

Kodular: A Solution to Create an Instructional Material for Mobile Learning-Based Teaching Writing Skills in the Era Society 5.0

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Abstract. Learning in the era of society 5.0 requires 4C life skills (Creativity, Critical Thinking, Communication, Collaboration) through mastering several literacy skills, such as digital literacy. This study aims to analyze the role of kodular as a website for making mobile learning teaching materials for writing skills courses. This research is an exploratory description research with the research subject is a coded website user. Research data obtained through observation, questionnaires, and interviews. The results of the observation found that the naming of different courses for writing materials and teaching materials for writing skills courses were still in the printed version. The results of the questionnaire show that the kodular website is more widely used by students than by lecturers. They use a coded website to create learning materials/materials. As many as 80% of respondents agree that the kodular website plays a very important role in the success of learning in the era of society 5.0 and can be used in preparing teaching materials for writing skills courses. The results of the interview show that there are five steps in compiling teaching materials for writing skills courses by paying attention to the components that must be present when using a coded website. The conclusions of this study indicate that the kodular website can be used as a solution in making mobile learning-based teaching materials in writing skills courses to support learning in the era of society 5.0 because the kodular website is based on the Android operating system using block programming.

Keywords: kodular; teaching materials; writing skills; mobile learning; learning era of society 5.0.

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INTRODUCTION

The era of society 5.0 is often defined as the era of society 5.0 which is centered on people and technology. Fukuda (2020) mentions Society 5.0 is the fifth stage of the vision of society, as an achievement of the value of the Japanese society program (Harayama, 2017) which is human-centered, where economic development and solving social problems are in line with each other through cyber and physical space systems which is highly integrated (Government of Japan, 2021) such as technology of virtual reality, augmented reality, and mixed reality technology using big data, cloud, and AI technology (Hendarsyah, 2019).

Correspondingly, our society is moving from machine society (Societies 1.0), electric society (Societies 2.0), information society (Societies 3.0) and network society (Societies 4.0) into its fifth phrase of development: the parallel society or society 5.0 (Wang, et al., 2016). The era of society 5.0 has the goal of increasing the growth rate of Japanese society and eliminating negative effects (Mavrodieva & Shaw, 2020), making society more prosperous (Fukuyama, 2018), sustainable global development with the launch of 5G networks (Barrett, et al., 2021), and

improve the lives of community members (Nagy et al., 2020).

The era of society 5.0 also has an impact on the world of education. Education as an entity that is very closely related to human culture and civilization (Atiah, 2020) which plays an important role in improving the quality of human resources by applying literacy skills, lecturers must have skills in the digital field and think creatively to identify and identify the learning needs needed by students. (Nurani (2021). Students are not sufficiently equipped with the ability to read, write and count but also need to be equipped with 21st century life skills competencies, namely the ability to communicate, be creative, think critically, and collaborate or known as "4Cs", namely communicators, creators, critical thinkers, and collaborators (Ustundag & Cevikcan, 2018).

To accommodate student needs, lecturers must understand the main components in the learning process, one of which is the existence of teaching materials in learning. Haider (2019) states that experienced teachers in using teaching materials will make students more motivated. Therefore, Achimugui & Onojahii (2017) suggest that teachers attend seminars, workshops, and conferences to improve their knowledge and

skills in creating and utilizing teaching materials.

Teaching materials are the main part of learning (Ramdani, 2012) which contains instructions to be known (accompanied) by students (Deries, 1981) in written or unwritten form (Wahyuni, 2015) that can help teachers teach in class (Nurdyansyah, 2018) so that students accumulatively can master competencies systematically (Hernawan, Permasih, Dewi, 2012) according to the Competency Standards (SK) and Basic Competencies (KD) that have been set (Lestari, 2013).

High quality teaching materials are related to curriculum delivery (Ko, et al., 2014) effectively and critically (Jankowska, 2011) to facilitate out-of-the-box thinking and guide discovery (Burch, et al., 2011), and requires sufficient thinking and careful design to achieve the required impact (Schmidt, et al., 2021), such as preventing boredom, ease of use, and a more interesting learning process (Prastowo, 2011).

Interesting learning is certainly supported by interesting teaching materials and can follow the development of society 5.0 era. Both of these supports can help lecturers in compiling teaching materials, especially teaching materials about writing materials. These writing teaching materials are packaged into different subject names by Indonesian language education study programs in Indonesia. This packaging is adjusted to the applicable curriculum in each Indonesian language education study program. Based on observations in several universities, writing material is packaged into creative writing courses, academic writing courses, scientific writing techniques courses, writing courses, popular writing courses, and writing skills courses.

Based on the results of observations in the Indonesian Language and Literature Education Study Program, IKIP PGRI Bojonegoro in Indonesia, writing materials are packaged into writing skills courses. This course is a compulsory subject that teaches students to be proficient in writing scientific, popular scientific, and semi-scientific essays. So that students are proficient in writing skills courses, lecturers need to package writing skills course materials into

interesting teaching materials and can follow the development of society 5.0 era, namely by utilizing the concept of mobile learning.

Mobile learning can be interpreted as a form of personal and social device orientation (Baran, 2014) to combine learning experiences in a collaborative environment (Sarrab, Elgamel, & Aldabbas, 2012) with cell phones, smartphones, Personal Digital Assistants (PDA) or personal digital systems, tablets, and laptops (Traxler, 2005) that can be easily integrated to encourage student participation, measure understanding levels (McQuigaan, et al., 2015), as additional learning tools to improve teaching quality (Chiu, 2019), and complement learning in classroom or distance learning (Motiwalla, 2007) because learning can take place anytime and anywhere (Pachler, et al., 2009).

