media, 4) Students' ability to innovate when learning basic science concepts.

METHODS

The method used in this study is a pre-experimental method with One-Group Pretest-Posttest Design. According to (Arikunto, 2010), one group pretest-posttest design is a research activity that provides a pretest (pretest) before being given treatment, after being given treatment, and then gives a final test (posttest). In this research design, one group of subjects was used. First the measurements are taken, then subjected to treatment (treatment), and finally the final measurement is carried out.

The population used in this study was the first semester students of the Primary School Teacher Education study program, FKIP Sriwijaya University. The samples used in this study were students of the Elementary School Teacher Education study program at FKIP Sriwijaya University, Palembang Campus. As for the sampling technique used, it is the Cluster Random Sampling technique.

This instrument is used to measure the effectiveness of the application of web-based interactive multimedia learning for first semester students of the Elementary School Teacher Education study program, Sriwijaya University, Palembang campus. The instruments used in this study were pretest and posttest with multiple choice techniques, observation sheets, and questionnaires in the form of student responses to learning using web-based interactive multimedia learning (MPI BeWe).

The research procedure is divided into 6 stages, namely:

1. Stage of preparation
   a. Determine the population and sample size for the application of web-based interactive learning multimedia (MPI BeWe).
   b. Observing the facilities and infrastructure of the study program to support the implementation of the research.
   c. Setting up the previously created BeWe MPI.
   d. Creating learning activities that make use of lecture program units (SAP).
   e. Developed the BeWe MPI research instrument.
2. Pre-testing
   At this stage, an initial test is carried out in the sample class, namely the class that will apply web-based interactive multimedia learning. The pretest questions used are in the form of multiple choice questions that will measure the cognitive aspects of students.
3. The stage of learning implementation
   Teaching and learning activities are carried out according to SAP. This study uses 1 SAP. The time allocation for one SAP is 3 x 50 minutes. At this stage, learning is carried out in a room that has been determined by the faculty, but even though there is a WiFi signal, it is very weak, so students and researchers prepare devices to be able to access the internet/website. Students are given the opportunity to search for information and learning materials on the interactive multimedia learning website (MPI BeWe). Next, students work on exercises in the form of games and evaluations contained in MPI BeWe or those that have been prepared by the lecturer.
4. Posttesting
   At this stage, a test of learning outcomes was carried out in the sample class, namely the class that applied web-based interactive learning media. A posttest was conducted at the end of the meeting to measure the students' abilities after treatment. The posttest questions used are in the form of multiple choice, which will measure the cognitive aspects of students.
5. The data analysis stage
   At this stage, data analysis was carried out using statistical methods that compared the results of the initial test (pretest) before web-based interactive multimedia learning

(MPI BeWe) with the final results (posttest) after implementing web-based interactive multimedia learning.

6. Testing
   Tests on the application of interactive learning multimedia in this study were carried out using normalized gain or normalized gain to determine the effectiveness of learning.

Data analysis techniques to determine the effectiveness of learning in this study used the normalized gain technique, calculated using the following formula (Meltzer, 2002):

$$< g > = \frac{Postscore\,\% - Prescore\,\%}{100 - Prescore\,\%}$$

Information:
<g> = Normalized gain value
Postscore % = Percentage of posttest scores
Prescore %= Percentage of pretest scores

RESULTS & DISCUSSION

This section outlines research findings on the effectiveness of teaching elementary school students basic science concepts using web-based interactive multimedia (MPI BeWe). The findings include (1) data on cognitive test results for students of basic science concepts and (2) data on student responses to learning using MPI BeWe.

Conducting a concept analysis on the subject matter of basic science concepts is preceded by making interactive multimedia learning models. This is done to facilitate the preparation of the learning flow for the achievement of mastery of the concepts of basic science. MPI BeWe basic science concept courses consist of presentations in the form of text, audio, graphics, animations, and interactive simulations that are able to adapt to different ways of learning students so that they learn in a fun and enjoyable learning environment.

