

THE ANALYSIS OF TECHNOLOGICAL PEDAGOGICAL AND CONTENT KNOWLEDGE (TPACK) ECONOMICS TEACHERS

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ABSTRACT

This study aimed to describe the Technological Pedagogical and Content Knowledge (TPACK) economics teacher of Senior High Schools in Lampung Province. The method used in this research is descriptive method with data collection techniques through distributing questionnaires to economics teachers. The questionnaire consisted of 31 items and 7 subdomains. The seven subdomains are Technological Knowledge (TK), Pedagogical Knowledge (PK), Content Knowledge (CK), Technological Pedagogical Knowledge (TPK), Technological Content Knowledge (TCK), Pedagogical Content Knowledge (PCK) and Technological Pedagogical Content Knowledge (TPCK). The subjects of this study were 33 economic teachers chosen at random. Data analysis techniques using descriptive analysis. The results showed that TK economics teachers at Senior High Schools in Lampung Province included in the middle category (M = 5.37), middle PK (M = 5.62), middle CK (M = 5.43), middle TPK (M = 5.65), middle TCK (M = 5.66), middle PCK (M = 5.69) and high TPCK (M = 5.42). The overall economic teacher TPCK is middle (M = 5.54). The results show that economics teachers at Senior High School in Lampung Province can apply their technological knowledge in economic learning.

Keywords:

Technological Pedagogical Content and Knowledge, Senior High School, Economics Teacher

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INTRODUCTION

Assessment and Teaching of 21st Century Skills (ATC21S) distinguishes 21st Century skills into 4 categories namely way of thinking, way of working, tools for working, and skills for living in the world (Griffin, McGaw & Care, 2012). Way of thinking includes creativity, innovation, critical thinking, problem-solving, and decision making. Way of working includes communication skills, collaboration, and teamwork. Tools of working include awareness as local and global citizens, life and career development, and a sense of responsibility as a person and socially. Skills for living in the world is a skill-based on information literacy, mastery of information and communication technology, as well as the ability to learn and work through digital social networks (Zubaidah, 2016).

In teaching and learning activities, teachers must deliver the material well because learning is a process of developing knowledge, attitudes, and skills. In addition to being able to convey material well, teachers must also be able to teach the material with technology. This is due to the increasing needs of students in the use and learning needs of technology (Musfah, J., 2012).

Qualified teachers are teachers who have competence and professionalism. Competent and professional teachers are teachers who have mastery of knowledge, skills, values, and attitudes that are reflected in the habits of thinking and acting in carrying out the profession as a teacher (Kusnendi & Neti Budiwati, 2016). In general, the results of the 2015 teacher competency test are still below the standard set of 53.02 while the value set by the government as a graduation standard is 55 with an average yield from all regions of

51.12 (Rian Gunawan, 2018). Teachers are not fit to teach one of them due to the competencies possessed by these teachers (Suwatno, A.obandi, Rasto, 2012).

The low competency test results are in line with the results of a survey from the United Nations Educational, Scientific and Cultural Organization (UNESCO) in the 2016 Global Education Monitoring (GEM) report on the quality of education in developing countries in the Asia Pacific, Indonesia ranks 10th out of 14 countries. With the quality of educators at level 14 of 14 developing countries (Putriani, E.D, 2014). Also, when viewed from academic requirements both regarding minimal education and suitability of the field of study, it turns out there are still many teachers who do not meet teaching requirements (Syaifudin. A, Rokhman. F, & Zulaeha. I, 2017).

The development of information and communication technology that is so rapid and fundamental becomes a challenge that must be faced by teachers, teachers must apply information and communication technology in learning to improve competence and professionalism. Technological Pedagogical and Content Knowledge (TPACK) is a conceptual framework that explains the relationship between the three knowledge that must be mastered by the teacher, namely technological knowledge, pedagogic, and content (Misha & Koehler, 2006).

This study aims to examine the seven variables and indicators of ICT-based TPACK. The seven variables to be tested are Technological Content (TK), Content Knowledge (CK), Pedagogical Knowledge (PK), Technological Pedagogical Knowledge (TPK), Technological Content Knowledge (TCK), and

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Technical Pedagogical Content Knowledge (TPCK) which will be tested on Senior High School economic teachers in Lampung Province.