As a complement to distance learning, mobile learning has advantages, namely, convenience, collaboration, portability, compatibility, interesting (Sutopo, 2012), adaptive, easy, fast, flexible, attractive, flexible in accessing material (Ally, 2009) according to time and favorite place (Surahman, 2019).

To foster student enjoyment when studying in writing skills courses, lecturers need to have steps in compiling mobile learning-based teaching materials. According to Darmawan (2016), the steps include 1) flowchat preparation, 2) storyboard writing, 3) collection of graphic and animation materials, 4) programming, 5) finishing/mastering, 6) testing, 7) final product revision.

Products for teaching materials for writing skills based on mobile learning can be made using a coded website. Kodular is a website application based on the Android operating system using block programming so that users do not need to do coding (writing programming code) (Ronaldo & Ardoni, 2020). Kodular is similar to MIT app inventor (Koloay, Sompie, & Paturusi, 2020) by having a kodular store feature and a kodular extension IDE (Prasetya, 2020; Adinda, 2020). Kodular uses the concept of drag and drop (Kumala & Winardi, 2020). The initial appearance of the kodular can be seen in the following figure.



Figure 1. Initial appearance of the kodular website (Source: processed by researchers)

This research is important to do so that the role of kodular in producing teaching materials based on mobile learning in writing skills courses can be known and proven so that it really provides a solution in producing teaching materials that are useful for students in improving writing skills as well as a form of learning innovation in the 5.0 era which easier for lecturers.

METHOD

Research Goals

This research is an exploratory descriptive study with the aim of analyzing the role of a coded website as a solution for making mobile learning teaching materials for writing skills courses.

Samples and Data Collection

The sample in this study were users of the

kodular website, both lecturers, students, researchers who had used the kodular website. Research data were collected by observing, distributing questionnaires, and conducting interviews.

Observation

Observations were carried out by researchers objectively, factually, and systematically to obtain accurate information related to teaching materials for writing skills courses in several Indonesian language education study programs at Indonesian universities. This is reinforced by Sugiyono (2012) that in conducting observations the respondents observed were not too large.

Questionnaire

The researcher made a questionnaire based on the questionnaire grid as shown in the following table.

Table 1. Questionnaire grid (Source: Processed by researchers)

Questionnaire Number	Questionnaire Grid
1.	The number of using the kodular website
2.	The purpose of using a coded website
3.	The name of the application created with the coded website
4.	Constraints encountered when using a coded website
5.	The role of the kodular website in the success of Era Society 5.0 Learning?
6.	Kodular websites can be used in compiling teaching materials for writing skills courses
7.	Steps to compile teaching materials for writing skills courses with a coded website
8.	The advantages of a coded website
9.	Disadvantages of a coded website
10.	Components that need to be in teaching materials for writing skills courses
11.	Tricks and tips to get students interested in using teaching materials for writing skills courses

After the grid is arranged, the researcher validates it by involving the validator and conducting a test questionnaire. Furthermore, the questionnaire was distributed to the research sample by utilizing the google form tool. Questionnaires are used to estimate (Widoyoko, 2012) to collect information (Hunchinson, 2010) from respondents (Oyebanji, 2014).

Interview

Researchers conducted interviews directly with the research sample by using the telephone. The researcher recorded voice conversations during the interview process. At the time of the interview, the researcher did not use interview guidelines that were arranged systematically and completely, the questions given by the researcher were more open-ended so that the research sample could be answered according to their conditions, the answers were always recorded by the researcher as data validation material. Interview guidelines according to Mahat-Shamir, et al. (2021) helped researchers produce quality interviews.

To maintain the quality of the results of the interviews, the researchers did not conduct interviews with all samples, but the researchers conducted a random system for the research samples (lecturers, students, and researchers). The random sample is a sample that has used the kodular website more than once so that the researcher actually gets detailed, honest, and in-depth data.

Analyzing of Data

To analyze the data, the researcher used content analysis method. Neuendorf (2002) suggests that researchers should be very careful in limiting a conclusion when using content analysis methods. This method is described by Miles and Huberman (2007) as a flow model that includes three activity flows, namely, 1) data reduction, 2) data presentation, and 3) drawing conclusions.

Data reduction

At the data reduction stage, the researcher recorded in a detailed description the results of the research sample questionnaire from the google form. Next, the researcher conducts an analysis to simplify the data that is really the same to take good data on each data.

Data presentation

After all the data from the google form was reduced, the researcher found data that was worth

displaying. The data is arranged in an orderly and detailed manner so that it is easy to understand. Then, the data is analyzed to obtain a description and clarity of each indicator.

Draw conclusions

After the data is presented, the researcher makes a preliminary conclusion that is temporary. Furthermore, this initial conclusion was verified by conducting interviews with a random sample. If the results of the interview are supported by strong evidence so that the data are consistent or the same as the conditions found in the questionnaire. So, the conclusions obtained are credible conclusions.

RESULTS AND DISCUSSION

In this study, the results of the analysis of solutions for compiling mobile learning-based writing skills for learning in the era of society 5.0 with a kodular website were carried out by observing, distributing questionnaires, and conducting interviews with the following research results.

