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Learning Media Development Android Based on Basic Programming Subjects in a Pandemic Period

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Abstract

This research and development aims to develop products in the form of android-based learning media in Basic Programming subjects. The development carried out follows the stages of the ADDIE development model. The level of media feasibility is seen from the results of product validation. The results of material expert validation show the percentage of 90% which consists of content, presentation and contextual aspects. In addition, the results of media expert validation showed a percentage of 87.50% which consisted of aspects of appearance, content and writing. The results of the attractiveness test of the small group trial showed the percentage reached 95.71%. It can be concluded that android-based learning media in Basic Programming subjects is very feasible to use in learning.

Keywords
Learning media; development; programming

I. Introduction

Development is a systematic and continuous effort made to realize something that is aspired. Development is a change towards improvement. Changes towards improvement require the mobilization of all human resources and reason to realize what is aspired. In addition, development is also very dependent on the availability of natural resource wealth. (Shah, M. et al. 2020)

The development of Information Technology is now growing very rapidly. The world of education is one that must utilize technology for learning activities during the pandemic (Hanifah Salsabila et al., 2020). Android-based learning media is designed as the use of technological advances in the world of education (Adipura, 2012). The development of technology and communication currently involves the multimedia sector, because it is considered effective in delivering information (Tafonao, 2018). The results of the study of learning media in the form of an android-based application for independent asynchronous learning of students in learning activities.

Learning media is an important component in the learning process. The use of appropriate learning media can hone and motivate students in learning. Android-based learning media is an alternative creative learning media from teachers as educators. Android-based learning media provide opportunities for students to examine their lack of understanding when learning online, wherever and whenever (Nurhalimah et al., 2017). Android-based learning media is the development of information technology that can be used via smartphones so that it is easy to carry everywhere (Wardana et al., 2019). Utilizing features in smartphones can increase student learning motivation (Sobon, 2019).

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A good learning media is the one which can adapt various student learning styles in order to achieve the learning goals – one of them is digital flipbook. It is an electronic learning media in which text, audio and visuals are included. Flipbook is one of the classic animations made by a piece of paper, mostly found in the form of 'thick' book, and each paper aims to describe something – its appearance is designed in some specific ways so that the within objects may move or pop-up when opened (Nafiah in Afwan, B. et al, 2020).

Basic Programming is a basic subject in the Computer and Network Engineering expertise program at SMK Negeri 1 Pogalan, Trenggalek. Modules become conventional learning media that are less attractive to students. Teachers need alternative media to support learning activities during the pandemic. Learning can be done with various existing learning media including android-based learning media. Alternative learning media are needed to increase the attractiveness of students in doing online learning during the pandemic.

Basic Programming is the study of computer programming using popular programming languages such as Java, Pascal, PHP and many other programming languages (Safitri et al., 2019). Basic Programming subjects are the basis of the Computer & Network Engineering expertise program (Retta et al., 2020). Educators are student facilitators in the learning process, so learning media must be packaged with the latest technology in the world of education so that students are able to use it. The results of the learning media research are in the form of an Android-based application for students' independent online learning or distance learning in learning activities during the pandemic (Larisu et al., 2020). To overcome problems related to the world of education in this new normal era, it can be done by utilizing information technology in the field of education. With the use of information technology for the world of education, it can answer or overcome the problems being faced in this new normal era by improving educational conditions.

The development of android-based learning media in Basic Programming Subjects is expected to have a positive impact in increasing student interest in understanding learning materials in Basic Programming Subjects for students in the Computer and Network Engineering expertise program, at SMK Negeri 1 Pogalan, Trenggalek. Web-based learning tends to be easy and simple in using the internet and easier for students to use (Rohdiani & Rakhmawati, 2017). In making Android-based learning media, we will use a WEB-based application with the name Kodular. Kodular is a WEB site that provides tools for creating Android applications. Kodular provides features that make it easier for developers to upload Android applications to the Kodular Store. The file extension of Kodular is (.aia) and the plugin has the extension (.aix). The file in the form of an extension plugin contains several command codes in the Java programming language (.java) and will be converted into an extension plugin file (.aix).

