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Development of Valid, Practical, and Potential Web-Based Learning Materials for Higher Education

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Abstract: *The purpose of the research is to develop web-based learning materials. The developed teaching materials have valid, practical, and potential effects on learners' learning outcomes. The product development model using Rowntree and product evaluation is Tessmer's formative evaluation. The development research was conducted at Baturaja University. Data collection techniques were conducted with walkthroughs, interviews, questionnaires, observations and tests. The results showed that the third prototype is a valid and practical design, when used in learning with 80% (17 students) following the learning process very well, 20% (3 students) follow the learning process well, so it can be concluded that the development Web-based teaching materials that researchers develop with PHP MySQL applications have an effective potential for use in learning.*

Keywords: *Web-Based Learning, instructional, Learning Material*

Abstrak: *Tujuan penelitian adalah mengembangkan bahan ajar berbasis web. Bahan ajar yang dikembangkan memiliki unsur valid, praktis, dan memiliki efek potensial terhadap hasil belajar pada mahasiswa. Model pengembangan produk Rowntree dan evaluasi produk adalah evaluasi formatif Tessmer. Penelitian pengembangan dilakukan di Universitas Baturaja. Teknik pengumpulan data dilakukan dengan walkthrough, wawancara, angket, observasi dan tes. Hasil penelitian menunjukan prototype yang ke tiga merupakan desain yang valid dan praktis, ketika digunakan dalam pembelajaran dengan 80 % (17 mahasiswa) mengikuti proses pembelajaran dengan sangat baik, 20% (3 orang mahasiswa) mengikuti proses pembelajaran dengan baik, sehingga dapat disimpulkan bahwa pengembangan bahan ajar berbasis web yang peneliti kembangkan dengan aplikasi PHP MySQL mempuyai potensial yang efektif untuk digunakan pada saat pembelajaran.*

Kata Kunci: *Pembelajaran, Bahan Ajar, Web Pembelajaran, Pengembangan*

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INTRODUCTION

Nowdays, technological development is very fast and it may have significant impact in many field. Almost all human activities are directly related to technology, including the field of education. Education is programmed learning experiences in the form of formal, non-formal, and informal education in schools and outside schools that last a lifetime aimed at optimizing individual ability considerations, so that in the future they can play the role of life appropriately (Mudyahardjo, 2001). The teacher competence is needed to design an instructional in accordance with technological advancement so that students are able to face the outside world (Burns Sardone, 2014; Christensen, 2002; Parkay et al., 2010). By the development of education field today, the use of a learning media is very important in the instructional process. Selection of media that is appropriate to the objectives, materials, as well as the abilities and characteristics of the learner, will greatly support the efficiency and effectiveness of learning processes and outcomes (G. V. Davidson-Shivers et al., 1997; Mayer & Moreno, 2003; Schwier, 1993; Handayani et al., 2020). Teachers need adjustments through responsive, wise and prudent actions. Responsive teachers need to be well versed in science and technology products, especially those related to the world of education, such as learning using websites (Bofill, 2022; Morphew, 2000); Abdillah et al., 2018). One of the media that can be developed by teacher is web-based teaching material.

Web-based learning is a learning activity that utilizes media sites or websites that can be accessed via the internet network. Web-based learning, also known as web based learning is one type of application of electronic learning (e-learning) (G. V Davidson-Shivers et al., n.d.; Rusman & Riyana, 2011a). Teaching materials have an important role in achieving learning success. The era of learning and learning is dominated by internet technology which can be reached in almost every area, so students can easily access the delivery of learning materials by teachers so that teaching materials can be accessed via the website anytime and anywhere (Alexander, 2006). The contribution of web-based learning can change students' learning styles to be more effective and efficient. In addition, the information packaged in web-based learning is more interesting, because there are materials that are combined with images, motion, animation, and sound, so that the information presented is interesting. (Morphew, 2000).

RESEARCH METHODS

The type of research method in this research is development research. The design begins with three stages, namely: planning, development and evaluation (Rowntree, 1994). The procedure carried out in this study was a combination of procedures between the Rowntree development model and Tessmer's formative evaluation stage (Lasfika et al., 2022; Tessmer, 1998).

The questionnaire sheet was analyzed using a Likert scale, the variables to be measured can be broken down into several variable indicators where these indicators will be used as the basis for compiling instrument items in the form of questions or statements. The stage of developing teaching materials through various fundamental tests. Making the teaching materials themselves need to be prepared, designed according to the learning environment.