First, the researcher made observations on several Indonesian language education study programs in Indonesia, the results of the first observation found different naming of courses for writing material. The names of the courses are creative writing courses, academic writing courses, scientific writing engineering courses, writing courses, popular writing courses, and writing skills courses. The results of the second observation in one of the Indonesian language education study programs in Indonesia found that the teaching materials for writing skills courses used were still in the printed version so that students felt uncomfortable when using and storing them, not to mention having this printed version of teaching materials, students had to buy.

After knowing the data on the results of observations. Second, the researchers distributed questionnaires using the google form to lecturers, students, and researchers who had used the kodular website. The research respondents' answers are as follows.

Kodular websites are used more by students than by lecturers, as many as 60% of students use kodular websites and 40% of lecturers use kodular websites. They most often use the kodular website more than twice as much as 40% and only once 60%. They use the kodular website to create learning materials/materials such as Student PNK, physical education, reading materials, and so on. All respondents have never

used a kodular website to make games or learning games.

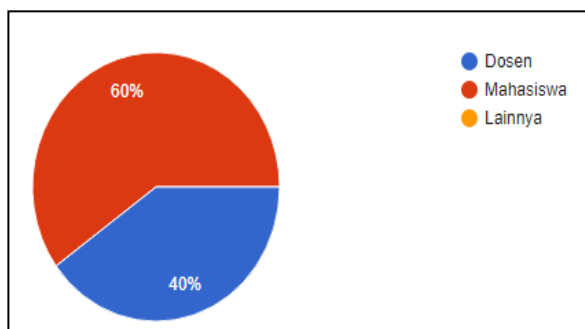


Figure 2. Number of Kodular Website Users (Source: processed by researchers) Blue: lecturers, orange: college student, yellow: others

Constraints faced by respondents when using a kodular website are the need to master the tool, do not understand the flow, are not used to it, limited features, the export process sometimes takes quite a long time, and the mastery of the website is still minimal.

Although there are obstacles faced by respondents when using a coded website. However, as many as 80% of respondents agree that the kodular website plays a very important role in the success of learning in the era of society 5.0 because it makes it easier to create materials, is more systematic, kodular can produce applications to accommodate learning in the current era, and is easily accessible via the internet anytime and anywhere. Meanwhile, 20% of respondents stated that they disagreed because the existence of a kodular website was less well known when compared to Flutter and Android studio.

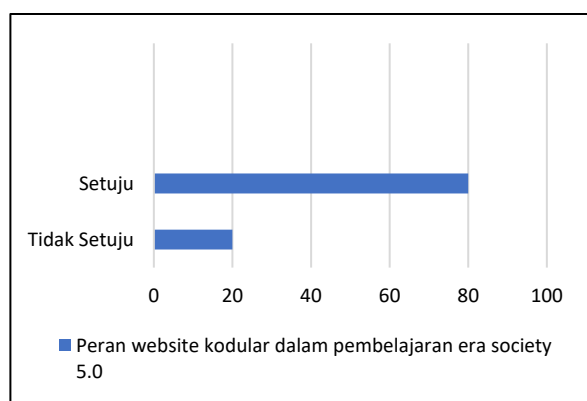


Figure 3. The role of kodular websites in learning in the era of society 5.0 (Source: processed by researchers) Setuju [agree], tidak setuju [do not agree]

Kodular websites can be used in compiling teaching materials for mobile learning-based writing skills courses. As many as 80% of respondents agree that this is because the kodular website is digital-based, more systematic and easy to understand, can create an application, is easy to use by students and can contain complete and innovative learning materials. However, as many as 20% of respondents disagreed with this because using a coded website was more difficult than using Microsoft Word or Microsoft PowerPoint and blogs. This can be seen in the following image.

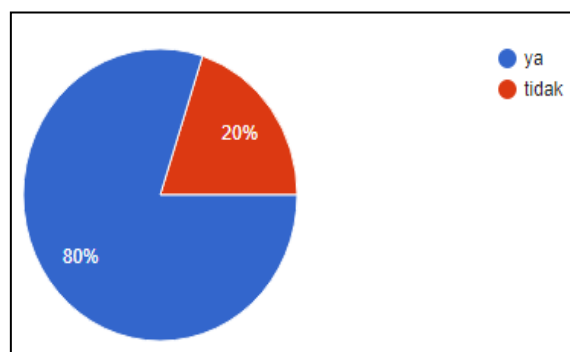


Figure 4. The role of kodular websites in producing teaching materials for mobile learning-based writing skills courses (Source: processed by researchers) Blue: yes, orange: no

The steps for compiling teaching materials for writing skills courses with a coded website according to respondents are:

1. Looking for materials needed such as covers for applications, materials, buttons, and so on
2. Inserting the material into the kodular website
3. Start compiling the material into the application as desired
4. After the display is formed, the next step is to make the block so that the application can run
5. After everything is complete and successful, the next step is to export it to the apk version.

These steps are respondents' answers to the questionnaire. When the researcher asked the reasons why these steps were important when compiling teaching materials for mobile learning-based writing skills courses with a coded website. Respondents answered because he had made teaching materials on other materials and there were more or less steps in using such a kodular website. The excerpt of the conversation between the researcher and the respondent can be shown in the following text.