Kodular is free for all users who want to create Android applications. There are several ways to login or register. Can use email, which has a function as a means of sending letters and so on, email is an effective, fast post box and delivery order (Fatria, 2018). There are several login options, you can login directly to the Kodular WEB or login via third-party authentication such as Facebook, Github, Gmail. Some of the advantages of Kodular, (1) It features a more complex palette of components, (2) It has various features of the monetize plugin as a means of earning money, (3) No need to install additional software, (4) Only uses the WEB browser, (5) Only typing fill in the parameters of the block program without typing the program code, (6) Can make Android applications more effective and efficient, (7) Have a separate keystore for each account. Disadvantages of Kodular, (1) There are still many bugs or app errors when compiling, converting, and even installing android applications, (2) The maximum size limit in making an android application is 25 MB. If the size is oversized, an error occurs while compiling, (3) Must be online (an active internet connection).

II. Research Method

This study uses a research development (R&D) approach. The development model used is the ADDIE (Analysis, Design, Development, Implementation, and Evaluation) model. The ADDIE model is a general learning model so it is suitable when used for research and development. When used in development, this process is considered sequential but and interactive (Bernardez, 2007). The ADDIE model is considered more rational and more complete than other models. The ADDIE model can be used for various forms of product development such as models, learning strategies, learning methods, media and teaching materials (Mulyatiningsih, 2012). The research and development method (Research and Development) is a research method used to produce certain products and test the effectiveness of these products (Sugiyono, 2009). The steps for developing learning media with the ADDIE model are (Branch, 2010) as follows:

The first stage in the development of the ADDIE model is the Analysis stage. At this stage, analyze what problems are behind the emergence of device development in learning. After analyzing the problem, it is necessary to analyze the feasibility and requirements of the learning device that will be made. The design of learning devices is in accordance with the circumstances of students at SMK Negeri 1 Pogalan in Trenggalek in the Computer & Network Engineering Expertise Program, adjusting to the learning objectives, identifying what material will be loaded and designing the writing structure in the learning device. The second stage is Design. At this stage, realize the things that have been analyzed. The steps at this stage are as follows, (1) Develop a map of learning device needs, (2) Determine the content or content of the material The design of the learning device is determined based on the basic competencies, indicators, and learning materials listed in the curriculum. The third stage is Development. At this stage, learning tools will begin to be developed according to a predetermined design, then will be validated. The fourth stage is Implementation. At this stage, a trial of learning tools will be held for Productive Teachers of the Computer and Network Engineering Expertise Program and students in class X TKJ. Implemented during online learning, or during a pandemic. The last stage is Evaluation. At this stage the evaluation is carried out in a formative form. Evaluation is carried out at the end of each face to face. The evaluation results are used to provide feedback to the user. Revisions are made according to the results of the evaluation or needs that have not been met in the learning device. The product that was developed was then tested on students. In this trial, if there is a revision, the prototype will be revised which will then be validated again by media experts, and if there is no revision, it will be tested in small groups. The type of product trial data used in this research and development is quantitative data. Quantitative data were obtained from distributing questionnaires to expert validation test examiners and small group trials. The data will then be processed and used as the basis for assessing the feasibility of the developed application product.

The method of data analysis in this study used a descriptive method. Descriptive analysis method is the analysis used to test quantitative variables. Descriptive method is a method used to describe or analyze a research result but is not used to make broader conclusions (Sugiyono, 2009). The purpose of this descriptive research is to make a description, describe or describe in a systematic, factual, and accurate way about the facts, characteristics, and relationships between the phenomena being investigated. Descriptive characteristics not only describe situations or events, but also explain relationships, test, hypotheses, make predictions and get the meaning and implications of a problem to be solved (Rukajat, 2018). Descriptive analysis of descriptive data is used to describe the data that has been collected as it is and is not used to draw statistical conclusions. The data processing

technique uses measurements with a Likert scale. The Likert scale can provide alternative answers from social instruments with gradations from very positive to very negative. Considerations for choosing this measurement because it makes it easier for respondents to choose answers. The answer criteria distributed to respondents used a questionnaire/questionnaire in the form of a Likert scale measurement, respondents were asked to use the application program as a whole face to face. Respondents were asked to provide one choice from the answers given. In general, the scoring technique used in this research questionnaire is a Likert scale technique. The Likert scale is used to measure attitudes, opinions and perceptions of a person or group of people about social phenomena (Sugiyono, 2013).

