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UNDERSTANDING OF TPACK CANDIDATES FOR TEACHER TRAINING AND EDUCATION FACULTY OF UNIVERSITAS MUHAMMADIYAH TANGERANG

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Abstract:

This study aims to determine the understanding of TPACK candidates for FKIP UMT teachers. This study uses a quantitative approach with survey research methods. Instrument to collect data using questionnaires distributed online using google form to students of five study programs at FKIP UMT, namely PGPAUD, PGSD, Indonesian Language, English and Mathematics. Based on the results of the study, this is indicated by the highest level of understanding on 60% and 58.9% practical teaching indicators on subject content and tends to be lower on other indicators. The conclusion of this study is that prospective teachers of FKIP UMT have a tendency to understand the TPACK.

Keyword: *understanding TPACK, prospective teacher, learning*

INTRODUCTION

Changes in increasingly advanced technology that have an impact on alllife, almost everyone, both children, adults to parents from various backgrounds use technological tools for various need. Current education and learning cannot be separated from technology. The integration between technology and learning is increasingly high and is a feature of change in the era of disruptive 4.0 (Education & Industry, 2018). Teacher candidates at FKIP UMT are expected to have an understanding to use technology in the learning process. The demand for qualifications of prospective teachers in FKIP UMT to use technology with their pendagogi knowledge in the learning and learning process is increasing. The high use of teacher technology tools is not necessarily directly proportional to the use of technology in teacher learning in the classroom (Koh & Chai, 2014), this occurs because of the integration of technology in learning, not only concerning understanding of technology, understanding pedagogy but understanding integrating technological knowledge by teacher candidates with teacher pedagogy knowledge in the learning process. Technology-oriented models target teacher acquisition of the knowledge and skills needed to use technology, while

pedagogical-oriented models target the integration of technology use by teachers with their pedagogical knowledge in the teaching process. Pedagogically oriented models that focus on technology integration with education are models of pedagogical technology knowledge (TPACK) (Ay, Karadaı, & Acat, 2015). TPACK was first proposed by Mishra and Koehler (2006) to describe the integrated relationship between content knowledge, pedagogical knowledge, and technological knowledge to help the potential integration of ICT tools in classroom settings and school practices (Ay et al., 2015). This model is a model that is widely used in seeing the complexity of the relationships between students, teachers, content, technology, practice, and tools. This understanding is very important to face learning in the era disruptive so that prospective teachers can learn by integrating technology according to the needs of each student and facing changes that occur quickly.
An understanding of TPACK is important because theunderstanding of TPACK will provide an overview of the prospective teacher's understanding of content (material that varies according to class level and discipline) using a pedagogical approach (model, and learning strategy) involving the use of technology and understanding of student relationships , teachers, content, technology, practice, and tools so that prospective teachers can carry out learning according to this disruptive era

LITERATURE STUDY

The bloom

taxonomy of Bloom's Taxonomy for educational purposes (Bloom 1956). This was later expanded by Anderson and Krathwohl (2001). Bloom's taxonomy is divided into three aspects: cognitive (knowing, understanding, application, analysis, synthesis and evaluation), affective (accepting, responding, evaluating, regulating and characterizing) and psychomotor. In terms of the six cognitive goals, this is deliberately seen as a representation of high-level thinking, from knowledge to evaluation. Anderson and Krathwohl (2001) revised categorization and included 'create' as the highest level educational goals (Editors & Spector, nd) (Anderson & Krathwohl, 2001)

TPACK (Technological Pedagogical Content Knowledge)

TPACK framework was built on Shulman's (1986) knowledge of pedagogy that can be applied to the teaching of certain content, and has been used to describe complete technology. The TPACK conceptual framework is used to describe instructional ideas about how teachers integrate technology into their pedagogy and have been adopted as a theoretical basis for structuring ICT curricula in teacher education programs (Chai et al., 2011; Jimoyiannis, 2010). TPACK was first proposed by Mishra and Koehler (2006) to describe the integrated relationship between content knowledge, pedagogical knowledge, and technological knowledge to help the potential integration of ICT tools in classroom settings and school practice, and it is most often represented in Venn diagram images with three overlapping knowledge circles (see Figure 1). TPACK diagrams cover three core categories of knowledge including knowledge of teaching and learning processes and methods called pedagogical knowledge (PK), knowledge of actual subject matter that must be learned or taught called content knowledge (CK), and knowledge of standard technology and the skills needed to operate a particular technology called technology knowledge (TK). The framework of Mishra and Koehler (2006) also proposes that combining these three types of core knowledge produces four additional types of knowledge including knowledge of certain teaching practices that precisely correspond to the nature of certain subject content called pedagogical content knowledge (PCK), knowledge of existence, components, and standard technology capabilities that can be used appropriately to specifically support teaching and learning processes and practices or methods called knowledge pedagogy

technology (TPK), knowledge of ways that actual knowledge of matter can be manipulated into appropriate representations by the application of technology standards called knowledge content technology (TCK), and knowledge of the way transactional relationships between knowledge about content (C), pedagogy (P), and technology (T) are dynamic for developing appropriate strategies, contextual specifics, and representations for for better learning from content knowledge called knowledge pedagogical technology (TPACK). (Srisawasdi, 2012) (Ay et al., 2015)