- P : “Apakah ada standar dalam menggunakan website kodular?”
[“Is there any standard for using a coded website?”]
- R1 : “Menurut saya sih tidak.”
[“I don't think so.”]
- P : “Lalu, apakah ada petunjuk menggunakan website kodular dalam menghasilkan bahan ajar berbasis mobile learning?”
[“Then, are there any instructions for using a kodular website in producing teaching materials based on mobile learning?”]
- R1 : “Sepengatahuan saya, petunjuk baku yang diterbitkan oleh website kodular belum ada.”
[“As far as I know, there are no standard instructions published by the kodular website yet.”]
- P : “Jika tidak ada petunjuk baku, lalu, bagaimana langkah-langkah saudara dalam menyusun bahan ajar berbasis mobile learning dengan website kodular.”
[“If there are no standard instructions, then, what are your steps in compiling mobile learning-based teaching materials with a kodular website.”]
- R1 : “Secara garis besar, ketika saya akan menggunakan website kodular dalam membuat bahan ajar yaitu dengan 1) mengumpulkan bahan, 2) memasukkan material dalam website, 3) mulai menyusun bahan ajar, 4) menyusun blok, dan 5) mengexport ke dalam bentuk versi apk.
[“Broadly, when I will use a coded website in making teaching materials, namely by 1) collecting materials, 2) inserting materials on the website, 3) starting to compile teaching materials, 4) compiling blocks, and 5) exporting them into the form of apk version.”]
- The advantages and disadvantages are the respondents' answers to the questionnaire. When the researcher asked the respondents whether the weaknesses of the kodular website had an effect on the process of making teaching materials. Respondents answered that in general no, however, this is to be known by future researchers to avoid deficiencies in the kodular website when compiling teaching materials. The excerpt of the conversation between the researcher and the respondent can be shown in the following text.
- P : “Apakah kelemahan dari website kodular berpengaruh terhadap proses pembuatan bahan ajar?”
[“Does the weakness of the kodular website affect the process of making teaching materials?”]
- R2 : “Menurut saya sih tidak. Pak.”
[“I don't think so. Sir.”]
- P : “Lalu, apakah fungsi saudara menyebutkan kelemahan website kodular saat menyusun bahan ajar?”
[“Then, what is your function mention the weaknesses of the kodular website when compiling teaching materials?”]
- R2 : “Agar peneliti selanjutnya tidak mengulangi kesalahan yang sama saat melakukan penelitian berikutnya sehingga peneliti bisa menghindari kekurangan tersebut.”
[“So that future researchers do not repeat the same mistakes when conducting subsequent studies so that researchers can avoid these shortcomings.”]

Kodular website as a solution in making teaching materials for writing skills courses has advantages, namely it is more practical, more interesting, easy to use, and does not require a lot of coding, the resulting teaching materials are more effective and efficient. Meanwhile, the disadvantages of a kodular website are that it has limited features, limited maximum size capacity, so if you want to include high-quality learning videos, you have to compress them first.

Kodular websites as a solution in making teaching materials for writing skills courses need to pay attention to the components in the writing skills material such as the writing stage material consisting of pre-writing resistance, writing resistance, and post-writing stages, diction, and mechanical abilities such as punctuation and others. etc. as well as material on writing development techniques. These materials are packaged in text form and can add video elements to support teaching materials in each sub-chapter, and the developer needs to add quizzes as a form of exercise to measure students' final competencies. Developers need to add visuals that can be explained in words that are more attractive to students and the material is packaged very innovatively and creatively by providing

light examples that can stimulate students' creativity to develop their writing.

The components that must exist in the teaching materials for writing skills based on mobile learning are the answers from the respondents. When the researcher asked the respondent the reason why he knew the components that must exist in the teaching materials for writing skills courses, he answered because he had taught writing skills courses. The excerpt of the conversation between the researcher and the respondent can be shown in the following text.

- P : *"Apakah saudara pernah mengajar mata kuliah keterampilan menulis?"*
["Have you ever taught writing skills courses?"]
- R3 : *"Ya, Pak."*
["Yes, sir."]
- P : *"Apakah komponen yang bapak sebutkan layak sebagai komponen bahan ajar mata kuliah keterampilan menulis?"*
["Is the component you mentioned worthy of being a component of teaching materials for writing skills courses?"]
- R3 : *"Menurut saya, komponen itu sangat layak, Pak, mengingat dalam menulis perlu mengetahui tahapan menulis dan komponen lain yang saling berkesinambungan."*
["In my opinion, this component is very feasible, sir, considering that in writing it is necessary to know the stages of writing and other components that are mutually sustainable."]
- P : *"Apakah komponen tersebut mampu meningkatkan minat mahasiswa dalam belajar?"*
["Are these components able to increase student interest in learning?"]
- R3 : *"Menurut saya sih iya, Pak, mengingat komponen itu nanti dapat dikemas dengan sangat inovatif dan kreatif dengan memberikan contoh-contoh ringan."*
["I think so, sir, considering that the components can be packaged very innovatively and creatively by giving light examples."]

Discussion

The preparation of teaching materials needs to prioritize elements of innovation so that they can be used in learning Era Society 5.0. Basically compiling teaching materials according to Sanjaya, et al. (2021) must be in accordance with the development of student needs and the development of information technology. For this reason, educators must start to innovate in compiling teaching materials (Rusman, 2017) both in terms of materials, models, and learning media (Purwanti & Rismaningtyas (2019) which are arranged systematically (Panen, et al., 2001; Prastowo, 2012; Sa'dun, 2013) in written or unwritten form (Johnson, 2002) based on the student's learning environment (Puspita & Purwo, 2019)

The form of innovation in compiling teaching materials for writing skills courses can take advantage of the concept of mobile learning. The reasons for choosing this concept are because 1) it allows students to build knowledge in different contexts, 2) allows students to build understanding, 3) mobile technology often changes the pattern of learning/work activities, 4) the context of mobile learning is more than just space and time. (Winter, 2009).

