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Eduwall Android App Development Superapps-Based for Simplicity Learning for Deaf Students

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Abstract: This research aims to develop an Android application called Eduwall based on the SuperApps framework for facilitating the learning process for deaf students. This study used a research and development (R&D) method, employing data collection techniques such as surveys, observations, interviews, and questionnaires to inform the development of the Eduwall application. The subjects in this research were deaf students at Pamulang University. The data analysis process encompassed six stages: concept development, design, material collection, assembly, product test and distribution. The research findings showed that the Eduwall application, based on the superapps model, was deemed suitable for use. This had been tested by IT experts, media experts, disability experts, lecturers, and students. The feasibility of this application means that the Eduwall application was practical, effective, efficient, and fun for students, especially deaf students. This Eduwall application was also equipped with a sign language dictionary to facilitate users in understanding the conditions of deaf students.

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Introduction

Education is a fundamental right of every individual, and as such, it should be accessible to all. The government acknowledges the numerous challenges inherent in establishing an inclusive educational system that accommodates the needs and rights of every child. Therefore, the educational system must cultivate a non-discriminatory environment while also attending to each child's right to development, goal attainment, and the expression of their opinions (Kemdikbud, 2021). Article 3 of the National Education System Law No. 20 of 2003 states: "National education functions to develop the ability and shape the character and civilization of a dignified nation in order to create national life, aims to develop the potential of students to become human beings who believe and are devoted to God Almighty, have noble character, healthy, knowledgeable, capable, creative, independent, and become democratic and responsible citizens."

In accordance with the aforementioned legislation, educational institutions are duty-bound to provide facilities conducive to the learning process for all segments of society, thereby ensuring the attainment of the noble objectives of the national education system. Every citizen has the right to a proper and excellent education. In 1994, inclusive education was introduced in international forums. The meeting in 1994, in Spain, UNESCO and PLAN-Indonesia gave birth to the Salamnca statement and the original framework on Special Education on the Covenant, Laws, and Regulations Guaranteeing All Children the Equal Right to Access Quality Education in an Inclusive Manner. The advent of inclusive education

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signifies a transformation in the content, approaches, models, media, strategies, and instructional materials employed to accommodate all students. Inclusion represents a response to address the developmental needs of children and to facilitate the achievement of learning objectives. Inclusive education is oriented towards providing a learning process within both formal and informal settings. The primary objective of inclusive education is to ensure that all students feel comfortable and do not perceive any distinction between students with special needs (ABK) and their typically developing (Karsidi et al, 2013).

The existing differences are no longer regarded as barriers to learning but are perceived as challenges. Inclusive education is an effective means to mitigate discriminatory attitudes, foster an open society, construct an inclusive community, and expand educational opportunities for all. It aims to provide effective education to all students and enhance cost efficiency in school enrollment (UNESCO, 2003). The success of inclusive education can be seen from the index for inclusion (Ainscow, 2005). The inclusion index includes the cultural dimension (creating inclusive cultures), the policy dimension (producing inclusive policies), and the practice dimension (evolving inclusive practices). Inclusive education must pay attention to aspects of culture, policies, and practices in the learning process. Referring to the inclusion index, it can be concluded that inclusive education is education that is able to accommodate all the needs of students both in physical, intelligence, social, emotional, and other obstacles that may arise in the learning process so that students can develop, have participation opportunities, and can achieve goals together.

According to the Great Dictionary of the Indonesian Language (KBBI), the term "tunanetra" refers to individuals who are unable to see (KBBI, 2006). According to Law of the Republic of Indonesia No. 8 of 2016 concerning persons with disabilities, including persons with sensory disabilities. Blind people have higher visual function abnormalities and are unable or have significant difficulty reading alert writing or illustrations despite using vision aids (Nakata, 2003). It can be concluded that blind people have limitations in seeing and reading writing despite using vision aids. Students with visual impairments have limited vision, but that does not mean they cannot follow the learning process and achieve learning goals like other students.

