



TPACK-Integrated Learning Media Assisted by Appypie to Improve the Literacy Skills of Elementary School Teacher Education (ESTE) Students

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ABSTRACT

TPACK is a 21st-century competency that must be mastered by lecturers, including prospective lecturers. Much research has been conducted on TPACK, but research linking TPACK with learning media is still limited. Therefore, researchers need to conduct research that connects integrated learning media with TPACK using Android with the Appypie system to increase digital literacy. This research aims to produce TPACK-integrated learning media assisted by APPYPIE that is valid, practical and effective for PGSD FIP UNP students. This type of research is research and development. The development model used in this research is the 4-D model. This model consists of four stages, namely, definition, design, development and dissemination. The research results show that literacy skills play an important role in determining student learning success. TPACK-integrated learning media assisted by APPYPIE has been proven to increase student interest in lectures. This makes students interested in the lecture material so that it can increase students' understanding of the course.

Keywords: Media; Learning; TPACK; Literacy; Appypie

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1. INTRODUCTION

The millennial era is an era where the internet and technology are a thing principal. In this era, the development of information and communication technology (ICT) is very rapid and influences the daily lives of all groups, including students. Results research show the year 2018, the number of active

users of *smartphones* in Indonesia reached 100 million people. With a number of this size, Indonesia is in the fourth position as the country with the largest number of active smartphone users after China, India and America (Syarisma, 2019). Along with the increase in *smartphone* users among students who only use them are limited for social media (*Facebook, Instagram, Line, WA*) and also use a smartphone only just for playing games. This will bother concentration Study students and reduce interest in looking at textbooks. Students will prefer to stare at their *smartphone screen* which makes students more focused on their *smartphones* even leads to addiction. This is in line with research conducted by Masfiah, et al (2019) which states that students have a picture of low learning motivation due to them playing online games so that their study time is reduced, even meal time, and their way of communicating with their families is also disrupted because of playing online game. Overcoming problems Therefore, *smartphones should* be used in learning, so that students more interested for see material lectures so that can increase literacy student.

Literacy is an activity that is needed by anyone who wants to progress and increase self. One of the literacy activities is reading books which are a source for learning about written textual features (Mason, 1992). Literacy makes student loves reading and writing activities (Brown et al., 2010). Literacy skills will not be achieved without conscious and planned effort. For this reason, so that students can improve their literacy, the introduction of literacy must use technological media that can attract the attention of students.

Literacy in this research is associated with digital literacy. The idea of digital literacy began to be popularized by Gilster in 1997. According to Gilster, digital literacy is the ability to understand and use information in various formats originating from digital sources displayed through computer (Nurjanah et al., 2017).

Literacy activities usually start with textbooks, become more complex with reading texts presented in a structured manner, and culminate in critical evaluation. Despite carefully designed teaching materials and methods, many students experience a lack of interest in reading to build meaningful understanding. Sometimes, textbooks obtained in class fail to motivate students to study. For this reason, technology is needed in digital literacy activities (Rapp, 2011).

Knowledge and technology are interrelated and influence each other in life. Society and technology are inseparable phenomena and changes that occur in one of them change the other (Dorneles et al., 2015). Technology offers a great way to strengthen instruction, whether in the classroom, online, or in a blended learning environment (Holland & Holland, 2014). Along with progress technology, the use of charts in Technology-based educational environments has become commonplace and increasingly visible and popular (Lin & Atkinson, 2011). Enhancement quality learning is influenced by a number of factor. Effectiveness learning is influenced by media used by educators. Maximum use of learning media can support students to achieve learning goals. So educators need to prepare the right media and innovation so can motivate students so like in learning (Ardianti et al., n.d.).

The use of learning media in the learning process can stimulate new desires and interests, generate motivation and stimulate learning activities and even have a psychological influence on students (Sakti et al., 2012). Instructional Media is something which is no less important in learning activities. Students can be helped to understand the subject matter presented by the lecturer if the subject matter is packaged in appropriate learning media. One of the learning media used in this research is digital learning media utilize technology. Learning media that utilizes technology is one of the alternative learning media choices that can be taken into account because it can be used as a complement to learning and provides students with the opportunity to study material they don't understand anywhere and anytime. (Suriani et al., 2021).