Liu, et al. (2008) explained that there are four elements that can be used in designing and developing mobile learning material content, namely, 1) analysis of needs and constraints, 2) mobile learning scenarios, 3) design of technological environments, and 4) design of student support services. This can be described as follows.

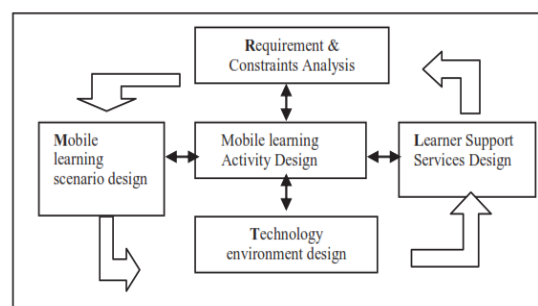


Figure 5. Mobile learning framework (Liu et al., 2008)

According to Alda (2020) mobile devices have very different characteristics from desktop systems even though mobile devices have many types in size, design, and layout. These characteristics include 1) small size. 2) limited memory, 3) limited processing power, 4) low

power consumption. 5) Strong and reliable. 6) limited connectivity. 7) short life span.

Mobile learning bases on teaching materials for writing skills courses can be compiled by utilizing a coded website. Kodular can create applications without coding (Ramya & Padmalatha, 2021) and can be opened via any browser (Patil, et al., 2020) which proves to be useful for students and a different way for teachers to teach learning materials (Nunes & Karkow, 2020). The results of the research by Syarlisjswan & Wahyuningsih (2021) show that kodular software is chosen in developing teaching materials because 1) a number of supporting tools are available, 2) it is easy to use (3) the format is widely supported and has been included. Kodular can also be used in developing comic versions of teaching materials (Damayanti & Kuswanto, 2021) and online worksheets (Hobri, et al., 2021).

CONCLUSION

The conclusions of this study indicate that a kodular website can be used as a solution in making mobile learning-based teaching materials in writing skills courses to support learning in the era of society 5.0 because a kodular website is based on the Android operating system using block programming that makes it easy for developers to upload applications to android.

REFERENCES

- Achimugui, L., & Onojahii, P. K. (2017). Factors hindering effective production and utilization of teacher-made instructional materials in teaching senior secondary chemistry in Federal Capital Territory, Abuja, Nigeria. *International Journal of Scientific Research in Education*, 10(3), 352-361.
- Adinda, N. F. (2020). *Perancangan Prototipe Sistem Parkir Otomatis Berbasis Internet of Things [Prototype Design of Internet of Things Based Automatic Parking System]*. (skirpsi, Institut Teknologi Telkom Purwokerto, Purwokerto, Indonesia). Retrieved from <http://repository.ittelkom-pwt.ac.id/6079/>.
- Alda, M. (2020). *Aplikasi CRUD berbasis android dengan kodular dan database airtable [Android based CRUD application with kodular and airtable database]*. Bandung, Indonesia: Media Sains Indonesia.
- Ally, M. (2009). *Mobile learning transforming the delivery of education and training*. Canada. Athabasca University Press.
- Atiah, N. (2020, May). Pembelajaran Era Disruptif Menuju Masyarakat 5.0. In *Prosiding Seminar Nasional Program Pascasarjana Universitas PGRI Palembang Disruptive Era Learning Towards Society 5.0. [In Proceedings of the National Seminar on the Postgraduate Program at PGRI Palembang University]*. Retrieved from <https://jurnal.univpgripalembang.ac.id/index.php/Prosidingpps/article/view/3875>.
- Baran, E. (2014). A review of research on mobile learning in teacher education. *Journal of Educational Technology & Society*, 17(4), 17-32. Retrieved from <https://www.jstor.org/stable/jeductechsoci.17.4.17>.
- Barrett, B. F., DeWit, A., & Yarime, M. (2021). Japanese smart cities and communities: Integrating technological and institutional innovation for Society 5.0. In *Smart Cities for Technological and Social Innovation* (pp. 73-94). Amerika Serikat: Academic Press.
- Burch, G., Heller, J. A., Burch, J. J. and Heller, N. A. (2016), "Web-based and face-to-face classes: are there unintended outcomes?", *Journal of Management Development*, 35(8), 1031-1044. Doi <https://doi.org/10.1108/JMD-06-2015-0088>.
- Chiu, H. -S. (2019). Dataset of mobile learning effectiveness on learning computer programming in community college. *Data in brief*, 26. 1-7. Doi <https://doi.org/10.1016/j.dib.2019.104525>.
- Damayanti, A. E., & Kuswanto, H. (2021, March). Developing Android-Based Marbles Game Comics Using Group Investigation Model in Physics Learning. In *7th International Conference on Research, Implementation, and Education of Mathematics and Sciences (ICRIEMS 2020)* (pp. 440-445). Atlantis Press.
- Daries, I. (1981), *Instructional Tenchnology and Media*. Newyork: MC Graw Hill Company.
- Darmawan, D. (2016). *Mobile learning sebuah aplikasi teknologi pembelajaran [Mobile learning is a learning technology application]*. Jakarta, Indonesia: Rajawali Press
- Fukuda, K. (2020). Science, technology and innovation ecosystem transformation toward society 5.0. *International journal of production economics*, 220, 1-14. Doi <https://doi.org/10.1016/j.ijpe.2019.07.033>.
- Fukuyama, M. (2018, Juli-Agustus). Society 5.0: Aiming for a New Human-Centered Society. *Japan SPOTLIGHT*. Retrieved from https://www.jef.or.jp/journal/pdf/220th_Special_Ar

