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Transforming Education in the Age of Society 5.0: Exploring the Relationship Between Technological Pedagogical Knowledge and Adaptation Skills in Designing Learning

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Abstrak

Kata Kunci:

TPACK;
Keterampilan
Adaptasi; Merancang
Pembelajaran

Integrasi pengetahuan konten pedagogis teknologi (TPACK) dan keterampilan adaptasi adalah krusial dalam merancang pembelajaran yang responsif di era Society 5.0. Kehadiran teknologi mengubah lanskap pembelajaran, memerlukan pemahaman mendalam tentang konten dan kemampuan adaptasi untuk menghadapi perubahan. Tujuan penelitian adalah untuk mengidentifikasi dan menganalisis hubungan antara pengetahuan konten pedagogis, keterampilan adaptasi, dan kemampuan merancang pembelajaran. Metode penelitian yang digunakan adalah tinjauan literatur untuk menyelidiki temuan terkait dari penelitian sebelumnya. Hasil penelitian menunjukkan adanya korelasi positif yang signifikan antara pengetahuan konten pedagogis dan kemampuan merancang pembelajaran, serta antara keterampilan adaptasi dan kemampuan merancang pembelajaran. Selain itu, ditemukan pula bahwa pengetahuan konten pedagogis tentang teknologi dan keterampilan adaptasi memiliki pengaruh yang kuat terhadap kemampuan merancang pembelajaran yang adaptif dan responsif terhadap perkembangan masyarakat. Temuan ini menyoroti pentingnya integrasi pengetahuan pedagogis tradisional dengan pemahaman teknologi dan keterampilan adaptasi dalam konteks merancang pembelajaran yang relevan dengan tuntutan era Society 5.0.

Abstract

Keywords: TPACK;
Adaptation Skills;
Designing Learning

The integration of technological pedagogical content knowledge (TPACK) and adaptation skills is crucial in designing responsive learning in the Society 5.0 era. The presence of technology is changing the learning landscape, requiring a deep understanding of content and adaptability to face change. The aim of the research is to identify and analyze the relationship between pedagogical content knowledge, adaptation skills, and learning design abilities. The research method used is a literature review to investigate related findings from previous research. The research results show a significant positive correlation between pedagogical content knowledge and the ability to design learning, as well as between adaptation skills and the ability to design learning. In addition, it was also found that pedagogical content knowledge about technology and adaptation skills have a strong influence on the ability to design learning that is adaptive and responsive to societal developments. These findings highlight the importance of integrating traditional pedagogical knowledge with technological understanding and adaptation skills in the context of designing learning that is relevant to the demands of the Society 5.0 era.

INTRODUCTION

Education is an important factor for a country to develop reliable and quality human resource capabilities so that the country can compete with other countries. Without good education, a country will not be able to compete with other countries that have developed education systems.

Education is the most important indicator of a country's progress (Asvio et al, 2019). Education is a conscious effort to build quality human resources to compete (Tobari et al, 2018). Quality human resources are more important than the wealth of natural resources,

because the wealth of natural resources cannot guarantee the welfare and success of a nation (Asvio et al, 2019).

Indonesia still has a low quality of education and cannot compete with developed countries so that the quality of Indonesian human resources is still unable to compete with human resources from other countries.

In Law Number 14 of 2005 concerning Teachers and Lecturers in article 1, among others, it is said that teachers are professional educators with the main task of educating, teaching, guiding, directing, training, assessing, and evaluating students in early childhood education through formal education, primary education, and

secondary education in accordance with laws and regulations. It is clear that the role of a teacher in the world of education is very urgent. It can be said that teachers are the leading banner who will face students directly with various problems.

No matter how rapid technological progress is in this information age, the role of teachers has not been replaced. Teachers still have a leading role in the world of Education. The increasing demands on the world of education cause demands on teacher professionalism to also increase. The community really expects the figure of a professional teacher for students. The professionalism of teachers in the educational process has a very strategic role in guiding students towards maturity, maturity towards independence.

As a professional, the teacher's job is not only to teach, deliver subject matter in accordance with his responsibilities, but also as an educator. As an educator, the teacher's task is related to the formation of attitudes and behaviors of students to form individuals with character both as individuals and as members of society, nation, state, and religion. From the description above, we can conclude that teachers are one of the factors that affect the quality of education.

In the hands of professional teachers, programs in education can be more easily achieved. For this reason, a mechanism and effort are needed that allow schools to find out the

performance of teachers who devote themselves to a work unit. Teacher performance itself is defined as the level of teacher success in carrying out educational tasks in accordance with their duties and authorities based on standards that have been set during a certain period in order to achieve educational goals (Barnawi, 2014).

