Undergraduate Physical Education Students' Technological Pedagogical Content Knowledge

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Abstrak. Physical education program in colleges must prepare students to be future physical education teachers who have knowledge of relevant technology integration, pedagogical skills, and discipline-specific knowledge in order to enhance students learning. The purpose of this study was to identify the Technological Pedagogical Content Knowledge (TPACK) competence of undergraduate physical education students. The research design used in this study is a survey. The research participants are 120 undergraduate students studying physical education in Makassar city. The participants were selected by purposive sampling technique. The data of students' TPACK were collected by using TPACK questionnaire. The study results showed that students' TPACK competence were high. The results of the study also revealed that there was no significant difference between male and female students even though the scores of female students were higher than the scores of male students. In addition, there was no significant difference between the scores of public and private university students.

Kata Kunci: Technology; Physical Education; Undergraduate Student.

INTRODUCTION

Today's teachers are required to have knowledge of the material being taught and how to teach it (Tsuda, et al., 2019). In addition, the latest developments in science, technology, and art in the field of education require teachers to also have knowledge of technology and its use in learning and learning. Therefore, teachers must have knowledge as well as skills in using various technology tools, both traditional and modern to facilitate learning and improve learning outcomes.

Today's learning integrates various technological devices in carrying out the entire series of interaction processes between students and teachers with learning resources in a learning environment. Technology plays an active role as a tool, process, and at the same time a source for learning and implementing learning. Thus, students and teachers must have adequate technological literacy (Kern, 2017). Moreover, future teacher candidates must ensure that they have good technology knowledge, skills and competencies, so that they can integrate technology in learning effectively and efficiently (Mishra & Koehler, 2006).

Teaching is a complex activity that involves various types of knowledge. In a global context, teacher competence has changed and developed, the pattern of teacher competency development was initially only in the form of pedagogical

knowledge, content, knowledge (PCK). PCK is an important knowledge for developing professional skills of teachers and prospective teachers. Rochintaniawati, et al., (2019) suggests that teachers must have special and unique skills in presenting knowledge that is in accordance with the interests and abilities of students. The development of information and communication technology has had a major influence on the world of education so that aspects of PCK are added to other aspects that are able to integrate technology into teaching and learning in the classroom. So that the addition of technological elements into PCK is known as tecnological pedagogical and content knowledge (TPACK).

Teaching activities are based on knowledge about the material to be taught (content knowledge), how to teach a material (pedagogical knowledge), and knowledge about the use of various technologies (technological knowledge) which all three have an intersection to be able to support one another (Mishra and Koehler, 2008). The old theory which states that teaching requires knowledge of content and pedagogy as well as knowledge resulting from the intersection of the two, namely pedagogical content knowledge (Shulman, 1986) is no longer relevant to be applied in the 21st century learning era.

Teaching activities are the main activities carried out by a physical education teacher. Through these activities, physical education teachers will deal with students in teaching and learning interactions. Therefore, teachers must show their best performance, minimize all shortcomings and take advantage of all their strengths to be able to mingle with students in order to create an effective learning process. This teaching activity will shape the personality of a teacher (Muhson, 2004).

Universities' efforts in producing qualified teacher candidates are to provide educational science lectures which are ultimately implemented through direct teaching practice activities to schools. However, there is no comprehensive data on the TPACK level of prospective students for physical education teachers. This data is important considering that TPACK can be used as an evaluation material for the success of higher education institutions in educating prospective students for physical education teachers.