Technology pedagogical and content knowledge (TPACK) is a 21st-century competency that must be mastered by lecturers, including prospective lecturers. One of the TPACK-integrated learning media that can be used is using Appypie. Appypie is one of the online builders available on the internet. Appypie can support the process of creating applications based on Android, Mac OS, Windows Phone, Blackberry, and HTML 5. Under construction with appypie must be connected directly with an Internet that is in a way on line. Material learning which filled can contain text, pictures, videos, links, and interactive quiz (Riki Idianto, 2021).

Android-based learning media with the *Appypie system* designed in one application that contains detailed service company adjustment journal material accompanied by video tutorials for recording adjusting journals, example questions, and quizzes for practice students and the language used in this media uses standard language so that easily understood by student (Amalia, 2022). Media also has a number of advantages including that it can be used anywhere, able to increase interaction between lecturers and students, can be used for independent study, packaged media displays with a new and attractive design, making it easier for students to understand the material, so that media the Also can increase efficiency process learning (Astuti et al., 2018). Based on this description, the researcher developed learning media more interesting, more efficient, and more effective that is media learning integrated Android-assisted TPACK with the *Appypie system* to increase the digital literacy of student PGSD FIP UNP. This research aims to produce TPACK learning media assisted by APPYPIE that is valid, practical and effective for PGSD FIP UNP students. The focus of this research is deep service area digital learning with topic media and learning resources in Era Revolution Industry 4.0.

2. METHOD

Type study This is study And development (*Research & Development*) with means producing product through stages certain. Research and development is research that produces certain products and test the effectiveness of the product. Research is carried out to develop a TPACK-integrated learning media product assisted by APPYPIE to increase digital literacy.

The development model used in this research is an adaptation of the existing model the 4-D model (four D model). This model consists of four stages, namely, *defining*, *designing*, *developing*, and *dissemination* (Thiagarajan, 1974). There are stages, activity descriptions and activities study can be seen in Table 1.

Table 1. Stage Development, Activity Study, And Description Activity

No	Stage Development	Activity Study	Description Activity
1	Definition	a. Analysis draft b. Analysis curriculum c. Analysis needs	Analyze various problems to serve as a basis for making the initial design
2	Planning	a. Designing media learning	Designing media learning integrated TPACK help APPYPIE
3	Development	a. Test Validity	Do trial validity of all products which are done by an expert.
		b. Test Practicality	Field trials to get practical value (convenience use, time, And activity Study)
		c. Test Effectiveness	Field trials to obtain effectiveness values
4	Disseminate	Product Distribution	Perform limited distribution to products developed.

The product of this research is media learning integrated TPACK assisted by APPYPIE to increase the digital literacy of PGSD FIP students UNP. The resulting product is a learning media *prototype in the form of a product* digital. The product is adapted to the curriculum used by the department PGSD FIP UNP. Product trials were carried out in section 21 AT 01 in the PGSD department FIP UNP. The instruments used in data collection in this research can be seen in table 2.

Table 2. Research Instrument

Type Data	Source Data	Tool Collector Data
Data Definition	Lecturer, student, and media learning which used	a. Guidelines interview b. Questionnaire needs analysis
Data Validation Product	Validator	Questionnaire validation expert
Data Practicality Product	Lecturer And Student	a. Questionnaire practicality lecturer and students b. Sheet observation activity Study
Data Effectiveness Product	Lecturer And Student	a. Test Formative b. Test Summative
Data Deployment Product	Lecturer	Questionnaire spread product

The data analysis technique used in this research is analytical techniques descriptive data, that describe the validity, practicality and effectiveness of the media learning integrated TPACK. Technique analysis data results The research is described as follows: *First*, the validity of the product produced is determined by scale calculations *Likert*. Use scale *Likert*, so the variable Which will be measured is

explained into sub-variables, then the sub-variables are translated into indicators. Calculation data mark end results validation analyzed in a scale of 0-100. AnalysisThe validity of TPACK-integrated learning media is carried out using the validator stage. For all-over indicators and giving mark validation. Second, the practicality of learning media can be seen from the questionnaire data that has been filled in by lecturers and students. The questionnaire is arranged in scale form *Likert*. Apart from that, the practicality stage is also seen based on learning activities for students. Activity Study student assessed based on sheet observation. Analysis was carried out by counting the number of students involved in the process activity learning Which set. Third, the effectiveness of the learning model is carried out by analyzing student learning outcomes using the N-Gain test.