The teaching material prepared for offline learning because it is expected can increase student motivation and enthusiasm for learning. Teaching materials are all materials (both information, tools, and text) that are arranged systematically which display a complete figure of the competencies that will be mastered by students in the learning process with the aim of planning and implementing learning (Wick & Leon, 1995). Web-based learning is a learning activity that utilizes the internet network, also known as e-learning. While e-learning has several characteristics, namely Interactivity, Independence, Accessibility, Enrichment.

RESULTS AND DISCUSSION

The result of this R&D research is a web-based learning for the Development of Teaching Materials. This development research Course. Before it is applicated in instructional process, some experts validated the product to ensure that the product is proper to use for learning. Expert validation was carried out by three validators for three aspects, they are learning material, instructional design and learning media. An average score for learning material validation obtained 4,8 which belong to a very good category, learning design validation obtained an average score 4.4 belong to a good category and media validation got 4,4. The average value of the 3 aspects of the assessment is 4.5 with a good category. Some research in R&D field did the same evaluation to see the same aspects. They did some experts validation especially in the field of learning material, instructional design and media or multimedia (Isa & Diningrum, 2019; Khaerotin, 2019; Qosim & Susila, 2018; Roemintoyo et al., 2022).

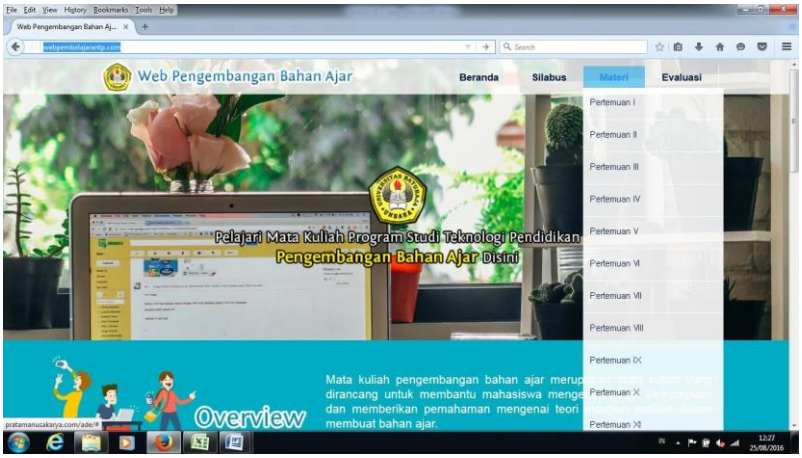

Figure 1. Web for Developing Learning Material Subject

Table 1. Expert Validation

Validator	Score	Category	Decision
Learning Material Expert	4,8	Very good	Eligible Without Revision
Instructional Design	4,4	Good	
Learning Media	4.4	Good	
Average	4,5	Very Good	Eligible Without Revision

Questionnaires were given to three students during the one-to-one evaluation, the result showed that 80% students gave very good responses, and 80% gave a good response. Small group evaluation obtained average percentage of student activity while participating in the learning process using web-based teaching materials was 70% (7 students) participating in the learning process very well, and 30% (3 students) following the learning process well, there were 10 students as respondents in small group evaluation.. Student responses to the implementation of field tests (field tests) have given positive responses to prototype III. In the learning process 16 students (80%) gave very good responses, and 4 students (20%) gave good responses. This shows that learning using web-based teaching materials has a potential effect on student learning interest.

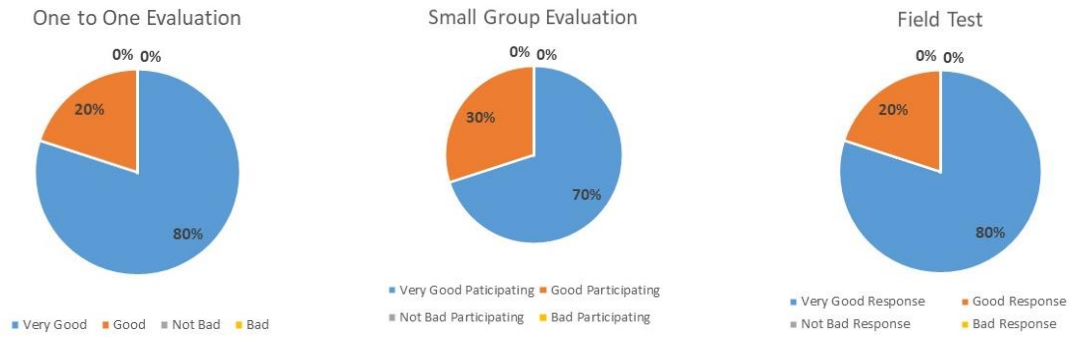

Figure 2. Result of three step evaluation

This research produces a web-based learning for the Development of Teaching Materials Course. The Validity of this product can be seen by the result of experts' evaluation. Based on the results of the validation by experts shows that the development of teaching materials meets the requirements from the material aspect, instructional design, learning media. The results suggested that the product is eligible to be used by doing some revisions.