Multimedia is a term used to describe a variety of media (file formats) including text, pictures (vector or bitmap), graphics, music, animation, video, interactivity, etc. that have been processed and packed into digital files in order to communicate ideas to the general audience. The interactive aspects of multimedia can be in the form of navigation, simulations, games, and practice questions (Munir, 2015).

Students may use their five senses actively while navigating, interacting, creating, and communicating in the visualization, making it simpler for them to remember and retain the knowledge when they need it. Information processing in the formation of concepts will be easily recalled if it is stored in long-term memory, especially in the form of images (Matlin, 1994).

In addition to serving as a teaching tool, multimedia has an impact on the atmosphere, circumstances, and learning environment that are planned and generated by lecturers. (Arsyad, 2015). This is in line with (Hamalik, 1986) which suggests that the process of teaching and learning might result in new interests and wants thanks to the usage of media in learning. creating learning activities with excitement and motivation, as well as having psychological effects on students.

Cognitive Data for Prospective Elementary School Teachers

Cognitive data of prospective elementary school teacher students were assessed from the answers to the pretest and posttest which were conducted before learning and after learning. The pretest and posttest data will be calculated and analyzed to be used as a basis for drawing conclusions from the research that has been carried out at the PGSD FKIP Study Program, Sriwijaya University, Palembang Campus. Data on students' cognitive abilities can be seen in table 1.

Table 1. Acquisition of Cognitive Scores for Prospective Teacher Students

	Experimental Class		
	Pre test	Post test	N-gain
N (Number of Students)	45	45	
Average	18,89 (47,22%)	29,27 (73,17%)	0,49 (medium)
Standard Deviation	12,47	6,94	

Of the 40 pretest and posttest questions that were tested on 45 first semester students of the PGSD FKIP study program, Sriwijaya University, Palembang Campus in the 2015/2016 academic year in the science basic concepts course, with an average score of 18.89 and an average score of 29.27. After the pretest and posttest data from the class were obtained, the pretest percentage was 47.22%. After being treated to the sample using web-based interactive multimedia learning, the percentage is 73.17%. The average percentage of pretest and posttest results in the experimental class can be seen in Figure 1.

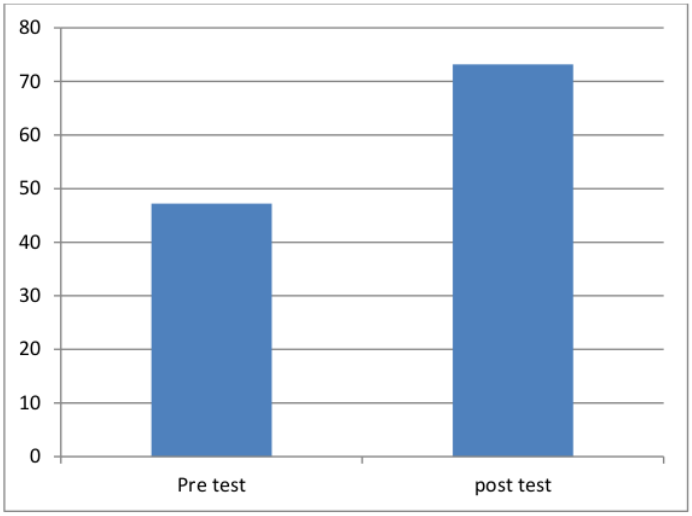

Figure 1. Average Percentage of Pretest and Posttest Results

From the results of calculations using normalized gain, the value of G for the experiment is 0.49. The G value is then interpreted into the G value criteria. After being interpreted, it is found that the effectiveness of using interactive learning multimedia (MPI BeWe) is classified as moderate.

Implementation of Learning using MPI BeWe

Data on the implementation of learning in the basic science concept course classes was obtained from observation sheets conducted by observers. Observations were made on the activities of lecturers and students during the lecture process. Lectures using MPI BeWe are held for 7 (seven) meetings. The first meeting was conducted with pretest and lectures; the seventh meeting was conducted posttest but with previously conducted lectures as usual using MPI BeWe.