- ticle_02.pdf.
- Government of Japan. (2021, February 19). Science, Technology, and Innovation Basic Plan. Retrieved from https://www8.cao.go.jp/cstp/english/sti_basic_plan.pdf.
- Haider, M. Q. (2019). *Development, validation, and use of an assessment of learning outcomes in introductory linear algebra classes* (Doctoral dissertation, The Florida State University). Retrieved from <https://www.proquest.com/openview/19bf0fad9ff9f63e9965f170b6c75f96/1?pq-origsite=gscholar&cbl=51922&diss=y>.
- Harayama, Y. (2017). Society 5.0: aiming for a new human-centered society. *Hitachi Review*, 66(6), 8-13. Retrieved from https://www.hitachi.com/rev/archive/2017/r2017_06/pdf/p08-13_TRENDS.pdf.
- Hayashi, H., Sasajima, H., Takayanagi, Y., and Kanamaru, H. (2017, September 19-22). International standardization for smarter society in the field of measurement, control and automation. Artikel diseminarkan pada *56th Annual Conference of the Society of Instrument and Control Engineers of Japan (SICE)*, Kanazawa, Japan. Doi <https://doi.org/10.23919/SICE.2017.8105723>.
- Hendarsyah, D. (2019). E-commerce di era industri 4.0 dan society 5.0. [E-commerce in the industrial era 4.0 and society 5.0.]. *IQTISHADUNA: Jurnal Ilmiah Ekonomi Kita*, 8(2), 171-184. Doi <https://doi.org/10.46367/iqtishaduna.v8i2.170>.
- Hernawan, A. H., Permasih, H., & Dewi, L. (2012). Pengembangan Bahan Ajar [Development of Teaching Materials]. *Direktorat UPI, Bandung*, 4(11), 1-13. Retrieved from http://file.upi.edu/Direktori/FIP/JUR._KURIKULUM_DAN_TEK._PENDIDIKAN/197706132001122-LAKSMI_DEWI/BAHAN_KULIAH_PBA/PENGEMBANGAN_BAHAN_AJAR.pdf.
- Hobri, H., Putri, M. A. K., Murtikusuma, R. P., Oktavianingtyas, E., & Pambudi, D. S. (2021). Developing Student Worksheet for Grade Seven on Social Arithmetics and Its Use in Flipped Classroom Blended Learning. *Edumatica: Jurnal Pendidikan Matematika*, 11(1), 1-11. Doi <https://doi.org/10.22437/edumatica.v11i01.12032>.
- Hunchinson, T. (2010). *Research and writing in law, 3rd edition*. Australia: Lawco.
- Jankowska, M. (2011). A reflection on adaptability, achievement motivation and success of Central and Eastern European students in one English university. *Compare: A Journal of Comparative and International Education*, 41(6), 801-818. Doi <https://doi.org/10.1080/03057925.2011.602536>.
- Johnson, E. B. (2002). *Contextual teaching and learning: What it is and why it's here to stay*. Thousand Oaks, California: Corwin Press, Inc
- Ko, J., Sammons, P., & Bakkum, L. (2014). *Effective teaching*. Berkshire, Inggris: University of Oxford: Education Development Trust.
- Koloay, K., Sompie, S. R. U. A., & Paturusi, S. D. E. (2020). Rancang Bangun Aplikasi Fitness Berbasis Android (Studi Kasus: Popeye Gym Suwaan) [Android Based Fitness Application Design (Case Study: Popeye Gym Suwaan)]. Retrieved from <http://repo.unsrat.ac.id/2913/>.
- Kumala, A., & Winardi, S. (2020). Aplikasi pencatatan perbaikan kendaraan bermotor berbasis android [Android-based motor vehicle repair recording application]. *Jurnal Intra Tech*, 4(2), 112-120. Retrieved from <https://journal.amikmahaputra.ac.id/index.php/JIT/article/view/72>.
- Lestari, I. (2013). *Pengembangan Bahan Ajar Berbasis Kompetensi (Sesuai dengan Kurikulum Tingkat Satuan Pendidikan) [Development of Competency-Based Teaching Materials (According to the Education Unit Level Curriculum)]*. Padang, Indonesia: Akademia Permata.
- Liu, H., Huang, R., Salomaa, J., & Ma, D. (2008). An Activity-Oriented Design Framework for Mobile Learning Experience. *Fifth IEEE International Conference on Wireless, Mobile, and Ubiquitous Technology in Education (Wmute 2008)*, 185-187. <https://doi.org/10.1109/WMUTE.2008.30>.
- Mahat-Shamir, M., Neimeyer, R. A., & Pitcho-Prelorntzos, S. (2021). Designing in-depth semi-structured interviews for revealing meaning reconstruction after loss. *Death studies*, 45(2), 83-90. Doi <https://doi.org/10.1080/07481187.2019.1617388>.
- Mavrodieva, A. V., & Shaw, R. (2020). Disaster and climate change issues in Japan's society 5.0—a discussion. *Sustainability*, 12(5), 1-17. Doi <http://dx.doi.org/10.3390/su12051893>.
- McQuiggan, S., Kosturko, L., McQuiggan, J., & Sabourin, J. (2015). *Mobile learning: A handbook for developers, educators, and*