Practicality of this product can be seen by students' response during learning process using this media. Comments from students on the one-to-one evaluation, they have no obstacles that need to be followed up with revisions. At the time of carrying out the small group evaluation, conducted lectures for 3 hours (3x40 minutes), which began with an explanation with a presentation of teaching materials, and continued with independent learning using the learning media. In the small group evaluation, learning was still effective in 120 minutes. Student comments on small group evaluations were very good, there were no more comments that needed to be followed up with prototype revisions. This means that prototype II is in accordance with the needs of students. The same goes for field trials. The development of web-based teaching materials produced in this study meets the criteria as a practical product, because it is easy to understand, interesting and able to present information efficiently. Based on the results of observations during learning, the average student activity was classified as very good. There are no students who are bored during the learning process. Thus, it can be said that the development of teaching materials developed is good and classified as a practical prototype.

The Potentiality of this product can be seen from the results of observations carried out in field trials, during the instructional process using the learning media, students look enthusiastic and motivated in learning. Descriptor scores on aspects of classical learning and independent learning aspects got high scores. The average assessment of the classical and independent learning aspects is very good. Understanding the concepts explained through the presentation of teaching materials is very

important for lecturers to provide initial knowledge for students in carrying out independent learning and also needs to be explained in advance by lecturers in learning. The results of student evaluations from one-to-one evaluations, small groups, and field tests showed that the learning process was carried out very effectively. Learning effectiveness occurs because the learning process using web-based teaching materials can motivate students and is able to present the information needed by students.

Learning by using web-based teaching materials has the potential effect in increasing student learning activities. Website-based learning is built through several principles that play a role in determining the success of this learning process at the implementation stage, they are interaction, usability and relevance (Smaldino et al., 2012). Interaction means communication capacity with others who are interested in the same topic or use the same web-based learning (Agudo-Peregrina et al., 2014). The useability referred to here is how easy it is for students to use the web. There are two important elements in this principle of ambiguity, namely consistency and simplicity (Doherty & O'Brien, 2014). Relevance is gained through precision and convenience. Every information on the web should be made very specific to increase learning understanding and avoid bias (Rusman & Riyana, 2011b).

CONCLUSIONS AND RECOMMENDATIONS

Learning web material has been produced which has function as a learning media of development learning material course for high school students especially education technology subject. This web material has fulfilled the criteria of valid, practical and potential. These criteria are obtained through a series of evaluation step, experts' validation, one to one evaluation, small group evaluation and field trial. Besides some principles also play role in the implementation of learning process, they are interaction, usability and relevance. Website-based learning plays a role in determining the success of the learning process, namely there is interaction to create communication between web users, the principle of usability is to create a simple learning environment and help students not experience learning difficulties, the principle of relevance is to place content that is relevant to the material or content will be delivered, so that the development of web-based learning in the future, it is necessary to conduct a more in-depth study of learning interactions.

REFERENCES

Abdillah, R., Sunardi, S., & Ardianto, D. T. (2018). Pengembangan Aplikasi Multimedia Pembelajaran CD Tutorial Pada Mata Kuliah Berbasis Praktik. *Teknodika*, *16*(1), 53. https://doi.org/10.20961/teknodika.v16i1.34755

Agudo-Peregrina, A., Iglesias-Pradas, S., Conde-González, M., & Hernández-García, Á. (2014). Can We Predict Success from Log Data in VLEs? Classification of Interactions for Learning Analytics and Their Relation with Performance in VLE-Supported F2F and Online learning. *Computers in Human Behavior*, *31*, 542–550. https://doi.org/10.1016/j.chb.2013.05.031

Alexander, B. (2006). Web 2.0: A New Wave of Innovation for Teaching and Learning? *Educause Review*, *41*, 32–44.

Bofill, M. (2022). *Transformation of Our Understanding and Impactful Influences*. *13*(2), 1549–1553.