Tabel 2. Implementation of Learning using MPI BeWe

No	Observed Aspects	Realization			
		Lecturers		Students	
1	Lecturers explain the material using learning media.	7	100		
2	Students pay attention to the explanation of the material from the MPI BeWe website, which is broadcast by the lecturer with pleasure and enthusiasm.			24	85,71
3	Lecturers provide opportunities for students to ask questions.	7	100		
4	Students dare to ask questions if there is material that is not clear.			18	64,29
5	Lecturers provide examples of questions related to learning materials.	7	100		
6	Students pay attention to the explanation of examples of questions explained by the lecturer.			22	78,57
7	The lecturer gives questions to students to work on in front of the class.	7	100		
8	Students work on the questions given by the lecturer in front of the class.			19	67,86
9	Students actively express their ideas.			19	67,86
10	Students are not afraid of being wrong, afraid of being laughed at, afraid of being considered inferior, afraid of being underestimated.			22	78,57
11	Lecturers provide comments and suggestions on student ideas.	7	100		
12	Students' complete assignments on time.			21	75,00
13	Students pay attention to lectures.			24	85,71
14	Students are passionate about learning.			26	92,86
15	Students feel happy with the learning media used.			26	92,86

From table 2, it can be seen that the percentage of implementation of lecturer activities using MPI BeWe reaches 100%. The implementation of students during learning using the BeWe MPI is the smallest, namely the statement that students dare to ask questions if there is material that is not clear, with an average of only 64.29. While the implementation of MPI BeWe is the largest in the statement that students are enthusiastic about learning and student activities feel happy with the learning media used, which reaches

an average of 92.85%. The distribution of the implementation of learning using web-based interactive multimedia learning (MPI BeWe) in detail can be seen in part in Figure 2.

The student's activity is influenced by the role and function of multimedia in learning. Learning multimedia functions can be categorized as follows: a). Supplements (additional): The function of learning media as a supplement means that students have the freedom to choose whether to use electronic learning materials or not. b) complement (complement); the function of the media as a complement to electronic learning materials is programmed to complement the learning materials received by students in class. c) substance (substitute); the function of multimedia as a substance means that multimedia replaces most of the roles of lecturers. It can be an alternative model of learning activities.

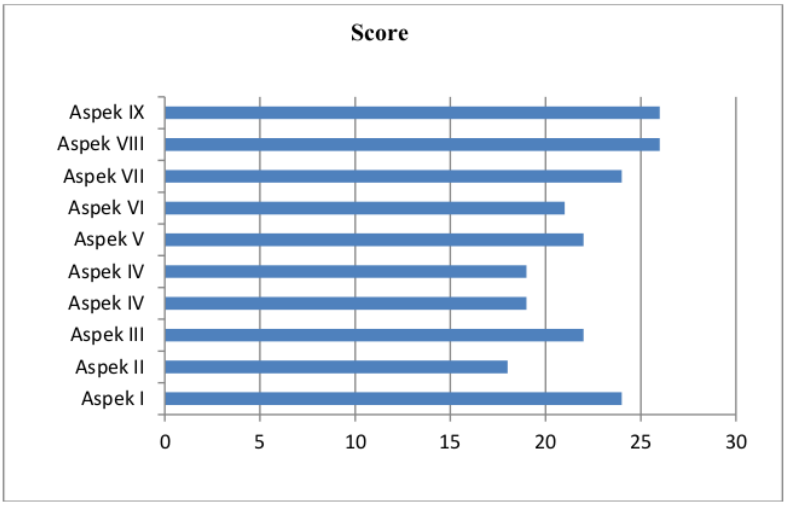

Figure 2. Graph of Learning Implementation using MPI BeWe

Information:
Aspect I : Students pay attention to the explanation of material from the MPI BeWe website which is displayed by the lecturer with pleasure and enthusiasm;
Aspect II: Students dare to ask questions if there is material that is not clear;
Aspect III: Students pay attention to the explanation of examples of questions explained by the lecturer;
Aspect IV: Students work on the questions given by the lecturer in front of the class;
Aspect V: Students actively express their ideas;
Aspect VI: Students are not afraid of being wrong, afraid of being laughed at, afraid of being considered inferior, afraid of being underestimated;
Aspect VII: Students complete assignments on time; Students pay attention to lectures;
Aspect VIII: Students are enthusiastic in learning;
Aspect IX: Students feel happy with the learning media used