III. Result and Discussion

Data from product trials conducted on 10 students of class X TKJ, 1 material expert teacher from Productive Teacher Computer and Network Engineering expertise program and 1 media expert from Productive Teacher Multimedia expertise program can produce android-based learning media applications in Basic Programming Subjects for class X students of the Computer and Network Engineering Expertise Program at SMK Negeri 1 Pogalan, it is necessary to write down the form of the needs of the application user, Table 1 below is a list of the needs for android-based learning media.

Table 1. List of Application Usage Needs List of Application Usage Needs

No	List of needs
1	Applications may display materials on Basic Programming subjects
2	Applications may display sub-material within core materials in Basic Programming subjects
3	The application can display the questions at the end of each subject matter in basic programming subjects
4	Aplikasi dapat menampilkan gambar dan praktikum mata pelajaran Perograman Dasar
5	Aplikasi dapat menampilkan soal praktek mata pelajaran Perograman Dasar

The development of learning media is carried out after analyzing user needs. The development of learning media applications is made based on WEB Programming using a codular platform. By registering an account on the kodular website, you can register using a Google Mail account. Email verification is required for authentication when registering using a Google Mail account.

The initial stage of making the application is to make a design of the application to be developed. The design of the application design is adjusted to the needs of the learning media to be made. In this process, learning media were developed for students' understanding in Basic Programming Subjects.

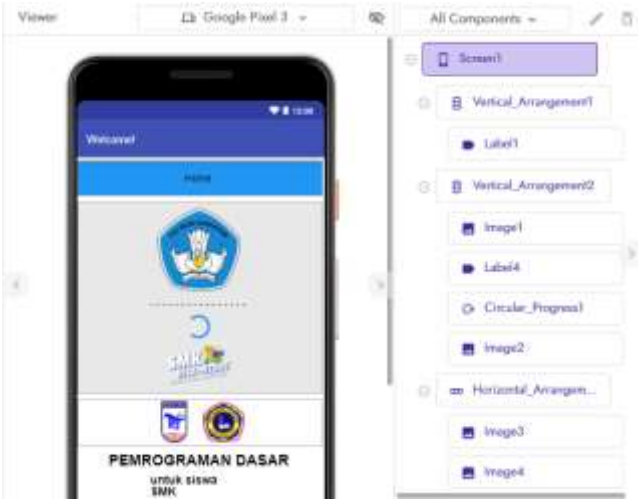

Figure 1.*Project Design View*

Writing program code on code is done by compiling program blocks, where each program block represents a script that is usually done in other programming languages. The program block provided has attributes according to the program that will be paired with other components in the code. Each codular screen layout has a link function or to move to a different screen layout. The design of program blocks that have been installed can be done by sliding and moving the desired program blocks.