Based on observations conducted among students at Pamulang University, it is evident that the limitations faced by deaf students include "a lack of supporting media and teaching aids that can facilitate the learning process for students, particularly in comprehending course materials holistically. There is currently a dearth of technological tools to aid students in learning and comprehending the subject matter. Students find it difficult to carry out the learning process because lecturers consider deaf students to be students who need special treatment; this makes them feel more limited in the learning process and development." After researchers obtained information to provide learning innovations, a learning plan was made using an effortless application on Android with the theme EDUWALL based on super apps to complete the learning system tools, including material, quizzes such as games, videos, assignments, and material deepening. Although globally, governments and international organizations have fully supported the progress and rights of persons with disabilities, Indonesia is far from being inclusive. One is the absence of an application with full features to support several tools that make it easier for deaf students.

Several findings suggest that higher education institutions play a crucial role in elevating the nation's quality of life. In succeeding this, universities have three basic guidelines, namely 1) providing equity and increasing access to education, 2) improving quality, relevance, and competitiveness, and 3) improving education management, accountability, and public image (Ginting, 2017; Soleh, 2014, 2016). Accessibility is one of

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the problems still faced by universities. Various facilities that should be obtained by all parties to receive higher education are still not as expected (Soleh, 2014), especially during distance learning. Innovative efforts need to be made so that the diversity of student learning abilities can meet their learning needs.

Deaf students do not face cognitive impediments in information processing and providing responses. However, the challenge in their interactions with hearing instructors or peers stems from the difference in the mode of response communication. Individuals who hear quickly can grasp verbal explanations. At the same time, deaf students are more familiar with non-verbal symbols (sign language) and visualizations in writing/images (Ariej & Rahardjo, 2019). Safaat (2015) suggests that Android is an operating system for Linux-based mobile devices, including operating systems, middleware, and applications. Android provides an open-source platform for developers to build their apps. The Google company created Android in collaboration with the Open Handset Alliance. According to Satyaputra & Aritonang (2014), Android is an operating system for smartphones and tablets. The operating system can be illustrated as a bridge between the device and its use so that users can interact with it and run applications available.

Herlandy et al. (2019) stated that mobile-based learning media is a learning media embedded in mobile phones or telecommunication devices, especially those using smartphones. The forms of learning technology displayed on mobile devices can be e-books, games, and simulations. There are more mobile devices than PCs. Mobile devices are easier to operate than PCs. Mobile devices can be used as learning media. Along with the development of technology in education, teachers use increasing types of media in their learning. Currently, technology is in demand by technology connoisseurs where the implementation combines two dimensions; therefore, researchers design new applications based on Android Super Apps.

The EDUWALL application design based on superapps will be equipped with several tools from the learning system, including materials, quizzes such as games, videos, assignments, and material deepening. Although globally, governments and international organizations have fully supported the progress and rights of persons with disabilities, Indonesia is far from being inclusive. One is the absence of an application with full features to support several tools that make it easier for deaf students. The technology is augmented reality. According to Ismail et al. (2018), using technology such as augmented reality in teaching is very helpful for students in improving their visualization skills. Augmented reality aims to add information, images, and 3D objects to a real-world setting. Augmented reality is not the same as Virtual Reality; Augmented Reality does not make a setting as a simulation of reality. Instead, it takes an object or real-world setting as the foundation and incorporates technology as the target place to add virtual data. Suryanto et al. (2018) explained that AR would work through image detection, commonly called markers or markers, using a smartphone camera and then detecting markers that have been printed.

Based on the background above, the objectives of this development are as follows: 1. To create the EDUWALL assistive tool based on SUPERAPPS to facilitate students in comprehending course materials. 2. To facilitate students in using this assistive tool due to its efficiency, portability, and easy accessibility via Android devices. 3. To provide deaf students with the opportunity to optimize the learning process effectively.

Research Method

This research method used research and development (R&D). Its primary objective was the creation and evaluation of a product. The product developed in this study was the

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Android application called EDUWALL, which was based on the superapps framework and aimed at enhancing the learning experience for deaf students. The target population for this research comprises all students, with a specific focus on those with hearing impairments. The subjects in this research were deaf students at Pamulang University. Data collection techniques employed include surveys, observations, interviews, and questionnaires, all of which are conducted for the purpose of developing the product.