The implementation of learning using MPI BeWe from the data above, after analyzing the average implementation of learning reached 79, if converted to the assessment guidelines, this implementation is considered good. While the activities of the lecturers from the first lecture to the last after the analysis obtained an average of 100% implementation.

Description of Student and Lecturer Activities During Web-Based Interactive Learning Multimedia Learning (MPI BeWe)

The activities of students and lecturers during the MPI BeWe lesson in the Basic Science Concepts course were obtained from the observation sheets provided for each Lecture Program Unit (SAP) as shown in table 3.

Table 3. Against Student Learning Responses Using MPI BeWe

Indicator	Questions	Students Response	
		Yes	No
Preliminary Identification	Have you previously studied using web-based interactive multimedia learning (MPI BeWe) as a learning medium?	11	34
	Is learning to use web-based interactive multimedia learning (MPI BeWe) more interesting than learning as usual?	44	1
	Does this way of presenting web-based interactive learning multimedia (MPI BeWe) attract your interest and attention to see and learn it?	41	4
	Does this media motivate you to learn?	40	5
	Do you like this learning media?	41	4
	Is this web-based interactive learning multimedia display (MPI WeBe) interesting?	38	7
Identification of Physical Presentation	Is the layout, shape, color, and size of this web-based interactive learning multimedia (MPI WeBe) appropriate?	40	5
	Is it easy to read and understand the forms and writings used in this medium?	43	2
	Is the presentation of material in this media easy to understand?	42	3
Identification of the Concept Presentation	Can this web-based interactive learning multimedia (MPI WeBe) clarify your understanding of the basic concepts of science?	43	2
	Does the video in this media support your understanding before carrying out learning activities?	45	0

From the data above, after analyzing web-based interactive multimedia learning, the biggest student response was on the question of whether the video in this media supports your understanding before carrying out learning activities. All students answered yes, so a total of 100% of students stated that MPI BeWe supports students' understanding before going lectures. Because it can combine text, images, animation, music, and video, it may have a significant impact in the realms of communication and education. The teaching and learning process has evolved in a more dynamic way thanks to multimedia. Understanding how to use technology more wisely and come up with innovative teaching and learning concepts, however, is more crucial.

Through Web-based interactive learning multimedia (MPI BeWe) students can interact directly with the application, increasing the attractiveness and interest of students

in learning the material in the application. It will make it easier for teachers to deliver lectures. MPI BeWe is also able to provide simulation tools or simulation games. This simulation will make this learning media so addictive that it can reduce student boredom in learning.

CONCLUSION

Based on the results of calculations and analysis of research data, it shows the effectiveness of learning for first semester students of the PGSD study program through the application of web-based interactive multimedia learning (MPI BeWe). This can be seen from the increase in the percentage results of the average value of the pretest and posttest results and the increase in the results of the average gain <g>. Thus, it can be concluded that there is an effective application of web-based interactive learning multimedia (MPI BeWe).

REFERENCES

Ali, M. (2005). E-learning in the Indonesian education system. *Asia-Pacific Collaborative Education Journal*, *1*(2).

Alias, N., Zakariah, Z., Ismail, N. Z., & Aziz, M. N. A. (2012). E-learning successful elements for higher learning institution in Malaysia. *Procedia - Social and Behavioral Sciences*, *67*, 484–489. https://doi.org/10.1016/j.sbspro.2012.11.353

Arikunto, S. (2010). *Prosedur Penelitian Suatu Pendekatan Praktik*. Rineka Cipta.