- learners.
- Miles, M. B. & Huberman, A. M. (2007). *Analisis Data Kualitatif: Buku Sumber Tentang Metode-Metode Baru*. Terjemahan Tjetjep Rohendi Rohidi [Qualitative Data Analysis: A Resource Book on New Methods. Tjetjep Rohendi Rohidi's translation.]. Jakarta: Universitas Indonesia Press.
- Motiwalla, L. F. (2007). Mobile learning: A framework and evaluation. *Computers & education*, 49(3), 581-596. Doi <https://doi.org/10.1016/j.compedu.2005.10.011>.
- Nagy, K., Hajrizi, E., & Palkovics, L. (2020). Responsible Innovation in Support of Society 5.0-Aspects of Audit and Control. *IFAC-PapersOnLine*, 53(2), 17469-17474. Doi <https://doi.org/10.1016/j.ifacol.2020.12.2123>.
- Neuendorf, K. A. (2002). *The content analysis guidebook*. California: SAGE.
- Nunes, F. B., & Karkow, H. A. (2020). Uso da ferramenta Kodular no ensino de matemática para a educação básica [Using the Kodular Tool in Teaching Math for Basic Education]. *Saber Humano: Revista Científica da Faculdade Antonio Meneghetti*, 10(17), 104-123. Doi <https://doi.org/10.18815/sh.2020v10n17.458>.
- Nurani, D. (2021, February 03). Menyiapkan pendidik profesional di era society 5.0. Dirjen PAUD, Dikdas dan Dikmen Kemdikbudristek [Preparing professional educators in the era of society 5.0. Director General of PAUD, Dikdas and Dikmen Kemdikbudristek]. Retrieved from <http://ditpsd.kemdikbud.go.id/artikel/detail/menyiapkan-pendidik-profesional-di-era-society-50>.
- Nurdyansyah, N. (2018). Pengembangan Bahan Ajar Modul Ilmu Pengetahuan Alam bagi Siswa Kelas IV Sekolah Dasar. *Universitas Muhammadiyah Sidoarjo [Development of Natural Sciences Module Teaching Materials for Grade IV Elementary School Students. Muhammadiyah University of Sidoarjo]*. Retrieved from <https://core.ac.uk/download/pdf/151573668.pdf>.
- Oyebanji, J. O. (2014). *Research and philosophies in Saliu H. A. & Oyebanji J. O. (Ed.), in A guide on research proposal and report writing (pp.34)*. Ilorin: University of Ilorin.
- Pachler, N., Bachmair, B., & Cook, J. (2009). *Mobile learning: Structures, agency, practices*. Boston, MA: Springer Science & Business Media.
- Panen, P., dkk. (2001). Konstruktivisme dalam pembelajaran [Constructivism in learning]. Jakarta, Indonesia: Depdiknas.
- Patil, K. A., Vittalkar, N., Hiremath, P., & Murthy, M. A. (2020). Smart door locking system using IoT. *Int Res J EngTechnol (IRJET)*, 7(5), 3090-3094. Retrieved from <https://www.irjet.net/archives/V7/i5/IRJET-V7I5592.pdf>.
- Prasetya, A. A. (2020). Rancang bangun aplikasi hadits bukhari berbasis android. *Jurnal Ilmiah Sistem Informasi dan Teknik Informatika "JISTI"*, 3(2), 9-16 [Design and build an android-based bukhari hadith application. Scientific Journal of Information Systems and Informatics Engineering "JISTI", 3(2), 9-16]. Retrieved from <https://ojs.stmik.ypls.ac.id/index.php/jisti/article/view/61/53>.
- Prastowo, A. (2011). *Panduan kreatif membuat bahan ajar inovatif [Creative guide to create innovative teaching materials]*. Jogjakarta, Indonesia: DIVA Press.
- Prastowo, A. (2012). *Panduan kreatif membuat bahan ajar inovatif [Creative guide to create innovative teaching materials]*. Yogyakarta, Indonesia: Diva Press.
- Purwanti, E., & Rismaningtyas, A. (2019, April). Pengembangan bahan ajar tematik berbasis kontekstual bagi siswa sekolah dasar. In *Prosiding Seminar Nasional PGSD UST (Vol. 1) [Development of contextual-based thematic teaching materials for elementary school students. In Proceedings of the UST PGSD National Seminar (Vol. 1)]*. Retrieved from <https://jurnal.ustjogja.ac.id/index.php/sn-pgsd/article/view/4738>.
- Puspita, A. M. I., & Purwo, S. (2019). Pengaruh bahan ajar berbasis literasi dengan pendekatan kontekstual terhadap hasil belajar siswa sekolah dasar. [The effect of literacy-based teaching materials with a contextual approach on the learning outcomes of elementary school students]. *Al-Aulad: Journal of Islamic Primary Education*, 2(1), 1-7. Doi <https://doi.org/10.15575/al-aulad.v2i1.4426>.
- Ramdani, Y. (2012). Pengembangan instrumen dan bahan ajar untuk meningkatkan kemampuan komunikasi, penalaran, dan koneksi matematis dalam konsep integral. *Jurnal Penelitian Pendidikan*, 13(1), 44-52. [Development of instruments and teaching materials to improve communication skills, reasoning, and mathematical connections in