In this study, data analysis techniques encompassed the development of the system used, namely the development of a multimedia system version of Luther-Sutopo (1994) quoted from the book Binanto (2016). This research employed the multimedia software engineering method according to the Luther-Sutopo version, which is considered most suitable due to its well-defined stages, particularly the "material collecting" phase. According to Luther (1994), the multimedia development methodology comprises six stages: *concept*, *design*, *material collecting*, *assembly*, *testing*, and *distribution*. These stages need not necessarily be sequential and may interchange positions in practice. Nonetheless, the concept stage should indeed be the starting point. Sutopo (2013) adopted Luther's methodology by modifying 6 stages.

Concept

The needs analysis in the development of this application encompasses all the requisite data for application creation, including input, output, and system requirements. The concept stage is a stage to determine the purpose of making applications, user information, and types of applications (information, entertainment, and training) also determines the purpose of making applications.

Design

Design or planning is the stage to determine detailed specifications about the application, style, and other needs that will be needed in making the application.

Material Collecting

The material collecting stage is the stage to collect materials that will be needed for making applications, such as images, animations, sound, and audio.

Assembly

Assembly or creation is the stage in which all gathered materials are consolidated for processing into an application constructed based on the design phases.

Testing

The testing stage is carried out after the creation stage (Assembly), and all data after completion is entered into the application; this stage is intended to test whether there are still errors or not in the application. These tests are performed by the loader or the maker's environment. Product development trials are carried out as an evaluation step consisting of trials of Material Content Experts, Learning Media Design Experts, and Learning Media Experts. The level of validity and attractiveness of this teaching material is known through the results of the analysis of trial activities carried out through several stages, namely:

1) Validator by Material Content Expert
2) Validators by Learning Design Experts and Learning Media Experts
3) Individual Trials
4) Small group trials
5) Large group trials.

The steps are performed as follows:

1) Content or material experts provided assessments by filling out validation sheets by checking or in blocks on the computer, in the columns provided, and commenting on the notes column for Teaching Materials developed at which points should be revised.

2) Learning Design Experts assessed by filling in the questionnaire sheet with check marks or in blocks using a computer in the column provided and commenting on the notes column for Teaching Materials that have been developed at which points should be revised.
3) Learning media experts gave assessments by filling out questionnaire sheets by checking or in blocks using computers in the available columns and commenting on the notes column for teaching materials developed at which points should be revised.
4) Assessment test Teachers for individuals, small groups, and large groups provided assessments to fill out the validation sheet by checking the column provided and commenting on the note column.
5) Test the parents' assessment of the results of this android-based application development by providing an assessment, filling out the validation sheet by checking the column provided, and commenting on the note column. The data obtained was then analyzed and used as a basis for subsequent decision-making.

Based on the results of the evaluation, further revisions or improvements can be made to the development of the Super Apps-based Eduwall Android application to be developed. Then, Eduwall will be ready to be used in the learning process.

Distribution

In this stage, application storage that has been made into a storage media was carried out. If the storage media is insufficient, compression will be carried out on the application to be inserted.

Results and Discussion

Deafness is a condition in which individuals lose or have hearing loss, thus hindering speech, language, and communication skills. The data that the researchers received after conducting interviews and observations at the Disability Service Center at Pamulang University and hearing directly from deaf friends and teachers were experiencing difficulties accessing the material, especially the material's content. Thus, students need a medium that makes it easier to understand the material. Therefore, researchers provided a solution that could be designed to make applications that can help them, namely the Eduwall-based Android application Super Apps. The development of the Eduwall application is one of the media that can be developed in an exciting learning process and hopefully can increase student learning motivation, especially deaf students. The Eduwal application also provided learning media tutorials for deaf children following current technological developments to help lecturers and parents at home.

General planning of the system is carried out to provide users with information about the system to be built. The system is built as a product of the super apps based EDUWALL Android application. The process of designing the EDUWALL application is system design in general, analysis of needs that will be used in software design, and software design specifically. Software design consists of designing system architecture, designing sequence diagrams and activity diagrams, designing databases that aim to provide information structures that are easily understood by users, and designing user interface flow diagrams that illustrate the interface that bridges the system with users in the application.