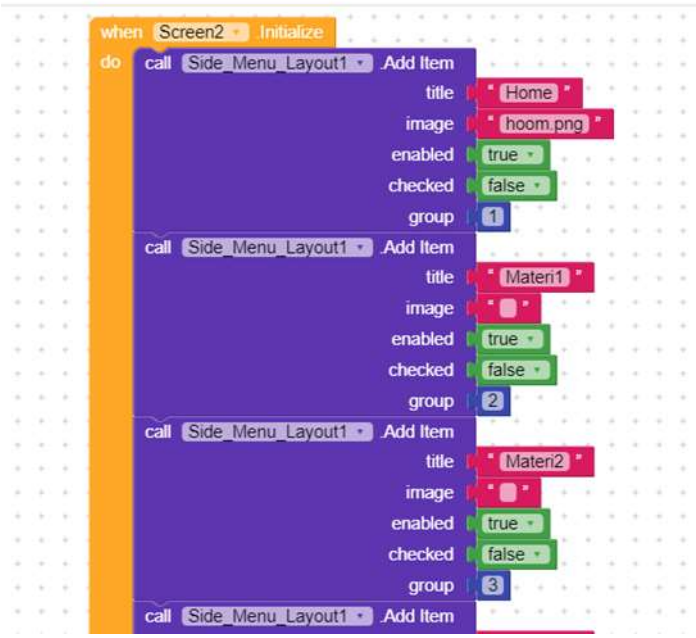

Figure 2*. Program code in Kodular*

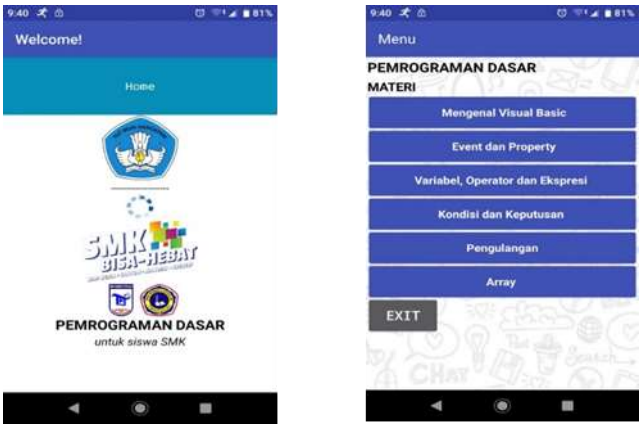

Figure 3. *Application Implementation Results*

Table 2. Instrument Material Expert Validation Results

No	Aspects Assessed	Average score - average
Fill		
1	Android-based learning media relevant to the competencies that must be mastered	4
2	Completeness of the material in accordance with the level of student development	4
3	Material relevant to the competencies that must be mastered by students	4
4	Media illustrations in accordance with the level of student development	3
Serving		
5	The material presented starts from easy to difficult.	4
6	Training questions can be used to hone students' knowledge.	3
7	Reference sources of preparation are appropriate	4
8	Encourage student curiosity	3
Contextual		
9	Material related to reality in the industrialized world	4
10	There are training questions to assess learning outcomes.	3
	Total	**36**

Based on table 1, regarding the level of product feasibility, the results of the calculation of the percentage of eligibility of material experts are as follows:

$$P = \frac{\Sigma x}{\Sigma x1} \; x \; 100\%$$

$$P = \frac{36}{40} \; x \; 100\%$$

$$P = 90\%$$

Information:
P = Persentase
Σx = Score jawaban
$\Sigma x1$ = Total score jawaban

The average percentage of all aspects obtained from material experts is 90%, stating strongly agree on the description of the criteria for the level of product feasibility but needs to be revised according to the advice of material experts.

Validation of applications by media experts is carried out by the Productive Master of Multimedia Expertise Program. Variables that are aspects of observation about the quality of learning media can be presented in table 2 below.

Table 3. Media Expert Validation Results

No	Assessed Components	Average score - average
Display		
1	Media design in accordance with the function of the material	4
2	The menu component is in accordance with the contents	4
3	Media design provides examples of appropriate functionality	3
4	Color selection in a very interesting learning medium	3
Fill		
5	In-app images according to the material	4
6	In-app images are very interesting.	3
7	Illustrations in the application according to the material and easy to understand	3
Writing		
8	Media looks attractive and easy to use	4
9	The title can be clearly read	4
10	Components have been arranged sequentially	3
	Total	**35**

Based on table 2, regarding the level of product feasibility, the results of calculating the percentage of feasibility from the results of media experts are as follows:

$$P = \frac{\Sigma x}{\Sigma x1} \; x \; 100\%$$

$$P = \frac{35}{40} \; x \; 100\%$$

$$P = 87{,}50\%$$

Information:

P = Persentase

Σx = Score jawaban

$\Sigma x1$ = Total score jawaban

The average percentage of all aspects obtained from media experts is 87.50%, stating that they strongly agree with the description of the product eligibility criteria but need to be revised according to media expert suggestions. The existence of the display aspect of the right learning media can make it easier for readers to receive the information presented (Mawaddah et al., 2019).

In the trial phase, the application was carried out to 10 students from class X of the Computer & Network Engineering Expertise Program. Variables that become aspects of observation about the quality of learning media can be presented in table 3 below.

Table 4. Small Group Trial Results

No	Component Value	Persentase (%)
1	I'm glad to learn about this app.	96
2	I can easily understand this app.	97,75
3	I'm interested in understanding this app.	93,5
4	I feel that learning goals are achieved faster by using apps.	96,5
5	I enjoy learning Basic Programming using apps	95,35
6	My attention increased when learning Basic Programming using apps.	94,65
7	I find it helpful to learn independently.	97,75
8	The material presented is easy to understand.	97,25
9	The pictures in this app are interesting.	92,5
	Total	**95,71**

Based on table 3 regarding the level of product feasibility it is known that the average percentage of all aspects obtained from small group trials (10 students) is 95.71%, stating strongly agree with the description of the criteria of the level of interest of the product.