Teacher performance is closely related to the ability to design learning that will be used in the learning and learning process. In the current era, the development of technology and information in education has developed very rapidly so that it requires teachers to change the way of learning from the old way to a renewable way that can follow developments in the era of Society 5.0 which requires teachers to use and include TPACK elements in the learning process.

Mastery of technology in the era of society 5.0 is very important for teachers, so that teachers can access various information to develop teachers' insights and abilities in implementing learning (Eliwatis et al., 2022). Technology plays an important role in improving the teaching profession where teachers must be able to adapt to various kinds of technology that have developed rapidly (Nasrullah & Sufiyanto, 2023). Technology in education can be used to manage or implement systematic education. Technology in education is abstract as a process (Ridho et al., 2022). Improving teacher competence is an important step in responding to the demands of

technological developments and ensuring that Islamic education remains relevant and effective in this digital era.

Technological Pedagogical Content Knowledge (TPACK) is a framework that identifies the knowledge teachers need to teach effectively with a technological framework. According to Mishra, et al (2016: 2) TPACK is a framework to understand and describe the type of knowledge needed by a teacher to streamline the practice of pedagogy and concept understanding by integrating a technology in the learning environment. The basic concept of TPACK is as follows: TPACK was first introduced by Mishra and Koehler in 2006. They discussed TPACK as a teacher/designer framework for integrating technology into learning. The concept of TPACK emerging in learning technology is based on the *pedagogy content knowledge* (PCK) model pioneered by Shulman.

Besides, Knowledge of Pedagogical Content Technology that can affect the Ability to Design Learning in the Era of Society 5.0 in Teachers, another variable is Adaptation Skills. Teachers who have good adaptation skills will be quick to accept a change and strive to improve their skills in designing learning in the era of Society 5.0. According to Semuun (in Isnawati, 2014: 41), adaptability is the ability to adjust to internal needs, tensions, frustrations, conflicts. Adaptation skills are a set of skills defined as an individual's capacity to

change actions, directions, or ways to handle the completion of something to fit other circumstances. Adapting in a profession can then mean that a person can react quickly to thoughts, responsibilities, desires, patterns, strategies, and other procedures that develop in the workplace.

This study aims to determine the relationship between the Relationship between Knowledge of Pedagogical Content Technology and Adaptation Skills with the Ability to Design Learning in the Society 5.0 Era.

RESEARCH METHODS

The method used in the preparation of this paper is the library research method. The literature study method is a method that in finding reference sources or data sources uses written works as references (Bisri, 2001). This method is used in the preparation of papers because it is not based on numbers but in the form of text in the form of theories, concepts and thoughts of characters.

RESULTS AND DISCUSSION

The Relationship between Pedagogical Content Knowledge Technology and the Ability to Design Learning in the Society 5.0 Era.

The ability to design learning in the era of society 5.0 is the ability of teachers to teach using learning models that can improve students' ability to think critically and solve problems,

communication skills, creativity and innovation, and collaboration with indicators, namely 1. Able to plan learning using the methods of Inquiry Training, Inquiry Jurisprudence, Group Investigation, and Project Based Learning, 2. Carry out the learning process using the methods of *Inquiry Training, Inquiry Jurisprudence, Group Investigation, and Project Based Learning*, and 3. Conduct assessments based on students' ability to think critically and solve problems, communication skills, creativity and innovation, and collaboration.

Technological Pedagogical Content Knowledge (TPaCK) is the ability of teachers to organize learning by integrating learning strategies and technology. This is what distinguishes the depth of mastery of competence for each subject teacher. TPACK is a learning center consisting of three components, namely: technological knowledge (TK), pedagogical knowledge (PK) and content knowledge (CK) (Koehler et al., 2013). Knowledge of pedagogical content is the integration of subject expertise and skilled teaching of a particular subject. It was first developed by Lee Shulman in 1986. There are three knowledge fundamentals (content, pedagogy, and technology) forming the core of the technology, pedagogy, and content knowledge (TPACK) framework. Pedagogy involves the ability to convey knowledge and skills in a way that students can understand, remember, and apply. Knowledge of pedagogical

content as the interpretation of the teacher and the transformation of knowledge of the subject matter in the context of facilitating student learning. Technological pedagogical content knowledge is a framework for understanding and describing the types of knowledge required by a teacher for effective pedagogical practice in a technology-enhanced learning environment. The era of revolution 5.0 is a renewal that places mausia as the main component in it, not just a passive component like in revolution 4.0. The renewal in the era of revolution 5.0 produces new value by elaboration and cooperation on systems, information and technology that also improves the quality of human resources needed or human capital. The main ability in dealing with society 5.0, including the ability to solve complex problems and can be problem solving for yourself and many people. The ability to think critically, not only in class but also in community life and the surrounding environment so that social sensitivity and the ability to be creative arise. The era of revolution 5.0 can be said to be the integration of virtual and physical space, so that everything becomes easy with artificial intelligence. People need to have the readiness and ability to think *Higher Order Thinking Skills* (HOTS) to answer the global challenges of the era of society 5.0, namely to minimize the gap in the mindset and technological orientation of each society so that it can have integrity between humans and technology later. According to Joenadi