Category validity, practicality, and effectiveness of media learning integrated TPACK can seen based on Table 3.

Table 3. Category Mark Validity, Practicality, and Effectiveness Media Learning

Levels of Achievement	Category
81 - 100	Very Valid/ Practical/ Effective
61 – 80	Valid/ Practical/ Effective
41 – 60	Quite Valid/ Practical/ Effective
21 – 40	Less Valid/Practical/Effective
0 – 20	Not Valid/ Practical/ Effective

3. RESULTS & DISCUSSION

3.1. Results Study

Stage development aims to produce media learning integrated TPACK help APPYPIE For student PGSD Which valid, practical and effective. This development stage consists of three stages, namely: validation stage, practicality test, and effectiveness test.

The designed learning media is then validated by validators. Validation was carried out by three validators from universities. In this activity, experts and practitioners are asked to assess the learning media that has been created. Assessment includes content, language, presentation and graphics. Validators are asked to provide assessments and suggestions for improvements to the learning media that have been designed. The revised learning media is handed back to the validator for further discussion. Validation has been completed if the validator has stated that the learning media designed is valid and ready to be tested.

Validation media learning is done to a number of aspects which cover aspect appropriateness content, aspect language, aspect presentation, And aspect graphics. By general results, validation media learning for aspect appropriateness content ranges from 3.33 to 4.00 which is a very valid category. Then for the average overall validity of the aspects. The feasibility of this content is 3.83 with a very valid category. This means, that media content learning has shown suitability between fill with achievementscourse learning, student needs, broadening student insight, organize students for Study,

guiding students in individual or group investigation, and it has been seen that the content of each is integrated learning Which presented in media learning Which developed.

Evaluation media next lesson reviewed from aspect language. Results validation from aspect language has a value range between 3.67 to 4 which is in the very valid category. As for the average validity aspect language in a way whole is 3.84 with a very valid category. Thus it can be said that in aspect The language of learning media can be seen from the readability of the material and the information be delivered Already clear in accordance with spelling Language Indonesia Which Good And Correct, short, and easy to understand.

Aspect furthermore Which assessed on stage validation media learning is the presentation aspect. The validation results for this aspect have a value range between 3.33 to 4.00 which is in the very good category. valid. Whereas for the average validity aspect presentation, the whole is 3.67 with the category very valid. This means presentation on media learning has served with clear formulation indicator achievement, can provide motivation, interaction, clear identity, systematic, and information complete.

The last assessment aspect is viewed from the graphic aspect. The validation results of this aspect show that the average value for each graphic aspect is 3.33 in the valid category. Thus it can be concluded that the learning media design has a good and attractive appearance.

Based on the description data, in a way whole results validation medialearning can be seen at Table 4.

Table 4. Results Validation Instructional Media By Whole

Aspects that Rated	Amount score Evaluation from Validator			Amount
	V1	V2	V3	
Appropriateness fill	48	44	47	139
Language	16	15	15	46
Presentation	28	26	23	77
Graphics	8	15	16	40
Total score				302
Average Whole				3.73

From Table 4, the average overall score for media validation obtained learning is 3.73 which is included in the very valid category. So you can conclude that media learning integrated TPACK helps APPYPIE for students PGSD is valid.

After the learning media for TPACK integrated learning media help APPYPIE For student PGSD stated valid, step next does test try for know practicality and effectiveness of the learning media developed. Trials were carried out on student section 21 AT 01 majoring in PGSD FIP UNP.

The practicality of the learning media developed can be seen from the results analysis implementation learning, questionnaire practicality by lecturer, questionnaire practicality by students, and observations of the use of learning media by students. Questionnaire response lecturer used for

getting response lecturer to practicality use media learning Which developed. Questionnaire This is filled out by lecturer after the learning end. Results response from the lecturer who teaches Linguistic Studies course in section 21 AT 01 who has used media learning integrated TPACK to help APPYPIE understand the lecture material. The average percentage of response assessments lecturers regarding TPACK integrated learning media assisted by APPYPIE is at on category very practical that is with percentage practicality 88.89%. This means learning media that was developed has had practicality Good from presentation nor its use. With thereby It can be concluded that the practicality of TPACK integrated learning media helps APPYPIE For student PGSD based on questionnaire response lecturer categorized as very practical.