The stages of EDUWALL product development use Luther stages with an explanation of each stage as follows:

Concept

The *concept* stage is the stage for determining the purpose and the program's users (audience identification). The purpose and end user of the program affects the nuances of

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multimedia as a reflection of the organization's identity that wants information. This stage began with identifying targets involved in the application, elaborating functional needs to be modeled in the form of use case diagrams, and non-functional needs. This needs analysis aims to describe the system's needs to meet user needs. The basic design rules, for example, application size and targets, are also determined at this stage. *The output* of this stage is usually a narrative document to express the project objectives to be achieved. Here is the concept of EDUWALL superapps product development:

Table 1. Development Concept

Aspects	Information
App title	Eduwall Super Aps
User Application	All students, especially those with deaf disabilities
Application Brief	Eduwall Super Aps is an Android application designed to facilitate deaf students. Tools in this application are fun material modules, learning videos accompanied by Sign Language translation (JBI), gamification quizzes, sign language dictionaries to translate words and sentences.

Design

Design is the stage of making specifications regarding the program architecture, style, appearance, and material requirements for the program. In this case, the Eduwall Super Apps android application is designed with the initial display there is a logo, then on the next page there is a login page for students. Login is designed via email and password to be able to enter in Eduwall. Then the next display will have a video explanation of using Eduwall equipped with a Sign Language Interpreter (JBI). The tools provided are the first interesting module equipped with animated learning videos accompanied by JBI translations. The second is a gamification-based quiz in which there are game elements such as rewards, points and interesting animations to increase the attractiveness of students in doing so. Finally, there are tools regarding the summary of grades or scores so that they can be a reference for the extent of student achievement in understanding the material. Eduwall super apps will be equipped with a sign language dictionary, so that when there are lecturers or other students who want to understand and learn sign language can use this application.

Walker & Hess (Kustandi and Sutjipto, 2013) provide three characteristics in reviewing learning media based on quality. First, the quality of content and objectives consists of accuracy, importance, completeness, balance, interest or attention, fairness and suitability to the student's situation. Second, the quality of learning consists of providing learning opportunities, providing assistance to learning, motivating quality, learning flexibility, relationships with other learning, social quality of learning interactions, quality of tests and assessments, impacting students. Third, technical quality consists of readability, ease of use, quality of display or hand, quality of answer handling, quality of program management, and quality of documentation.

Material Collecting

Material collecting is the stage of collecting materials that are in accordance with the needs being worked on. These materials, including *clip art images*, photos, animations, *videos*, audio, and others that can be obtained free of charge or by order to other parties according to their design. This stage can be done in parallel with the *assembly* stage. However, in some cases, the *material collecting stage and* the assembly *stage* will be done linearly and not in parallel.

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The Super Apps-based Eduwall android application will be equipped with many animations to attract students, especially deaf students. Animation includes quizzes, materials and their application to learning videos. The learning process can run according to the objectives due to many influential factors, one of which is influenced by the media (Toto Ruhimat, et al., 2011). Meanwhile, Wang Qiyun & Cheung Wing Sum (2003) said that "... media is that they are the means or equipment that transmit information from the sender to the receiver. In the context of education, media is usually defined as instructional facilities that carry messages to learners". It can be interpreted that the media is a means that provides messages to students or connects information from lecturers to students. It was further conveyed that the media is in the form of writing, images, sound, animation and video. Thus, the use of media certainly contributes positively to the learning process and learning outcomes, especially for deaf students.

Assembly

The *assembly stage* is the stage of making all multimedia objects or materials. Application development is based on the *design* stage, such as *storyboards*, flowcharts, and/or navigation structures. This stage usually uses *authoring* software. At this stage the software used to develop this application is *Android Studio* for program coding. The result of the *Assembly stage* is in the form of the Eduwall Super Apss android application to facilitate deaf students equipped with videos and dictionaries, namely BISINDO. In this application will show symbols - symbols images and videos in the form of sign language movements that are easy to understand by users later.

