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Design of TPACK-Based Learning Media in Strengthening Digital Literacy

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ABSTRACT

Penelitian ini bertujuan untuk mengembangkan perangkat pembelajaran berbasis T-Pack (Technological Pedagogical and Content Knowledge) untuk meningkatkan Kemampuan literasi Mahasiswa Universitas Muslim Nusantara Al-Washliyah. Perangkat pembelajaran berupa Rencana Pelaksanaan Pembelajaran (RPP) dan Lembar Kerja Siswa (LKS). Lembar kerja siswa merupakan media pembelajaran sebagai sarana untuk melatih siswa berpikir, bertindak dan bersikap layaknya ilmuwan muda. Penelitian ini merupakan penelitian pengembangan dan dirancang dengan menggunakan desain pengembangan model 4D dan subject penelitian adalah mahasiswa semester 7 UMN Al-Washliyah. Adapun Instrumen yang digunakan adalah angket tanggapan peserta didik, lembar observasi, instrument penilaian kemampuan literasi. Tpack adalah suatu model pembelajaran yang saat ini sering digunakan dalam dunia pendidikan. Praktik pelaksanaan metode ini mencakup penguasaan teknologi, pedagogic dan pengetahuan mengenai konten pembelajaran. Pengumpulan data akan dilakukan untuk memperoleh data yang akurat dan obyektif melalui observasi di kampus UMN Al-Washliyah. Hasil penelitian menunjukkan cukup efektif pengembangan perangkat pembelajaran berbasis TPACK untuk meningkatkan kemampuan literasi diperoleh skor sebesar 121 ini artinya observer memberi interpretasi kategori baik dengan nilai A, sedangkan persentase sebesar 89%.

This study aims to develop a T-Pack (Technological Pedagogical and Content Knowledge) based learning tool to improve the literacy skills of Al-Washliyah Muslim Nusantara University students. The learning tools are in the form of Lesson Plans (RPP) and Student Worksheets (LKS). Student worksheets are learning media as a means to train students to think, act and behave like young scientists. This research is a development research and is designed using a 4D model development design and the research subjects are 7th semester students of UMN Al-Washliyah. The instruments used are student response questionnaires, observation sheets, literacy ability assessment instruments. Tpack is a learning model that is currently often used in the world of education. The practice of implementing this method includes mastery of technology, pedagogy and knowledge of learning content. Data collection will be carried out to obtain accurate and objective data through observations on the UMN Al-Washliyah campus. The results of the study indicate that the development of TPACK-based learning tools is quite effective in improving literacy skills, with a score of 121, meaning that observers give a good category interpretation with a value of A, while the percentage is 89%.

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INTRODUCTION

To stay up with the times, education is constantly changing and evolving. According to Curriculum 2013, graduates must meet the Graduate Competency Standards (SKL), which include knowledge, skills, and attitudes (Sani, 2015: 45).. The basic and secondary education process standards of Curriculum 2013 state that in order to motivate students to actively participate, learning must be engaging, stimulating, fun, demanding, and inspiring. According to each student's distinct abilities, interests, and stage of mental and physical development, there must also be adequate space for initiative, creativity, and independence (Kemdikbud, 2013).

Digital literacy has emerged as a critical component for academic performance and social skills among students in the twenty-first century. Digital literacy extends beyond the ability to use technology; it also extends the capacity to interact, comprehend, produce, and synthesise knowledge in a digital environment (Ng, 2012). Nevertheless, teachers frequently struggle with comprehensive techniques to incorporate digital literacy into topik education, and many students are constantly engaged in digital basic activities.

Mishra and Koehler (2006) developed the concept of Technological Pedagogical Content Knowledge (TPACK), which offers a systematic approach to integrating technology, content knowledge, and pedagogy in instructional design. By using this approach, the teacher can produce educational materials that help students develop their digital literacy skills and effectively communicate the content. Learning materials are all of the equipment and supplies that teachers use to carry out the teaching and learning process. Syllabi, lesson plans (RPP), student activity sheets (LKPD), learning outcomes or assessment tools, learning media, and student textbooks are a few examples of these educational resources.