Questionnaire response students used for know response students towards practicality teaching materials which were developed. This questionnaire was filled in by 28 students at the end of the trial. Analysis of the data obtained from each response questionnaire filled out by students with the help of lecturers. By summarize the results of the practicality sheet on the student response questionnaire after use media learning integrated TPACK help APPYPIE for understand the lecture material. The average percentage of response assessments lecturers regarding TPACK-integrated learning media assisted by APPYPIE is at on category very practical that is with a percentage practicality 88.89%. This means learning media that was developed has had practicality Good from presentation nor its use. With thereby It can be concluded that the practicality of TPACK integrated learning media helps APPYPIE For student PGSD based on questionnaire response lecturer categorized as very practical.

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Based on the description above, it can be concluded that the TPACK-integrated learning media assisted by APPYPIE used can provide convenience in the learning process. Thus it can be said that the use of learning media based on observations that have been made can be said to be practical.

The effectiveness of learning media can be seen in student learning outcomes. Results assessment is an assessment related to students' understanding of the material obtained from the test results on the evaluation sheet contained in the learning media.

Learning outcomes to determine the effectiveness of learning media using formative tests. The effectiveness of initial learning media for beginning reading can be seen from student learning outcomes which are assessed by aspects of attitude, knowledge and skills. Assessment in this learning consists of assessing the process and results. The assessment process is seen from student activities during learning,

such as their attitudes and skills. Meanwhile, the results assessment is an assessment related to students' understanding of the material obtained from the test results at the end of the lecture.

Learning outcomes to determine the effectiveness of teaching materials are known from formative tests. The questions are given after the TPACK-integrated learning media assisted by APPYPIE has been tested. The test questions used are an assessment component of the learning media being developed. Learning using the TPACK integrated learning media assisted by APPYPIE can help students understand the material so that they get excellent results. This can be seen from the average score obtained by students, namely 85.97 (Very Good) and classically learning using the TPACK integrated learning media assisted by APPYPIE is said to be complete.

Next, the N-Gain test was carried out and the results can be seen in Table 5.

Table 5. N-Gain Score

	Class		
	Pretest	Posttest	N-Gain
Σ	361	876	8.13
\bar{x}	36.1	87.6	0.81

Based on the data calculations above, it was found that by comparing the pretest and posttest results, the difference in mean value was 51.5. This difference suggests that the use of APPYPIE learning media is quite significant in improving learning outcomes.

3.2. Discussion

One of the studies on digital literacy was conducted by Murray and Perez (2014) based on results assessment of literacy digital which done to final year students at a regional university in the United States, stated that understanding digital literacy cannot be equated with the level of exposure And interaction student with technology digital on daily life, results assessment literacy digital show only 12% of student who is capable answered about 80% of the answers correctly. This shows that although on basically, students often interact with digital technology, but that's not the case means they understand what which Good about digital literacy. There is a need to develop strategies to increase digital literacy for students Which is coherent, inclusive and holistic (Newton et al., 2014).

Study about literacy digital Also Once done by Mary Yanti (2016). This research aims to analyze the contribution of the digital divide to levels of literacy digital in circles student University of Brawijaya. Results study This states that literacy is digitally influenced by difference ownership, cost communication, and the age factor of first using ICT devices (computers, laptops and others), the existence of this relationship further explains the urgency to manage interaction between children and ICT devices through formal, informal, And non-formal. Besides That, the results study also state the importance of pushing maker policy to make benchmarks And instrument evaluation Minimum ICT competency that students must have which is similar to the Test of English US a

Foreign Language (TOEFL) or Test Academic Potential (TPA) (Nurjanah et al., 2017).

Research on optimizing the function of technology and the internet as Appypie-based learning media was conducted by Astuti (2018). Learning media that utilizes cell phone technology is called mobile learning. Mobile learning is an alternative for developing learning media. The presence of mobile learning is intended as a complement to learning and provides students with the opportunity to study material they have not mastered anywhere and anytime. The results of this research are in the form of an Android-based learning media application with the Appypie system which can be used by lecturers to support learning activities in class (Astuti et al., 2018).