This assembly stage is the process of processing from materials to multimedia objects that have been collected and combined with teaching materials into a structured media in accordance with flowcharts and story boards. All objects or materials are created and combined into one complete application. In this stage, several software such as Vuforia, Unity 3D and Blender are used. In this Eduwall application, the focus is on color sharpness and 3D design which is an attraction for students.

Figure 1. Eduwall Super Apps

This Eduwall application is applied as microcontroller programming for control equipment in accordance with industrial needs. According to Zuhrie (Juanda, E.A., et al, 2018), suggest that learning media should be one of the learning media that meet the student's needs. Commonly used is a trainer set to be used as a practicum tool. Learning media should be a learning medium that meets the needs of students.

Testing

Testing carried out on Super Apps-based Eduwall applications is by testing using *alpha test* and *beta test.*

Alpha Test

Alpha testing is testing performed by the user on an environment, in this case, a controlled environment. Alpha testing (*alpha test*) is carried out by *black box* testing, which

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is one of the software testing methods that focuses on the functionality side, especially on the input and *output* of the application, whether it is in accordance with what is expected or not. The application test will be addressed to IT practitioners, media experts, and disability experts. The results of the alpha test are as follows:

Table 2. Alpha Test

No.	Aspects	IT Member	Media Members	Disability Reviewer
1	Learnability	88,2	81,4	88
2	Efficiency	86,4	80,2	86
3	Memorability	78,8	88,2	86
4	Errors	84,0	80,6	88
5	Statisfication	90,2	90,2	82

From the alpha test results above, all scores are above 80, except for the memorability of IT experts, who gave 78.8 to their assessment. The value, if converted into a five-scale table, is in the range of a score of $80.0<X\leq100.0$; then a value above 80 gets a qualification of "very feasible," then for a value of 78.8, the qualification on the memorability of IT Experts is "very feasible." Thus, it can still be categorized as usable because all aspects are at the feasible and very feasible stage. Although Eduwall is said to be very feasible, there have been some revisions from expert validators of practitioners. The material must be adjusted so that the learning objectives are achieved. It is in line with the opinion (Rahmi, 2017) that concept understanding is meaningful learning; the learning process is not just memorizing concepts or mere facts but is an activity to connect concepts to produce a complete understanding and to achieve learning objectives.

In line with the feasibility of the Eduwall Application, it is true what Daryanto (2013: 52) said if multimedia learning is chosen and used appropriately and well it will provide enormous benefits for lecturers and students, namely: (1) the learning process is more interesting and interactive, (2) the amount of teaching time can be reduced, (3) the quality of student learning can be improved, (4) the teaching and learning process can be done anywhere and anytime, and (5) student learning attitudes can be improved. According to (Afifah et al., 2019), the use of relevant media in the classroom can optimize the learning process. For lecturers, learning media helps concrete concepts or ideas and helps motivate active learning participants. Related to that, the Eduwall application is appropriate if it is developed based on relevance, basic competencies, material, and student characteristics. Lecturers can act as creators, namely creating and utilizing appropriate, efficient, and fun media for students, especially deaf students.

Beta Test

Beta testing is a test carried out on end users who will later assess this application, in this case, lecturers and students. *Beta* tests are conducted to provide input and suggestions for the Eduwall application developed.

Table 3. Beta Test

No.	Aspects	Lecturer	Student
1	Learnability	80,2	82,4
2	Efficiency	80,4	84,2
3	Memorability	80,8	86,2
4	Errors	86,0	82,6
5	Statisfication	80,2	80,4

From the beta test results, all scores are above 80, both from the assessment of lecturers and students. This value, if converted into a five-scale table, is in the range of $80.0<X\leq100.0$ scores, then values above 80 get a qualification of "very decent". This feasibility means that

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Eduwall has received the title of interactive multimedia and can be distributed to all students or those in need. According to Ratini (2011), "interactive multimedia is a combination of different media packaged into a digital file," making interactive multimedia utilizing computer media and image, animation, and sound processing software. Interactive multimedia on the mutation material in which there is a combination of text, images, and animations about the mutation material."