- integral concepts. *Journal of Educational Research*, 13(1), 44-52] Retrieved from https://www.academia.edu/download/39013202/6-yani_ramdhana-edl.pdf.
- Ramya P., Padmalatha L. (2021) IoT-Based Health Monitoring System (IHMS). In: Kumar R., Chauhan V.S., Talha M., Pathak H. (eds) *Machines, Mechanism and Robotics. Lecture Notes in Mechanical Engineering*. Springer, Singapore. https://doi.org/10.1007/978-981-16-0550-5_16
- Ronaldo, R., & Ardoni, A. (2020). Pembuatan Aplikasi Mobile" Wonderful of Minangkabau" Sebagai Gudang Informasi Pariwisata di Sumatera Barat Melalui Website Kodular. *Info Bibliotheca: Jurnal Perpustakaan dan Ilmu Informasi*, 2(1), 88-93 [Making the "Wonderful of Minangkabau" Mobile Application as a Warehouse for Tourism Information in West Sumatra through the Kodular Website. *Info Bibliotheca: Journal of Library and Information Science*, 2(1), 88-93]. Doi <https://doi.org/10.24036/ib.v2i1.90>.
- Rusman. (2017). Belajar dan pembelajaran: Berorientasi Standar Proses Pendidikan [Learning and learning: Standards Oriented Educational Process]. Jakarta, Indonesia: Kencana.
- Sa'dun, A. (2013). Instrumen perangkat pembelajaran [Learning device instruments]. Bandung, Indonesia: PT Remaja Rosdakarya Offset.
- Sanjaya, M. D., Nilawijaya, R., & Erwanto, E. (2021). Strategi dan model pengembangan bahan ajar bagi calon guru di era pandemi covid 19 PBSI FKIP Universitas Baturaja. *Jurnal INDONESIA RAYA (Pengabdian pada Masyarakat Bidang Sosial, Humaniora, Kesehatan, Ekonomi dan Umum)*, 2(1), 1-5 [Strategies and models for developing teaching materials for prospective teachers in the era of the COVID-19 pandemic PBSI FKIP Baturaja University. *INDONESIAN RAYA Journal (Social Service, Humanities, Health, Economics and General Affairs)*, 2(1), 1-5]. Retrieved from <http://journal.pdmengkulu.org/index.php/indonesiaraya/article/view/202>.
- Sarrab, M., Elgamel, L., & Aldabbas, H. (2012). Mobile learning (m-learning) and educational environments. *International Journal of Distributed and Parallel systems*, 3(4), 31-38. Doi <https://doi.org/10.5121/IJDPS.2012.3404>.
- Schmidt, W. H., McKnight, C. C., Houang, R. T., Wang, H., Wiley, D. E., Cogan, L. S., Wolfe, R. G. (2001). *Why schools matter: A cross-national comparison of curriculum and learning*. San Francisco, CA: Jossey-Bass.
- Sugiyono. 2012. Memahami penelitian kualitatif [Understanding qualitative research]. Bandung, Indonesia: Alfabeta.
- Surahman, E. (2019). Integrated Mobile Learning System (IMOLE) sebagai upaya mewujudkan masyarakat pembelajar unggul era digital. *JINOTEP (Jurnal Inovasi dan Teknologi Pembelajaran): Kajian dan Riset Dalam Teknologi Pembelajaran*, 5(2), 50-56 [Integrated Mobile Learning System (IMOLE) as an effort to create a superior learning community in the digital era. *JINOTEP (Journal of Innovation and Learning Technology): Studies and Research in Learning Technology*, 5(2), 50-56]. doi:<http://dx.doi.org/10.17977/um031v5i22019p050>
- Sutopo, A. H. (2012). *Teknologi informasi dan komunikasi dalam pendidikan [Information and communication technology in education]*. Yogyakarta, Indonesia: Graha Ilmu.
- Syarlisjswan, M. R., & Wahyuningsih, D. (2021, September 22-23). The development of e-modules using Kodular software with problem-based learning models in momentum and impulse material. Artikel diseminarkan pada Young Scholar Symposium on Science Education and Environment (YSSSEE) 2020, Lampung, Indonesia. Doi <https://10.1088/1742-6596/1796/1/012078>
- Traxler, J. (2005). Defining mobile learning. *IADIS International Conference Mobile Learning 2005*, 261-266.
- Ustundag, A., & Cevikcan, E. (2018). *Industry 4.0: Managing the digital transformation*. Springer.
- Wahyuni, S. (2015, September 13). *Pengembangan bahan Ajar IPA untuk meningkatkan kemampuan berpikir kritis siswa SMP*. Artikel dipresentasikan pada Seminar Nasional Fisika dan Pendidikan Fisika (SNFPF), Surakarta, Jawa Tengah, Indonesia [Development of science teaching materials to improve the critical thinking skills of

- junior high school students. Article presented at the National Seminar on Physics and Physics Education (SNFPP), Surakarta, Jawa Tengah, Indonesia]. Retrieved from <https://jurnal.fkip.uns.ac.id/index.php/prosfi/s1/article/view/7857>.
- Wang, X., Li, L., Yuan, Y., Ye, P., & Wang, F. Y. (2016). ACP-based social computing and parallel intelligence: Societies 5.0 and beyond. *CAAI Transactions on Intelligence Technology*, 1(4), 377-393. Doi <https://doi.org/10.1016/j.trit.2016.11.005>.
- Widoyoko, S. E. P. (2012). *Teknik penyusunan instrumen penelitian [Research instrument preparation techniques]*. Yogyakarta, Indonesia: Pustaka Belajar.
- Winter, N. (2009). What is mobile learning? In M. Sharples, I. Arnedillo-Sánchez, M. Milrad, & G. Vavoula (eds.), *Big issues in mobile learning report of a workshop by the kaleidoscope network of excellence mobile learning initiative* (pp. 4-8). Dordrecht: Springer.