This research aims to determine the procedure for developing Android-based learning media for algebraic function derivatives using AppyPie. This type of research is research and development (R&D) using the development procedures proposed by Borg and Gall. The research results showed that Android-based learning media was successfully developed using Appy Pie, a media product in the form of an Android application in APK format. The learning media developed is considered very appropriate based on the results of lecturer and student assessments with average scores of 64.5 and 60.2. The media effectiveness test shows that the Android-based learning media developed is effective for training understanding of concepts (Lestari et al., 2019).

Sukaesih (2017) conducted research that analyzed candidates' TPACK abilities as Biology lecturers in the Biology Teaching Management (PP Bio) course. This research This is descriptive research to describe the TPACK abilities of prospective lecturers in biology. The TPACK ability of prospective lecturers is obtained by analyzing the CoRe instrument and Paper. TPACK in this research includes three main components of lecturer knowledge namely content, pedagogy, and technology. Based on CoRe and PaPeR analysis, prospective lecturers can organize big ideas to develop teaching materials 3 to 5 big ideas; candidate Biology lecturers are good at managing teaching time and have good abilities in choosing learning strategies (85%). There are still 77% of prospective lecturers showing this Difficulty in managing an effective class. In the aspect of content mastery, it showthere are 62% of prospective lecturers who have mastered the concept correctly, while 38% have in-depth mastery of concepts, and some lead to misconceptions. The use of information technology and computer-based learning resources still needs to be maximized because the types are still limited (power point, video, internet), few people use them (32%), and the choice of learning resources and media is less relevant for achieving basic competencies. The conclusion from this research is that the TPACK abilities of prospective lecturers still need to be improved in several aspects of mastery of content, pedagogy and technology (Sukaesih et al., 2017).

Nevrita (2020) conducting research on TPACK. This research aims to analyze lecturers' TPACK competencies through high school biology learning media. The research was carried out at all 7 senior high schools in Tanjungpinang City with a sample of 22 biology lecturers. The research procedure begins with initial coordination with the school and agreement on the research schedule,

followed by the preparation of instruments and implementation of the research. The data collection technique used is an open questionnaire which is in accordance with the TPACK aspect consisting of technological knowledge (TK) and pedagogical content knowledge (PCK). Results from the study this show 83% of lecturer biology has utilized technology-based media in their learning and 85% have the ability in designing simple technology-based learning media. Learning media is mostly used and designed in the form of PowerPoint. TPACK Competency for the kindergarten aspect it is in the very good category, as well as for the lecturer PCK aspect biology Senior High School in Tanjung Pinang Also is in the category very Good. The average percentage of the initial TPACK competency profile in the learning media for biology lecturers at Tanjung Pinang City High School is 86.87%, which is in the very good category. (Nevrita et al., 2020) .

Looking at existing research, TPACK is a 21st-century competency must be mastered by lecturers, including prospective lecturers. Usage of media deep TPACK learning process learning can arouse new desires and interests, generate motivation and stimulate of learning activities and even have a psychological influence on students. Media learning is something that does not lose importance in activity learning. Students can helped to understand the material and the lesson delivered by the lecturer if the lesson material is packaged in appropriate learning media.

4. CONCLUSION

Learning media is something that is no less important in learning activities. Students can be helped to understand the lesson material presented by the lecturer if the lesson material is packaged in appropriate learning media. Based on the development and trials carried out, researchers can conclude several things, as follows: (1) The TPACK integrated learning media assisted by APPYPIE produced in this development research is very valid by expert validators in terms of content suitability, namely 3.83; linguistic aspect 3.84; presentation aspect 3.76; and graphic aspects 3.33; (2) The APPYPIE-assisted TPACK integrated learning media produced in this development research can be declared practical from the results of teacher response analysis, namely with an average of 88.89 and student response aspects with an average of 87.40; (3) TPACK integrated learning media assisted by APPYPIE produced in this development research has been declared effective in increasing learning activities and outcomes. This can be seen in the average value of student learning outcomes during the trial, namely 85.97. The research results show that literacy skills play an important role in determining student learning success. TPACK integrated learning media assisted by APPYPIE has been proven to increase student interest in lectures. This makes students interested in the lecture material so that it can increase student literacy.

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