(2019), there are four design principles of the 5.0 revolution era, namely the interconnection of machines, devices, sensors, people connected and communicating with each other through *the internet of things* (IoT) or *internet of people* (IoP).

The Relationship between Adaptation Skills and the Ability to Design Learning in the Society 5.0 Era.

The success of a country in facing the industrial revolution 5.0 is also determined by the quality of educators and the components of education itself, one of which is educators. All teachers are required to master expertise, adaptability to new technologies and global challenges. In this situation, every educational institution must prepare for new authentication and literacy in the field of education. Old literacy that relies on reading, writing and mathematics must be strengthened by preparing new literacy, namely data literacy, technology and human resources. Data literacy is the ability to read, analyze and use information from data in the digital world. In facing the era of the industrial revolution 5.0, education must form a creative, innovative, and competitive generation. One way to be achieved is to optimize the use of technology as an educational tool, securing students with technology-based learning. This is expected to produce good graduates and can keep up with the times that occur. Fisk (2017)

argues "*that the new vision of learning promotes learners to learn not only skills and knowledge that are needed but also to identify the source to learn these skills and knowledge.*" In this case, education in Indonesia must improve the quality of graduates according to the world of work and the demands of the times. Education in the era of revolution 5.0 is a way where humans and technology are aligned to be able to use creative opportunities and new ideas that are creative and innovative. Society 5.0 is a society that can solve various social challenges and problems by utilizing various innovations born in the era of the industrial revolution 4.0 such as *the Internet of Things* (internet of everything), *Artificial Intelligence* (artificial intelligence), *Big Data* (large amounts of data), and robots to improve the quality of human life. Society 5.0 can also be interpreted as a concept of a human-centered and technology-based society. There have been changes in education in the 20th and 21st centuries. In 20th Century Education education focuses on children's information sourced from books. And tends to focus on local and national areas. While the era of 21st Century Education, focused on all ages, every child is in a community of learners, learning is obtained from various sources, not only from books, but biases from the internet, various technology & information platforms and curriculum developments globally, Indonesia is defined as freedom of learning. As educators in the era of society 5.0, teachers must have

digital skills and think creatively. According to Zulfikar Alimuddin, Director of Hafecs (Highly Functioning Education Consulting Services) assessed that in the era of society 5.0 (society 5.0) teachers are required to be more innovative and dynamic in teaching in the classroom (Alimuddin, 2019). Therefore, there are three things that educators must take advantage of in the era of society 5.0. including the Internet of things in the world of Education (IoT), Virtual / Augmented reality in the world of education, the use of Artificial Intelligence (AI) in the world of education to find out and identify the learning needs needed by students. Educators must also have 21st century life skills, namely leadership, digital literacy, communication, emotional intelligence, entrepreneurship, global citizenship, team working and problem solving. The focus of expertise in the field of 21st century education is currently known as the 4Cs (Risdianto, 2019) which includes creativity, critical thinking, communication and collaboration. Educators in the 5.0th century must be mobilizing teachers who prioritize students over themselves, initiative to make changes to their students, take action without prompting, continue to innovate and be partial to students. Adaptability is an important aspect in the role of a teacher. Education is in an ever-changing environment, both in terms of technology, curriculum, and student needs. A teacher must be able to adapt quickly and be responsive to these

changes. Adaptive teachers can easily adapt their teaching methods according to the learning style of students. They don't hesitate to try new approaches or more effective learning aids. The combination of growth mindset and adaptability makes a teacher able to create a dynamic and relevant learning environment.

The Relationship between Pedagogical Content Knowledge, Technology and Adaptation Skills with the Ability to Design Learning in the Society 5.0 Era.