Knowledge content pedagogy technology (TPCK) (Koehler and Mishra, 2008) - is renamed TPACK for easy remembering. This refers to an integrated description of three types of knowledge: technology, pedagogy, and content, and is expected to accommodate educational demands in the digital age (Thompson and Maraya, 2007) (Tai, Pan, & Lee, 2015). TPACK is a blend of technology, pedagogical knowledge and content knowledge (Maloy, Robert., Ellen, Ruth., Edwards, Sharon., 2017). Describing ways to teach abilities in the 21st century can be taught through technology.

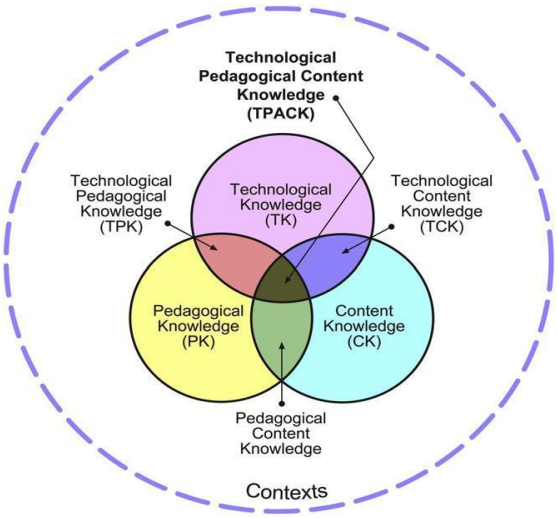
1) Technological knowledge contains ways to use various types of technology for learning, starting from books, manipulating, and writing boards connected to computers, internet based web 2.0
2) Pedagogical knowledge contains all the information the teacher knows about teaching methods, instructional design, curriculum development, and on how to think and learn
3) Content knowledge contains important learning where the teacher must teach this to students in the basic or advanced classes

To be a successful leader in school, teachers must combine 3 forms of knowledge to make different learning and student needs.

1) Academic content is combined with technology to produce technological knowledge content that shows how teachers use technology to deliver content (content) to students
2) Pedagogic knowledge combined with knowledge and academic content produces pedagogic knowledge content where the teacher where the teacher understands uses various pedagogical methods in learning to make students involved / bound
3) The combination of content, pedagogical and technological forms results in the content of pedagogical technology knowledge where teachers can effectively teach content using 21st century technology tools

In more detail the Koehler and Mishra TPACK defines TPACK as connections and interactions between knowledge content (subject matter taught), knowledge of technology (computers, the Internet, digital videos, etc.), pedagogical knowledge (practices, processes, strategies, procedures and methods of teaching and learning), and transformations that occur at that time combining these domains: "Good teaching does not only add technology to the teaching and content domain that exists. In contrast, the introduction of technology leads to representation of new concepts and requires the development of sensitivity to dynamic things, transactional relations between the three components suggested by the TPACK framework "(p. 134). (Archambault & Barnett, 2010)

The TPACK framework considers three different and interrelated fields of teaching, as represented by Figure. 1.



Picture. 1. Graphical representation of the knowledge of pedagogical technology content (TPACK).
Source: LM Archambault, JH Barnett / Computers & Education 55 (2010) 1656–1662

The TPACK-Practical model (see Figure 2) consists of eight dimensions of knowledge from five pedagogical fields. This pedagogical field includes: (i) learners, (ii) subject content, (iii) curriculum design, (iv) practical teaching, and (v) assessment. The dimensions of knowledge included in this area are as follows: (i) using ICT to understand students, (ii) using ICTs to understand the contents of the subject, (iii) planning curriculum that is planted by ICTs, (iv) using ICT representations, (v) using teaching strategies that are integrated with ICT, applying ICT for learning management, (vii) instilling ICT into the context of teaching, and (viii) using ICT to assess students (Yeh et al., 2013). (Ay et al., 2015)