Shulman states in (Sukaeshi, et al. 2017:58) that Pedagogical Content Knowledge (PCK) is the process of combining content and pedagogical knowledge in order to generate new knowledge. The TPACK method can be combined with a model that teaches students to learn new information on their own while still getting direction from the instructor. The discovery learning model is one possible approach. According to Syah (2010), Klauge (2011), Suminar & Meilani (2016), Balim (2009), and others, the Discovery learning model is a form of learning in which the teacher does not present the teaching material in its final form but instead expects students to find their own knowledge and construct that knowledge in order for them to acquire new knowledge.

Digital literacy encompasses multiple competencies, including information literacy, media literacy, and ICT literacy (Gilster, 1997). According to UNESCO (2018), digital literacy requires students to develop critical thinking, problem-solving, collaboration, and creativity in digital environments. Each educator's competencies, such as their mastery of technology, pedagogical skills, and content knowledge, are embodied in TPACK. The need for updates that mandate students have seven 21st-century survival skills is what spurred this. According to Farikah & Al Firdaus: 2020, students must master human literacy and technological literacy for self-development because if they only master the traditional literacy skills (reading, writing), they will lag behind and be oppressed by the times.

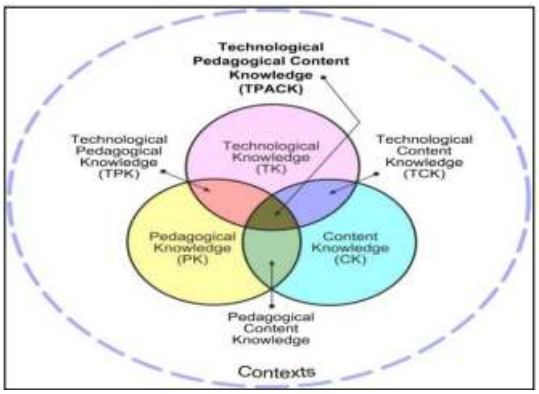

Figure 1. TPACK Framework
(Source: Baya'a & Daher, 2015)

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The TPACK Framework

1. Content Knowledge (CK): Mastery of the subject matter.
2. Pedagogical Knowledge (PK): Understanding of teaching strategies
3. Technological Knowledge (TK): Proficiency in using digital tools.

At their intersection, teachers develop TPACK, the knowledge required to design effective technology-enhanced learning (Mishra & Koehler, 2006).

TPACK and Digital Literacy

Research suggests that integrating TPACK in instructional design improves not only subject mastery but also higher-order skills, including digital literacy (Koehler, Mishra, & Cain, 2013). Studies by Chai et al. (2019) further indicate that TPACK-based interventions strengthen students' ability to critically analyze digital resources, engage in collaborative learning, and produce creative outputs.

METHOD

The research method used is the ADDIE model Development method. This model is an approach that helps in creating instructional design, content development, and create an efficient and effective teaching design.

This research is a TPACK-based learning device development study that focuses on developing Lesson Plans (RPP) to improve the literacy skills of students at Universitas Muslim Nusantara Al Washliyah. This research was designed using the 4D model development design. Based on the 4D development model, the procedures to be carried out in developing learning materials have the following stages: Define, Design, and Develop.

RESULTS AND DISCUSSION

Research and development of TPACK-based learning materials, including Lesson Plans (RPP) and literacy skills. The define stage is the initial research stage. At this stage, an initial study is conducted, which involves interviewing students. Most English language learning still emphasizes cognitive problem-solving, resulting in underdeveloped reading literacy among students.

The use of technology in implementing the TPACK framework will simultaneously enhance three literacies: (1) data literacy, even big data, where students must be able to read, analyze, and use data widely available in the digital world according to their needs; (2) technology literacy, where students must be able to understand how machines work and use technology applications such as ClassPoint, Squeezze, etc.; and (3) human literacy, where technology users must still be able to operate as humans and continue to communicate with those around them.

Analysis of the Effectiveness of TPACK Integration in English Literacy Learning.