METHOD

The research design used in this study is a survey. The research participants are 120 students studying at physical education department in two universities in Makassar. The participants are divided into 89 male students and 31 female students and they were selected by purposive sampling technique. The research samples in this study are students who are already in their last year of study in the Department of Physical Education. To see the difference in TPACK based on the place of study, the research sample was taken from two universities in the city of Makassar which organize physical education programs. The instrument used in this study is the TPACK questionnaire in physical education developed by Semiz and Ince (2012). The data

were analyzed descriptively by revealing a description of the student's TPACK conditions and analyzing the dimensions in the TPACK which were divided into five dimensions, namely Technology Knowledge (TK), Content Knowledge (CK), Pedagogical Knowledge (PK) and Pedagogical Content Knowledge (PCK), Technological Content Knowledge (TCK) and Technological Pedagogical Knowledge (TPK), and Technology Pedagogy and Content Knowledge (TPCK). The data are also analyzed for differences based on gender and campus status which are divided into public university and private university.

RESULT AND DISCUSSION

Result

The data obtained in this study is a questionnaire score which shows, the greater the score obtained, the higher the level of students' TPACK competence. From the results of descriptive analysis, the category for the average value of the entire research sample is in the high category with an average value of 58.27. Furthermore, the student TPACK data is categorized based on the TPACK dimensions.

Tabel 1. Undergraduate Students' Technological Pedagogical Content Knowledge Levels

Dimensions	Mean	St. Dev.	Category
Technology Knowledge (TK)	11.38	2.193	High
Content Knowledge (CK)	12.08	2.255	Very high
Pedagogical Knowledge (PK) and Pedagogical Content Knowledge (PCK)	11.89	2.530	High
Technological Content Knowledge (TCK) and Technological Pedagogical Knowledge (TPK)	11.67	2.485	High
Technology Pedagogy and Content Knowledge (TPCK)	11.38	2.651	High

From table 1, it can be seen that only on the Content Knowledge (CK) dimension, student scores are in the very high category, while for other dimensions the student score category is in the high category.

The research data were also analyzed by gender. The results of the analysis shown in table 2 show that although the TPACK score of female students is greater than that of male students, there is no significant difference between the scores of the two.

Tabel 2. Undergraduate Students' Technological Pedagogical Content Knowledge Based on Gender

	Gender	Mean	St. Dev.	Category	p
TPACK	Male	57.67	10.615	High	.232
	Female	60.48	11.313	High	

Student TPACK score data was also analyzed based on university status which was divided into public and private university. The results of the analysis shown in table 3 show that although the TPACK score of private university students is greater than that of public university students, there is no significant difference between the two scores.

Tabel 3. Undergraduate Students' Technological Pedagogical Content Knowledge Based on University

	College Status	Mean	St. Dev.	Category	p
TPACK	Public	57.04	5.443	High	.182
	Private	59.52	13.691	High	

Discussion

This study reveals the TPACK competencies of undergraduate students majoring in physical education at university. The results showed that in general the average value of the students' TPACK competence was in the high category. Students have obtained information and computer technology courses related to the use of technology in learning. Students with knowledge of information technology and computers will be able to easily implement various kinds of technology into learning media in physical education. In addition, students who have high TPACK competence will be accustomed to developing their knowledge in the field of learning technology (Koyuncuoglu, 2021).

The results also revealed that there was no significant difference in students' TPACK scores based on gender. This result is in line with previous research which found similar result (Koh and Chai, 2011; Redmond and Peled, 2019). Although several other studies found significant differences (Baturay, et al., 2017; Jang and Tsai, 2013). This means that there are inconsistencies in the literature regarding differences in TPACK competencies by gender.

The results of data analysis also showed that there was no significant difference between the TPACK scores of students at public and private university. As it is known in this study that public university have better learning technology facilities compared to private campuses. This difference can lead to differences in students' TPACK (Wang and Zhao, 2021). However, this study shows the opposite result. This can be caused by

the competence of teachers at private university who are able to transform learning technology knowledge well to students because teachers who provide effective learning can increase students' TPACK competencies (Siddiq, et al. 2016).

CONCLUSIONS AND SUGGESTIONS

Based on the results of data analysis and discussion, it was found that the TPACK competency level of undergraduate students majoring in physical education was in the high category. There was no significant difference between students' TPACK scores based on gender. In addition, there was also no significant difference in TPACK scores between students studying at private university and public university.