The product in this study produces android-based software in the subjects of Basic Programming Class X, the productive skills program of Computer and Network Engineering. Learning media is an inseparable part of the learning method (Kuswanto & Radiansah, 2018). One of them is android-based learning media, which needs to be improved for the fulfillment of learning. In the Android-based learning media testing that has been carried out, it resulted in material expert validation with an average percentage of 90%, from 10 validation components, 4 points were obtained from 6 aspects that were assessed from material expert validation, 3 points were obtained from 4 aspects assessed from material expert validation. Based on the results of material validation, this Learning Application media can be continued by adding components that are lacking with certain considerations, for the development of better learning media. It can be concluded that the media expert validation instrument with an

average percentage of 90% with a very feasible classification. With these results obtained, the Android-based learning media application is ready to be used in the field as a learning medium. The development of Interactive Learning Media (MPI) in Vocational High Schools (SMK) aims to obtain appropriate and quality learning media for the success of learning activities (Miftah, 2014).

In terms of media, the results of the validation carried out by media experts obtained an average of 87.50%. Of the 10 validation components, point 4 is obtained from 5 aspects that are assessed from material expert validation, point 3 is obtained from 5 aspects that are assessed from material expert validation. Functional media design, color selection, images in applications, illustrations in applications and components that are compiled need to be added so that learning media will be even better. It can be concluded that the media validation obtained an average of 87.50% with a very feasible classification and minor improvements were made. With these results obtained, the Android-based learning media application is ready to be used in the field as a learning medium.

The next trial is based on a questionnaire that has been given to students, with a Likert scale all components get the results strongly agree. The attractiveness of students to the developed android-based learning media strongly agrees, this is evidenced by the average percentage of 95.71%. Based on the attractiveness of the desire to learn using android-based learning media by 95.71%, then with these results android-based learning media can be said to be very interesting. Based on material expert validation, media validation by media experts, and attractiveness trials by small groups, data obtained were 87.50% for media expert validation and 90% for material expert validation, 95.71% for attractiveness test. by small groups.

The feasibility of an Android-based learning media can be seen from the ease of operation of the media by students. It is easy to see from the learning media that can be used immediately after being installed and is also fun for students. Many use learning media because they are quite effective, efficient, and interesting to use as a learning resource (Chumaidi et al., 2016). The results of student responses and opinions indicate that the use of android-based learning media in basic programming subjects is very feasible to use in online learning as it is now. This refers to the ease and attractiveness of the media when used by students. The use of learning media makes difficult material to be delivered easily so that there are no conceptual errors (Afif Afandi & Wibawanto, 2017). Thus, the use of this learning media is a complete and continuous medium in learning during the pandemic because it is able to present various activities and correct material concepts so that it can achieve learning objectives.

Based on data analysis and suggestions provided by material experts and media experts, the developer followed up by collecting data in the form of suggestions for improvement. Suggestions from material experts and media experts can be seen in table 4 below.

Table 5. Expert Material Advice and Media Expert

No	Action	Suggestion
Advice from Materials Expert		
1	Add material to Basic Programming subjects	Add material to Basic Programming subjects
No	**Action**	**Suggestion**
Advice from media experts		
1	Complete app usage instructions Add app usage instructions	Add app usage instructions

The final product of the development of android-based learning media applications on basic programming subjects with *.apk extension files that can be installed and subsequently used on all Android smartphones with the Android KitKat operating system and above. This android-based learning media application has passed the revision stage. Revisions made to the module refer to the advice of material experts and media experts. The media can act as a tool to minimize the limited experience possessed by students (Triastuti et al., 2017). The use of learning media can be a place for independent learning and overcome limitations when students study.