It is hoped that the SuperApps-based Eduwall Application can help students understand learning material in class. According to (Arifin, 2012) the quality of receiving learning information will be better if supported by interactive media. The advantage of using interactive multimedia is that it can present information with abstract objects in concrete and provide direct experience to students because they can interact with the concepts they are learning. When compared to other media, interactive multimedia is easier to use and contains moving images to facilitate understanding of a concept. It is reinforced by Hasrul (2010), who states that the use of multimedia can increase the effectiveness of delivering information. *Distribution.*

The Android operating system has come a long way since it first introduced the Open Handset Alliance in late 2007. *Android* is an open operating system that Google aggressively popularizes. Many wireless appliances in different countries use the Android operating system. Equipment such as tablets, net-books, set-top boxes, and even cars also adapt to the Android operating system. Safaat (2012) explained that Android is an operating system for Linux-based mobile devices that includes operating systems, middleware, and applications. Smartphones are technology products owned by most people (Arista and Kuswanto, 2018).

The final stage in this study is distribution. Distribution is a stage where applications that have passed testing will be packaged into an application format and distributed for use by application users later by installing applications to *Android mobile* devices running on the 4.1 operating system (Jelly Bean); distribution can be done in collaboration with deaf communities such as GERKATIN or other deaf communities. According to Husnul, NRI (2021), it is true that e-learning or Zoom, classroom, and media WhatsApp can also be accessed via cellphone so that the effectiveness will become easier. If you are a student or the lecturer has other work and a laptop cannot be used, then all platforms are on above, you can use a cellphone.

Android is an open platform that allows developers to create their apps. Android is distributed in two types. First that gets full support from Google or Google Mail Service (GMS). The second does not get direct support from Google or Open Handset Distribution (OHD). According to Kastubh et al, (2017) Interactive learning using mobile learning using portable media such as smartphones using Android, iOS, or Windows Phone supports the learning process. A new trend in e-learning nowadays is known as Mobile Learning, the use of portable media such as Smartphones either using the Android system, IOS, or Windows Phone. The use of Mobile Learning to support the learning process is considered essential to add flexibility to the activity of teaching and learning. Thus, the learning process can be done anywhere and anytime.

Conclusion

Through the stages of development research that have been carried out, starting from the concept stage to distribution, the superApps-based Eduwall android application can be used. The results of research that have been tested by IT experts, media experts, disability, lecturers, and students produce very decent results on the Eduwall superapps application. The feasibility of this application means that the Eduwall application is practical, effective,

efficient, and fun for students, especially deaf students. This Eduwall application is also equipped with a sign language dictionary to make it easier for users to understand the condition of deaf students. This eduwall super apps app comes with images, animations, videos, text, gamification quizzes that are easy for deaf students.

Recommendation

From the results of this research by producing super apps-based Eduwall android application products to facilitate deaf students, several things can be recommended as follows:

1) Lecturers can use the Eduwall Superapps application in the learning process for deaf students in all courses.
2) For further researchers, it is advisable to focus on the needs of students with other disabilities, not only the deaf but also the visually impaired or speech-impaired.
3) For further researchers, they can enhance this Eduwall superapps application by adding other tools that support easy access to understanding material in deaf students, for example with pretest, posttest, or group assignments or other tools.
4) It is hoped that universities can make other innovations to make it easier for students with disabilities to understand the material

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References

Afifah, et al. (2019). *Effectiveness of Problem Based Learning and Problem Solving Towards the Critical Thinking Ability of Class V Students in Mathematics Learning*. Journal of Mathematics Education, Science and Technology. Vol. 4, no. 1, (95-107).

Alfa Satyaputra Aritonang, EM (2014). *Beginning Android Programming with ADT Bundle*. Jakarta: PT. Elex Media Komputindo.

Arc C Luther. (1994). *Authoring Interactive Multimedia*. Boston : AP Professional.

Ariej, MC, & Rahardjo, T. (2019). *Communication Adaptation of Deaf Students in Higher Education*. Online Interaction, 8 No. 1, 132–144.

Ariesto Hadi Sutopo. (2013). *Interactive Multimedia with Flash.* Graha Ilmu: Yogyakarta.

Arifin, Zainal. (2012). *Educational Research New Methods and Paradigms*. Bandung: Rosda Karya Youth.