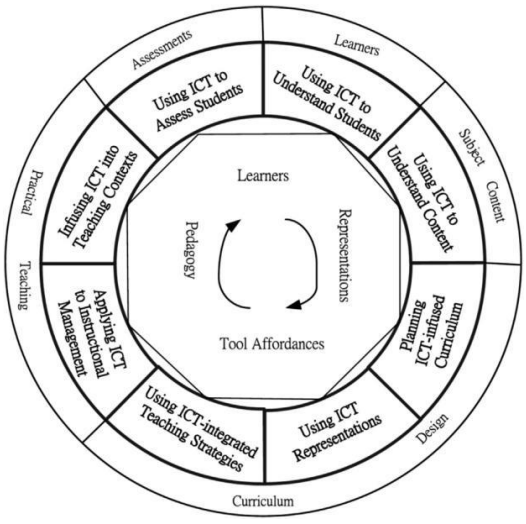


Figure 2. The TPACK-Practical model framework.
Source: Y. Ay et al. / Computers & Education 88 (2015) 97e108 100

RESEARCH METHODS

This study uses a quantitative approach with survey research methods. Instrument for collecting data using a questionnaire. Respondents in this study were students from each study

program at FKIP UMT namely English, mathematics, Indonesian language, PGSD and PAUD study programs. The total respondents were 219 respondents. The analysis carried out using descriptive analysis.

RESEARCH RESULT

This study aims to describe students' understanding of the integration of student technology knowledge with pedagogical knowledge in the learning process. Based on the results of the study, it can be concluded that prospective teachers of FKIP UMT have a tendency to understand the TPACK. This is indicated by the highest level of understanding on practical teaching indicators 60% and 58.9% in subject content and tends to be lower on other indicators.

In more detail from these five pedagogical indicators include: (i) learners, (ii) subject content, (iii) curriculum design, (iv) practical teaching, and (v) assessment. Indicators that have the highest level of understanding are practical teaching indicators which show that students have skills such as using ICT in learning management and facilitating learning achievement. The use of ICTs to facilitate achieving the objectives of lectures reaches 60%. The second highest level of understanding is subject content, which shows that students have acquired skills such as using ICT to study lecture content. The use of ICTs to facilitate understanding the content of lectures reaches 58.9%. The highest level of understanding is the learner, namely students have acquired skills such as self-identification, identifying and resolving their own difficulties in the learning process. Understanding using ICT to solve learning difficulties reaches 51.6%. The fourth highest level of understanding is the assessment that students have acquired skills such as using ICT technology to assess learning. The use of ICTs to assess learning progress reaches 45.4%. The fifth highest level of understanding is curriculum design, namely students have acquired skills such as planning curricula that are integrated with ICTs, using ICT design and teaching strategies integrated with ICT reaching 33.1%.

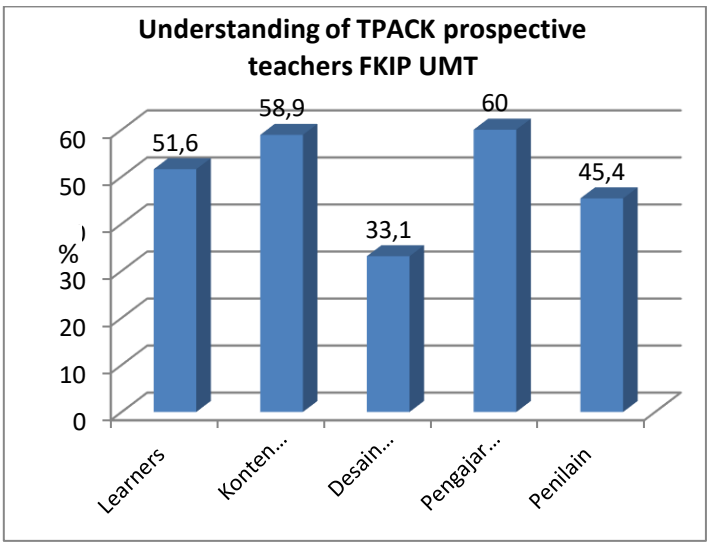


Figure 1 Understanding of TPACK for prospective FKIP UMT teachers

The findings in this study are the understanding of TPACK candidates for FKIP UMT teachers can be concluded in sufficient categories for 2 indicators, namely practical teaching indicators and subject content. For the other three indicators, they tend to be low.

The use of technology such as mobile phones and computers connected to the internet did not automatically make students understand the integration of TPACK in the learning

process. This can be caused because the use of technology is not used for the learning process, students tend to use technology only for basic and practical purposes, such as typing and searching. This is reinforced by another study that states that students use technology in their daily activities, but students may not be familiar with or use technology to learn (Waycott et al., 2010). Students may use more technology for social or entertainment purposes but not for learning (Prior et al., 2016). Gurung and Rutledge (2014) share the view that digital learners need help on how to use technology effectively for learning. Ng (2012) argues that students may not know how to use technology to study. However, they already have a certain level of digital literacy, they must be able to learn to use technology to learn easily (Tang & Chaw, 2015). Other research shows that students use mobile devices (cellphones and tablets) to access online learning materials. In general, most students do not have basic knowledge in using information technology for study purposes (Gulateee, Pagram, & Combes, 2018).