This study reveals conditions that have rarely been studied about the real condition of the TPACK competence of undergraduate students majoring in physical education at universities. This research is still limited to the survey method with a limited scope of participants. It is recommended that further research be conducted that uncovers TPACK at a wider level and analyzes the factors that can influence the development of TPACK.

REFFERENCE

Tsuda, E., Wyant, J., Sato, T., & Haegele, J. A. (2019). Pre-Service Physical Education Teachers' Practicum Experiences Teaching PreK Children Pre-Service Physical Education Teachers' Practicum. International Journal of Kinesiology in Higher Education, 0(00), 1–13.

Kern, B. D., & Graber, K. C. (2017). Physical Education Teacher Change: Initial Validation of the Teacher Change Questionnaire- Physical Education Physical Education Teacher Change: Initial Validation of the Teacher Change. Measurement in Physical Education and Exercise Science, 00(00), 1–13.

Mishra, P. & Koehler, M.J. (2006). Technological pedagogical content knowledge: A framework for integrating technology in teacher knowledge. Teachers College Record, 108(6), 1017-1054.

Rochintaniawati, D., Riandi, R., Kestianty, J., Kindy, N., & Rukayadi, Y. (2019). The analysis of biology teachers' technological pedagogical content knowledge development in lesson study in west Java Indonesia. Jurnal Pendidikan IPA Indonesia, 8(2):201-210.

Mishra, P., & Koehler, M. J. (2008). *Introducing TPCK. AACTE Committee on Innovation and Technology. The handbook of technological pedagogical content knowledge (TPCK) for educators* (pp. 3–29). Mahwah, NJ: Lawrence Erlbaum Associates.

Shulman, L. S. (1986). Those who understand: Knowledge growth in teaching. Educational researcher, 15(2), 4–14.

Muhson, A. (2004). Meningkatkan Profesionalisme Guru: Sebuah Harapan. Jurnal Ekonomi dan Pendidikan, Vol. 1(4).

Semiz, K. & Ince, M. L. (2012). Pre-service physical education teachers' technological pedagogical content knowledge, technology integration self-efficacy and instructional technology outcome expectations. Australasian Journal of Educational Technology, 28(7), 1248-1265.

Koyuncuoglu, O. (2021). An investigation of graduate students' Technological Pedagogical and Content Knowledge (TPACK). International Journal of Education in Mathematics, Science, and Technology (IJEMST), 9(2), 299-313. https://doi.org/10.46328/ijemst.1446.

Koh, J. H. L., & Chai, C. S. (2011). Modeling pre-service teachers' technological pedagogical content knowledge (TPACK) perceptions: The influence of demographic factors and TPACK constructs. Proceedings ascilite Hobart 2011 (pp. 735-746).

Redmond, P. & Peled, Y. (2019). Exploring TPACK among pre-service teachers in Australia and Israel. British Journal of Educational Technology. https://doi.org/10.1111/bjet.12707.

Baturay, M. H., Gokcearslan, S., & Sahin, S. (2017). Associations among Teachers' Attitudes towards Computer-Assisted Education and TPACK Competencies. Informatics in Education, 16(1), 1–23.

Jang, S. & Tsai, M. (2013). Exploring the TPACK of Taiwanese secondary school science teachers using a new contextualized TPACK model. Australasian Journal of Educational Technology. 29(4). https://doi.org/10.14742/ajet.282.

Siddiq, F., Scherer, R., & Tondeur, J. (2016). Teachers' emphasis on developing students' digital information and communication skills (TEDDICS): A new construct in 21st century education. Computers & Education, 92, 1–14. https://doi.org/10.1016/j.compedu.2015.10.006.

Wang, Q., & Zhao, G. (2021). ICT Self-Efficacy Mediates Most Effects of University ICT Support on Preservice Teachers' TPACK: Evidence From Three Normal Universities in China. British Journal of Educational Technology. https://doi:10.1111/bjet.13141.