Burns Sardone, N. (2014). Making the Case for BYOD Instruction in Teacher Education. *Issues in Informing Science and Information Technology*, *11*(August), 191–201. https://doi.org/10.28945/1988

Christensen, R. (2002). Effects of technology integration education on the attitudes of teachers and students. *Journal of Research on Technology in Education*, *34*(4), 411–433. https://doi.org/10.1080/15391523.2002.10782359

Davidson-Shivers, G. V., Rasmussen, K. L., & Bratton-Jeffery, M. F. (1997). Investigating Learning Strategies Generation in a Hypermedia Environment Using Qualitative Methods. *J. Comput. Child. Educ.*, *8*(2), 247–261.

Davidson-Shivers, G. V, Rasmussen, K. L., & Lowenthal, P. R. (n.d.). *Web-based learning*. Prentice Hall.

Doherty, S., & O'Brien, S. (2014). Assessing the Usability of Raw Machine Translated Output: A User-Centered Study Using Eye Tracking. *International Journal of Human–Computer Interaction*, *30*(1), 40–51. https://doi.org/10.1080/10447318.2013.802199

Handayani, T., Maulida, E., & Sugiyanta, L. (2020). Blended Learning Implementation and Impact in Vocational Schools. *Teknodika*, *18*(2), 146. https://doi.org/10.20961/teknodika.v18i2.42032

Isa, Y., & Diningrum, J. K. (2019). *Jurnal BaJET PENGEMBANGAN MEDIA PEMBELAJARAN MODUL*. *6*(2), 395–400.

Khaerotin, R. (2019). Pengembangan Multimedia Interaktif 3D Aurora Presentation Untuk Keterampilan Menulis Bahasa Arab. *Al Mahāra: Jurnal Pendidikan Bahasa Arab*, *5*(1), 1–18. https://doi.org/10.14421/almahara.2019.051-01

Lasfika, Y. T., Widyastono, H., & ... (2022). Digitalization Android-based Interactive Learning Media in Geography for High School Students. *Journal of Education …*, *6*(2), 207–216. https://ejournal.undiksha.ac.id/index.php/JET/article/view/44674%0Ahttps://ejournal.undiksha.ac.id/index.php/JET/article/download/44674/22183

Mayer, R. E., & Moreno, R. (2003). Nine Ways to Reduce Cognitive Load in Multimedia Learning. *Educational Psychologist*, *38*(1), 43–52. https://doi.org/10.1207/S15326985EP3801_6

Morphew, V. N. (2000). Web-Based Learning and Instruction: A Constructivist Approach. Distance Learn. *Technol. Issues Trends Oppor. 1–15.*

Mudyahardjo, R. (2001). *Pengantar pendidikan: Sebuah Studi Awal Tentang Dasar-Dasar Pendidikan pada Umumnya dan Pendidikan di Indonesia.* Raja Grafindo Persada.

Parkay, F. W., Stanford, B. H., & Gougeon, T. D. (2010). *Becoming a Teacher.* Pearson/Merrill.

Qosim, A., & Susila, H. R. (2018). Pengembangan Multimedia Interaktif Merakit Personal Computer (PC). *Lentera Pedagogi*, *1*(2), 98–108.

Roemintoyo, R., Miyono, N., Murniati, N. A. N., & Budiarto, M. K. (2022). Optimising the utilisation of computer-based technology through interactive multimedia for entrepreneurship learning. *Cypriot*

Journal of Educational Sciences, *17*(1), 105–119. https://doi.org/10.18844/cjes.v17i1.6686

Rowntree, D. (1994). *Preparing Materials for Open, Distance and Flexible Learning: An Action Guide for Teachers and Trainers.* Kogan Page.

Rusman, D. K., & Riyana, C. (2011a). *Pembelajaran Berbasis Teknologi Informasi dan Komunikasi*. Rajawali Pers.

Rusman, D. K., & Riyana, C. 2011. (2011b). *Pembelajaran Berbasis Teknologi Informasi dan Komunikas*. Rajawali Pers.

Schwier, R. E. R. M. (1993). *Interactive Multimedia Instruction*. Educational Technology Publications, Inc.

Smaldino, S. E., Lowther, D. L., & Mims, C. (2012). Instructional Media and Technology for Learning. *International Journal of Distributed and Parallel Systems*, *3*, 8.

Tessmer, M. (1998). *Planning and Conducting Formative Evaluation*. Kogan Page.

Wick, C. W., & Leon, L. S. (1995). From Ideas to Action: Creating a Learning Organization. *Hum. Resour. Manage.*, *34*, 299–311.

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