IV. Conclusion

The application of android-based learning media in basic programming and quality control subjects is a practical learning medium that students can use in independent learning. During the pandemic, students are required to learn using internet media. This application-based learning media creates a new atmosphere by combining the interaction of educators and students, so that users feel learning with a new atmosphere in the learning process (Mustaqim, 2016). And can support the online teaching and learning process (Handarini & Wulandari, 2020). The purpose of research and development of android-based learning media for basic programming subjects at SMK Negeri 1 Pogalan, the following conclusions can be drawn: 1) Applications that have been developed using the ADDIE development model (analysis, design, development, implementation, evaluation). 2) The developed application has been validated by content experts. Based on the results of the validation obtained a percentage of 90% which has a very decent classification with a note that there is a slight revision. 3) The developed application has been validated by media experts. Based on the results of the validation obtained a percentage of 87.50% which has a very decent classification with a note that there is a slight revision. 4) The developed application has been tested in small groups to 10 students who are studying. Based on the test results obtained a percentage of 95.71% which has a very feasible classification for use. From all test results, that the use of technology-based learning media is very supportive in the learning process (Adam, 2015).

References

Adam, steffi dan M. T. . (2015). Pemanfaatan Media Pembelajaran Berbasis Teknologi Informasi Bagi Siswa Kelas X SMA Ananda Batam. CBIS Journal, 3 No 2(ISSN 2337-8794), 78–90. https://ejournal.ap.fisip-unmul.ac.id/site/wp-content/uploads/2013/05/PRINT JURNAL SITI (05-09-13-03-29-59).pdf

Adipura, B. (2012). Pengaruh Model pembelajaran Sains-Teknologi-Masyarakat dalam Meningkatkan Literasi Sains dan Teknologi ditinjau dari Gaya Kognitif Siswa. Al-Tadzkiyyah: Jurnal Pendidikan Islam, 8, 75–83. https://media.neliti.com/media/publications/177430-ID-peran-teknologi-informasi-dan-komunikasi.pdf

Afif Afandi, A., & Wibawanto, S. (2017). Tersedia secara online EISSN: 2502-471X Pembelajaran Berbantu Komputer Pada Mata Pelajaran Sensor Dan Aktuator Untuk Meningkatkan Pengetahuan Dan Keterampilan Siswa Smk Kelas Xi Teknik Elektronika Industri. Jurnal Pendidikan, 1, 206–211.

Afwan, B. et al. (2020). The Development of Digital Flipbook Media Based on the 5 Hours Battle of Kalianda upon High School History Materials. Budapest International Research and Critics Institute-Journal (BIRCI-Journal). P. 1003-1012.

Bernardez. (2007). Should we have a Universal Model for HPT. Performance Improvement, 46(9), 9–16. https://doi.org/10.1002/pfi

Branch, R. M. (2010). Instructional design: The ADDIE approach. In Instructional Design: The ADDIE Approach. Springer. https://doi.org/10.1007/978-0-387-09506-6

Chumaidi, A. C., Sulton, & Sulthoni. (2016). Tersedia secara online EISSN: 2502-471X Pengembangan Multimedia Interaktif Mata Pelajaran Biologi Kelas X Semester Ii Di Sma Wahid Hasyim Model Lamongan. Jurnal Pendidikan, 1(3), 507–520.

Fatria, F. (2018). Penerapan Media Pembelajaran Google Drive Dalam Pembelajaran Bahasa Indonesia. Jurnal Penelitian Pendidikan Bahasa Dan Sastra, 2(1), 138–144. https://doi.org/10.32696/ojs.v2i1.158

Handarini, O., & Wulandari, S. (2020). Pembelajaran Daring Sebagai Upaya Study From Home (SFH) Selama Pandemi Covid 19. Jurnal Pendidikan Administrasi Perkantoran (JPAP), 8(3), 496–503.

Hanifah Salsabila, U., Irna Sari, L., Haibati Lathif, K., Puji Lestari, A., & Ayuning, A. (2020). Peran Teknologi Dalam Pembelajaran Di Masa Pandemi Covid-19. Al-Mutharahah: Jurnal Penelitian Dan Kajian Sosial Keagamaan, 17(2), 188–198. https://doi.org/10.46781/al-mutharahah.v17i2.138

Kuswanto, J., & Radiansah, F. (2018). Media Pembelajaran Berbasis Android Pada Mata Pelajaran Sistem Operasi Jaringan Kelas XI. Jurnal Media Infotama, 14(1). https://doi.org/10.37676/jmi.v14i1.467

Larisu, Z., Idrus, M., Upe, A., & Kasim, S. S. (2020). Berbasis Website Sebagai Media Komunikasi Interaktif Di Masa Pandemi Covid-19 Di Kota Kendari. Jurnal Pengabdian Masyarakat Anoa, 2(1), 127–136.