Arista, FC, & Kuswanto, H. (2018). *Virtual physics laboratory application based on the Android smartphone to improve learning independence and conceptual understanding*. International Journal of Instruction, 11(1), 1-16. Available at https://eric.ed.gov/?id=EJ1165233 .

Binanto, I. (2016). *Digital Multimedia-Theoretical Basis and Development*. Yogyakarta: Andi Offset.

Daryanto. (2013). *Effective Learning Innovation*. Bandung: Yrma Widya.

Ismail, et al. (2018). Learning Technology As Learning Media (Syarifuddi). Scholar Publisher.

Hasrul. (2010). *Evaluation of the Grounding System for Domestic Electrical Installations in*

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E-ISSN: 2442-7667
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Email: jklppm@undikma.ac.id

Barru Regency. UNM : Electric Media

Herlandy, PB, & Novalia, M. (2019). *Application of E-Learning in Network Communication Learning using the Blended Learning Method for Vocational School Students*. Journal of Educational Informatic Technology and Science, Volume 1, 24–33. https://ejurnal.umri.ac.id/index.php/JeITS/article/view/1225 .

Husnul, NRI. (2021). *Strategy Lecturer In E- Learning Management Improving Learning Outcomes Students at College High.* Master of Management EducationFKIP Satya Wacana Christian University: manage Journal Educational Management. https://ejournal.uksw.edu/kelola/article/view/4357/1791.

Juanda, et al. (2018). *Teachers' Expressive Speech Acts in Language Learning Indonesia Class X Student Man Pinrang*. Education, 1(1), 11–24.

Karsidi, et al. (2013). *Inclusive Education in Indonesia: Issues and Challenges*. ASSAIHL International Conference 2013 in Colombo.

Kastubh A, J, Yogita H, K, Mayuri VM, Pooja G, N. (2017). *Android Based ELearning Application "Class-E". I*nternational Research Journal of Engineering and Technology (IRJET) Volume 4 Issue 3 1745-1748.

Kemdikbud. (2021). *Guide to organizing learning in 2018. academic year and 2020/2021 academic year during the pandemic*. Coronavirus Disease 2019 (Covid-19) (Vol. 2019).

Kustandi and Sutjipto. (2013). *Instructional Media; Manual and Digital*. Bogor: Ghalia Indonesia.

Nakata, PA. (2003). *Advance in Our Understanding of Calcium Oxalate Crystal Formation and Function in Plants*. Plant Science. 164: 901-909.

Nazruddin Safaat H. (2012) (Revised Edition). *Android Based Smartphone and Tablet PC Mobile Application Programming*. Informatics. Bandung.

Ratini. (2011). *Use of Interactive Multimedia to Increase Activities and Results Learning Biology for Muhammadiyah 1 Metro High School Students in the 2010/2011 Academic Year.* Bio Education Journal of Biology Education, 2(1).

Safaat H, Nazruddin. (2015). *Multiplatform Application Design*. Informatics. Bandung.

Saripudin, S., Sumarto, S., Juanda, EA, Abdullah, AG, & Ana, A. (2018). *Understanding technology literacy: The characteristics of ICT literacy vocational teachers.* International Journal of Engineering and Technology (UAE), 7(4), 182-185.

Soleh, A. (2014). *Accessibility of Persons with Disabilities to Higher Education.* Case Study in Four Higher Education Institutions in Yogyakarta. Yogyakarta: LKIS Pelangi Aksara

Suryanto, A., Kusumawati, DA, & Sanhoury, IMH. (2018). *Development of Augmented Reality Technology Based Learning Media of Lathe Machines*. Journal of Technology and Vocational Education, 24(1), 32–38. https://doi.org/10.21831/jptk.v24i1.18245

Toto Ruhimat, et al. (2011). *Curriculum and learning*. Jakarta: Rajawali Press

Wang Qiyun & Cheung Wing Sum. (2003). *Designing Hypermedia Learning Environments in Tan Seng Chee & Wong, Angela.FL (Eds.).* Teaching and learning with technology: an Asian Pacific perspective (pages: 216-231). Singapore: Prentice Hall.