The era of society 5.0 is the development of the industrial revolution 4.0, where the industrial revolution 4.0 focuses on using artificial intelligence, large amounts of data (*big data*), and robots to improve the quality of human life while society 5.0 focuses on using technological and humanitarian components. Of course, in facing the era of society 5.0, the world of education has an important role in improving the quality of superior human resources and character. Talking about education in the era of society 5.0, of course, is related to changes in the learning system in that era. The era of revolution is closely related to the skills of the 21st century which is related to rapidly developing technological advances. Therefore, educators in the era of society 5.0 must have 21st century skills known as the 6Cs, namely character, citizenship, critical *thinking*, creativity, collaboration, and communication). One of the characteristics of the

implementation of 6C skills in learning in the 21st century is the emergence of humanist aspects in education, such as education and curricula that are centered on values and character, no longer only focusing on mastering subject matter. Meanwhile, in the 21st century, students are expected to have competencies called the ability of six basic literacy, namely literacy, numeracy, science, digital, finance, and culture and citizenship. However, in the era of society 5.0 that will be faced later, not only six basic literacy are needed, but also have other competencies, namely being able to think critically, reasoning, creative, communicative, collaborative, have problem solving abilities, and have characters that reflect Pancasila. In addition, learning activities in the era of society 5.0 do not only focus on one source such as books, but can receive information from various kinds of technology and information platforms such as the internet and social media. Therefore, the role of education and learning is very important in the era of society 5.0 with the aim of improving the quality of a superior generation with character. Currently, many information technologies have provided solutions to users and the freedom to choose how to overcome problems optimally, and this method is a step that should be followed because it will optimize the cost, resources, and use of technology. The era of the industrial revolution 5.0 has brought changes in the world of education. The change is not only the way teachers provide learning to

students, it will be a change in the education system. *Pedagogical Content Knowledge* Technology (TPACK) is a framework that identifies knowledge, teachers need to teach effectively with a technology framework.

The basic concept of TPACK is as follows: TPACK was first introduced by Mishra and Koehler in 2006. They discussed TPACK as a teacher/designer framework for integrating ICT in learning. The concept of TPACK emerging in learning technology is based on the *pedagogy content knowledge* (PCK) model pioneered by Shulman. *Technology Pedagogy Content Knowledge* (TPACK) summarizes a series of learning in which the ability to master technology in an integrated manner that cannot be separated from each other from its constituent components (C), (P) and (K). TPACK requires multi-interaction and combination between components, namely subject matter, pedagogy and technology that is unique and synergistic based on ICT. TPACK has advantages over the previous concept, namely PCK. Among them are in compiling instructional design, compiling learning instructions, learning models and strategies, assessment systems and in designing curriculum. The determining factor is TPACK, all these components are integrated with ICT. Thus, TPACK contributes greatly to the change and paradigm of learning. According to Mishra and Koehler, the concept of integration is the involvement of various

domains/components of material and pedagogy that can support teachers in technology-based learning. The assumption that the structure of knowledge is closely related to the declarative of students knowing what is learned, the procedure how to know it schematic students relate between declarative and procedure i.e. what is learned and how to learn it and the strategy of knowledge about when, dimana and how the domain is specifically related to the learning objectives. In the ever-evolving world of education, a productive teacher must have more than just teaching ability. They must have a growth mindset that allows them to continue to develop and innovate in their teaching. Adaptability is also a key factor in dealing with inevitable changes in the educational environment. Therefore, being a productive teacher is not just about giving lessons, but also about a positive mental attitude and flexibility ability in the face of challenges. The combination of growth mindset and adaptability can form teachers who are not only effective, but also inspiring in helping students reach their full potential.

According to Rivai and Murni (2010) said that the ability to adapt to new technology and adaptation to teacher innovation has a role as a determinant of teacher success related to teacher confidence in the ability to organize and sustain the learning needed to successfully complete specific and meticulous teaching tasks. According to Schneiders, self-adaptation is a mental

and behavioral response to successfully overcome one's needs. Self-adaptability plays a very strong role in all activities carried out by teachers.

CONCLUSION

In the context of Society 5.0, the conclusion of the study shows that pedagogical content knowledge about technology and adaptation skills have a crucial role in the ability to design responsive and effective learning. Strong integration between pedagogical content knowledge and understanding of technology allows the use of relevant and innovative learning tools. Meanwhile, adaptation skills allow educators to adjust to rapid and dynamic changes in the learning environment. The combination of these two factors allows learning design that is adaptive to the development of modern society. In an era where technology is increasingly becoming an integral part of everyday life, pedagogical knowledge of technology is becoming an important foundation to ensure relevant and continuous learning. In addition, adaptation skills are essential abilities to face challenges and opportunities that continue to grow amid the dynamics of Society 5.0. Therefore, a deep understanding of the relationship between technological pedagogical content knowledge and adaptation skills with the ability to design learning becomes key in preparing educators for the future of sustainable education.

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