Arsyad, A. (2015). *Media Pembelajaran*. Raja Grafindo Persada.

Azmi, B. H. (2015). Pengembangan bahan ajar berbasis e-book untuk pembelajaran kimia SMA pokok bahasan struktur atom. *Jurnal Pendidikan Kimia Universitas Riau*, *2*(1), 46–56. http://dx.doi.org/10.33578/jpk-unri.v2i1.4459

Buchari, A. (2018). Peran guru dalam pengelolaan pembelajaran. *Jurnal Ilmiah Iqra'*, *12*(2), 106. https://doi.org/10.30984/jii.v12i2.897

Eliza, F., Hastuti, Myori, D. E., & Yanto, D. T. P. (2019). Peningkatan kompetensi guru sekolah menengah kejuruan melalui pelatihan software engineering. *JTEV (Jurnal Teknik Elektro Dan Vokasional)*, *V*(1), 37–45. https://doi.org/10.24036/jtev.v5i1.104840

Hamalik, O. (1986). *Media Pendidikan.* Offset Alumni.

Koster, M., Pijl, S. J., Nakken, H., & Van Houten, E. (2010). Social participation of students with special needs in regular primary education in the Netherlands. *International Journal of Disability, Development and Education*, *57*(1), 59-75. https://doi.org/10.1080/10349120903537905

Marteney, T., & Bernadowski, C. (2016). Teachers' perceptions of the benefits of online instruction for students with special educational needs. *British Journal of Special Education*, *43*(2), 178-194. https://doi.org/10.1111/1467-8578.12129

Matlin, M. (1994). *Cognition*. Mcgraw Hill.

Meltzer, D. E. (2002). The relationship between mathematics preparation and conceptual learning gains in physics: A possible "hidden variable" in diagnostic pretest scores. *American Journal of Physics*, *70*(12), 1259–1268. https://doi.org/10.1119/1.1514215

Munir. (2015). *Multimedia Konsep Dan Aplikasi Dalam Pendidikan*. Alfabeta.

Pohan, R. F., & Rambe, M. R. (2022). Pelatihan e-learning bagi mahasiswa program studi teknik sipil fakultas teknik Universitas Graha Nusantara Padangsidimpuan.

Fordicate, *1*(2), 219–226. https://doi.org/10.35957/fordicate.v1i2.2431

Sulisworo, D. (2016). The Contribution of the education system quality to improve the nation's competitiveness of Indonesia. *Journal of Education and Learning*, *10*(2), 127-138.

Shaturaev, J. (2021). A comparative analysis of public education system of Indonesia and Uzbekistan. *Bioscience Biotechnology Research Communications*, *14*(5), 89-92. http://dx.doi.org/10.21786/bbrc/14.5/18

Pramana, C., Chamidah, D., Suyatno, S., Renadi, F., & Syaharuddin, S. (2021). Strategies to improved education quality in Indonesia: A Review. *Turkish Online Journal of Qualitative Inquiry (TOJQI)*, *12*(3), 1977-1994.

Widhiartha, P. A. (2009). Pemanfaatan e-learning sebagai alternatif pengganti pelatihan tatap muka bagi pendidik dan tenaga kependidikan pendidikan nonformal. *Jiv*, *4*(2), 189–196. https://doi.org/10.21009/jiv.0402.7

Winda, N. (2016). Implementasi kurikulum 2013 dalam pembelajaran Bahasa Indonesia berbasis teknologi informasi dan komunikasi. *STILISTIKA: Jurnal Bahasa, Sastra, Dan Pengajarannya*, *1*(1), 87–94. https://doi.org/10.33654/sti.v1i1.343

Winda, R., & Dafit, F. (2021). Analisis kesulitan guru dalam penggunaan media pembelajaran online di sekolah dasar. *Jurnal Pedagogi Dan Pembelajaran*, *4*(2), 211. https://doi.org/10.23887/jp2.v4i2.38941

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