Mawaddah, W., Ahied, M., Hadi, W. P., Yuniasti, A., Wulandari, R., & Ipa, P. P. (2019). Uji Kelayakan Multimedia Interaktif Berbasis Powerpoint Disertai Permainan Jeopardy Terhadap Motivasi Belajar Siswa. Natural Science Education Reseach, 2(2), 2654–4210. https://eco-entrepreneur.trunojoyo.ac.id/nser/article/view/6254

Miftah, M. (2014). Studi Kelayakan Media Pembelajaran Online Untuk Sekolah Menengah Kejuruan (Smk) a Feasibility Study Learning Media Online for Vocational School (Smk). 18(April), 84–93.

Mulyatiningsih, E. (2012). Metode Penelitian Terapan Bidang Pendidikan. Alfabeta.

Mustaqim, I. (2016). Pemanfaatan Augmented Reality Sebagai Media Pembelajaran. Jurnal Pendidikan Teknologi Dan Kejuruan, 13(2), 174.

Nurhalimah, S. R., Suhartono, S., & Cahyana, U. (2017). Pengembangan Media Pembelajaran Mobile Learning Berbasis Android pada Materi Sifat Koligatif Larutan. JRPK: Jurnal Riset Pendidikan Kimia, 7(2), 160–167. https://doi.org/10.21009/jrpk.072.10

Retta, A. M., Isroqmi, A., & Nopriyanti, T. D. (2020). Pengaruh Penerapan Algoritma Terhadap Pembelajaran Pemrograman Komputer. Indiktika : Jurnal Inovasi Pendidikan Matematika, 2(2), 126. https://doi.org/10.31851/indiktika.v2i2.4125

Rohdiani, F., & Rakhmawati, L. (2017). Pengembangan Pembelajaran Berbasis Web Pada Mata Pelajaran Dasar Elektronika di SMK Negeri 3 Jombang. Jurnal Pendidikan Teknik Elektro, 6(1), 105–110.

Rukajat, A. (2018). Pendekatan Penelitian Kualitatif (Qualitative Research Approach). CV. Budi Utama.

Safitri, R., Jamal, A., Ripmiatin, E., Hermawan, D., & Supriyanto, A. (2019). Pengenalan Dan Pelatihan Pemrograman Dasar Blockly. Jurnal Pemberdayaan Masyarakat Universitas Al Azhar Indonesia, 01(01).

Shah, M. et al. (2020). The Development Impact of PT. Medco E & P Malaka on Economic Aspects in East Aceh Regency. Budapest International Research and Critics Institute-Journal (BIRCI-Journal). P. 276-286.

Sobon, K. (2019). Pengaruh Penggunaan Smartphone Terhadap Motivasi Belajar Siswa Sekolah Dasar di Kecamatan Mapanget, Kota Manado. Jurnal Inovasi Pendidikan Dan Pembelajaran Sekolah Dasar, 3(1), 52. https://doi.org/10.24036/jippsd.v3i1.106198

Sugiyono. (2009). Metode Penelitian Pendidikan (Pendekatan Kuantitatif, Kualitatif, dan R&D). Alfabeta.

Sugiyono. (2013). Metode penelitian manajemen. Alfabeta.

Tafonao, T. (2018). Peranan Media Pembelajaran Dalam Meningkatkan Minat Belajar Mahasiswa. Jurnal Komunikasi Pendidikan, 2(2), 103. https://doi.org/10.32585/jkp.v2i2.113

Triastuti, D., Akbar, S., & Irawan, E. B. (2017). Pengembangan Media Papan Permainan Panjat Pinang. Jurnal Pendidikan, 2(10), 1344–1350.

Wardana, F., Utaya, S., & Bachri, S. (2019). Media Penginderaan Jauh Berbasis Android dalam Pembelajaran Geografi SMA. Jurnal Pendidikan: Teori, Penelitian, Dan Pengembangan, Vol. 4(7 EISSN: 2502-471X), 863–868. http://journal.um.ac.id/index.php/jptpp/article/view/12615/5837