In order to use technology effectively for learning, one needs to have a certain level of digital literacy. Digital literacy for learning is more than just knowing how to operate technology, but also having the right information management and critical thinking skills, as well as appropriate online behavior (Tang & Chaw, 2015). According to the National Council of Teacher of English The ability that must be possessed by students in the future, called 21st century literacies (2007, 2008b) or also called technology-based literacy (Maloy, Robert., Ellen, Ruth., Edwards, Sharon., 2017) Technology-based literacy is the ability to use technological tools, the ability to build relationships and solve problems collaboratively, the ability to design and share information, the ability to analyze and evaluate information from various sources and the ability to understand information in the right way (Hoffmann, 2014).

Based on the explanation above, technology-based literacy capabilities are needed, not only in using but also in integrating these technologies in the learning process so that technology can be used not only to help students communicate and interact but also help students in the learning process.

CONCLUSION

The level of understanding of TPACK for prospective FKIP teachers can be concluded in sufficient categories. The use of gadgets by prospective teachers in their daily lives is not directly proportional to the understanding of prospective FKIP teachers in using and integrating technology in the learning process. To improve the understanding and ability of teachers to integrate technology in the learning process, a special training is needed to integrate technology in learning

REFERENCE

Anderson, L. W., & Krathwohl, D. R. E. AL. (2001). The Revised Taxonomy Structure. In L. W. Anderson & D. R. Krathwohl (Eds.), *A Taxonomy for Learning, Teaching, and Assesing; A Revision of Bloom's Taxonomy of Educational Objectives* (Abridged E, p. 25). New York: Addison Wesley Longman, Inc.

Archambault, L. M., & Barnett, J. H. (2010). Revisiting technological pedagogical content knowledge: Exploring the TPACK framework. *Computers and Education*, *55*(4), 1656–1662. https://doi.org/10.1016/j.compedu.2010.07.009

Ay, Y., Karadaı, E., & Acat, M. B. (2015). The Technological Pedagogical Content Knowledge-practical (TPACK-Practical) model: Examination of its validity in the Turkish culture via structural equation modeling. *Computers and Education*, *88*, 97–108. https://doi.org/10.1016/j.compedu.2015.04.017

Editors, S., & Spector, J. M. (n.d.). Explorations in the Learning Sciences, Instructional Systems and Performance Technologies Volume 4. Retrieved from http://www.springer.com/series/8640

Gulateee, Y., Pagram, J., & Combes, B. (2018). Which Tech Will I Use? Trends in Students' Use and Ownership of Technology in a Thai University, an Ongoing Study. *Journal of ICT Research and Applications*, *12*(2), 138. https://doi.org/10.5614/itbj.ict.res.appl.2018.12.2.3

Hoffmann, B. (2014). Computer as a Threat or an Opportunity for Development of Children. *Procedia - Social and Behavioral Sciences*, *146*, 15–21. https://doi.org/https://doi.org/10.1016/j.sbspro.2014.08.080

Koh, J. H. L., & Chai, C. S. (2014). Teacher clusters and their perceptions of technological pedagogical content knowledge (TPACK) development through ICT lesson design. *Computers and Education*, *70*, 222–232. https://doi.org/10.1016/j.compedu.2013.08.017

Maloy, Robert., Ellen, Ruth., Edwards, Sharon., W. B. (2017). Becoming a 21st Century Teacher. In *Transforming Learning with New Technologies* (p. 15).

Pendidikan, M. G., & Industri, R. (2018). *Kebijakan Kemenristekdikti Lingkungan Baru - Era Global & RI 4 . 0 - Memerlukan Kebijakan Pendidikan Tinggi Yang Berbeda*.

Srisawasdi, N. (2012). The Role of TPACK in Physics Classroom: Case Studies of Preservice Physics Teachers. *Procedia - Social and Behavioral Sciences*, *46*, 3235–3243. https://doi.org/10.1016/j.sbspro.2012.06.043

Tai, H. C., Pan, M. Y., & Lee, B. O. (2015). Applying Technological Pedagogical and Content Knowledge (TPACK) model to develop an online English writing course for nursing students. *Nurse Education Today*, *35*(6), 782–788. https://doi.org/10.1016/j.nedt.2015.02.016

Tang, C. M., & Chaw, L. Y. (2015). Digital Literacy: A Prerequisite for Effective Learning in a Blended Learning Environment? *14th European Conference on E-Learning, ECEL 2015*, *14*(1), 601–610. Retrieved from https://www.scopus.com/inward/record.uri?eid=2-s2.0-84977151316&partnerID=40&md5=8b12c83ab9607a55596b8c0a050fa6bf

W. Maloy, Robert., Ellen, Ruth., Edward, S. (2017). *Transforming Learning with New Technologies* (Third edit). Pearson.