This analysis aims to determine the effectiveness of TPACK-based literacy learning in improving literacy skills and understanding. The instrument used was an effectiveness questionnaire consisting of 20 question items covering several aspects, namely lesson opening skills, mastery and enthusiasm for the subject matter, utilization of learning media, learning strategies, classroom management, communication, time efficiency, positive teacher attitude during learning, and flexibility in learning. As for the results of the analysis of the effectiveness of TPACK-based English literacy learning:

Tabel 1. Kategori Penilaian ideal seluruh komponen

No	Rentang Skor	Nilai	Kategori
1	$\overline{X} \geq 110{,}5$	A	Sangat Baik
2	$93{,}5 < \overline{X} \leq 110{,}5$	B	Baik
3	$76{,}5 < \overline{X} \leq 93{,}5$	C	Cukup
4	$59{,}5 < \overline{X} \leq 76{,}5$	D	Kurang
5	$X \leq 59{,}5$	E	Sangat Kurang

Analysis

The Analysis stage is carried out observation to collect the data, analyze the needs of students and the lecturers in learning stage. At this stage, the strength and the weakness of the implementation of TpackBased Learning Media. Need analysis data was obtained from Universitas Muslim Nusantara Al

Washliyah. The research results show that the development of TPACK-based learning materials is quite effective in improving literacy skills, with a score of 121. This means the observer interpreted this as a good category with an A grade, and the percentage is 89%.

According to preliminary results, students who used TPACK-based media showed improved skills in assessing online content, recognising reliable sources, and participating in group digital projects. Meaningful learning experiences were facilitated by the combination of interactive technological tools and pedagogical practices like inquiry-based learning.

Teachers stated that the media supported students' critical use of digital resources and matched curriculum goals. This implies that the TPACK framework serves as a useful basis for creating media that enhances digital literacy in real-world educational settings.

Additionally, the study emphasises how crucial it is for teachers to receive TPACK competency training. Teachers may find it difficult to use such media effectively if they lack the necessary pedagogical and technological expertise. As a result, professional development needs to be prioritised in addition to mastering media design.

Table 2. The Learning Device Framework is Presented as follows:

No	Learning Stage	Activities		Literacy Skills
		Lecturer	Students	
1	Simulation	The Lecturer present Narrative text using video animation	Students observe the animation and video phenomena presented	Identify phenomena/problems for further investigation.
2	Identification of Problems	The Lecturer direct students to answer the questions given.	Students identify problems presented by the lecturer in the form of questions.	Identifying to find scientific information.
3	Data Collection	The lecturer directs students to complete the test using the worksheet provided. The lecturer also guides students in seeking additional information from other sources, such as books or journals.	Collaborate to conduct experiments and write narrative texts. Work in groups to design, create, and write paragraphs about narrative texts. Students seek information and additional information from other sources.	Using Scientific Evidence
4	Data Processing	The lecturer discusses the results of the experiment and provides conceptual reinforcement to prevent misconceptions among students.	Students answer questions on the worksheet and fill in the test result data. Students explain the meaning of Narrative Text based on animation/video Students explain narrative text based on test result and animation/ video provided by the teacher.	Explaining Scientific Phenomena
5	Proofing	The lecturer presents graphics and animations about the fable material. The lecturer guides students in conducting proofs	Students connect the phenomena of Narrative text and fable.	Using Scientific Evidence

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		to increase their understanding of the material presented		
6	Drawing Conclusion	The lecturer provides explanations and directs students	Student conclude the concept of narrative text and the genre parts in narrative text.	Explaining Scientific phenomena.

CONCLUSION

This study presents important finding that the impact TPACK levels on students digital literacy and students competence. The result of the study shows that TPACK levels influence students ability, The research results show that the development of TPACK-based learning materials is quite effective in improving literacy skills, with a score of 121. This means the observer interpreted this as a good category with an A grade, and the percentage is 89%.

The result provide compelling evidence that Design of TPACK Based Learning Media in Strengthening Digital Literacy will help students build 21st-century capabilities while also improving teachers' pedagogical competencies. Consequently, educational designs that incorporate both TPACK and digital literacy require greater attention from teacher education programs. These methods are crucial for preparing aspiring educators to handle the demands of contemporary education. Setting technology integration as a top priority in teacher education programs and educational policy will help to. the results of this study provide a significant contribution to the literature by emphasising the value of digital literacy and TPACK in fostering pre-service teachers' pedagogical competences and helping them acquire 21st-century skills.

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