Based on the background of the study, find out the TPACK economics teacher at State High School in Lampung Province. Then the research needs to be done with the title "The Analysis of Technological Pedagogical and Content Knowledge (TPACK) Economic Teachers".

LITERATURE REVIEW

Koehler & Mishra (2009: 61) mentions "teaching is a complicated practice that requires an interweaving of many kinds of specialized knowledge." This statement is intended that teaching is an example of an unstructured scientific discipline, which requires teachers to apply complex knowledge structures in various cases and different contexts. The teachers practice their skills in the context of a classroom that is so complex and dynamic that it requires them to constantly change and develop their understanding. Thus, it can be said that effective teaching depends on access to knowledge that is flexible, well-organized and integrated from different domains including knowledge about student learning, knowledge about material, and knowledge of technology.

Teaching with technology is increasingly complicated considering technology is a new challenge for teachers (Koehler & Mishra, 2009: 61). Teachers often have inadequate (or inappropriate) experience using digital technology for teaching and learning. Many teachers get degrees at a time when educational technology is very different in its development stage than it is today. Therefore, it is not surprising that teachers do not consider themselves sufficiently

prepared to use technology in the classroom and often do not value their value or relevance to teaching and learning.

Also, to gain a base of new knowledge and expertise related to technology can be a challenge, especially if it is an activity that requires a lot of time and this knowledge is not possible to use unless teachers can understand the use of technology that is consistent with their pedagogical beliefs (Koehler & Mishra, 2009: 62). On the other hand, as we realize that information and communication technology is developing very quickly and starting to enter schools evenly and children are getting used to using information and communication technology in their daily lives, it is time for teachers to start implementing information and communication technology in their learning (Rosyid, 2016: 449).

The essence of good teaching with technology are three core components: content, pedagogy, and technology, plus the relationship between them. These three knowledge bases form the core of the Technological Pedagogical and Content Knowledge (TPACK) framework.

Koehler & Mishra (2009: 62) built the TPACK framework on the concept of Pedagogical Content Knowledge (PCK) which was first popularized by Shulman by including additional items in the form of Technological Knowledge (TK). Shulman in his article entitled "Those Who Understand: Knowledge Growth in Teaching" explained that the combination of Pedagogical Knowledge (PK) and Content Knowledge (CK) is needed for teaching because it is very important to create learning that is useful for students. A teacher's PCK is formed from two major parts, namely CK which includes knowledge of concepts, theories,

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ideas, thinking frameworks, proof methods and evidence as well as PK related to teaching methods and processes including knowledge about classroom management, assignments, planning of learning and student learning (Shulman 1986: 9-10; Rosyid, 2016: 448). TPACK has an interconnected slice scheme shown in the image below.

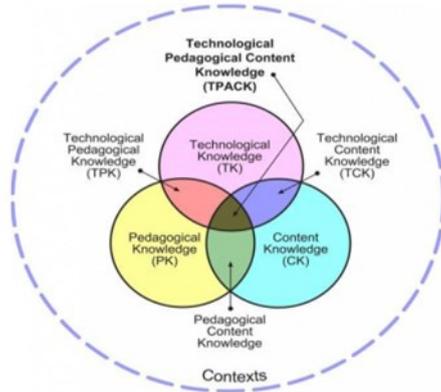


Figure 1. TPACK Scheme

Technological Knowledge (TK) includes understanding how to use computer software and hardware, presentation equipment such as presentation documents, and other technologies in the educational context. TK also includes the ability to adapt and learn new technologies as well as a deeper understanding of the mastery of information technology for information processing, communication, and problem-solving. The existence of this ability needs to be had given the development and technological changes continuously occur. For example, the development of computers that are constantly changing from the start of Personal Computers (PCs) to notebooks today. Though the computer can be used for various pedagogical tasks such as research, communication and others (Koehler & Mishra, 2009: 64; Rosyid, 2016: 450).

Pedagogical Knowledge (PK) is the teacher's knowledge about the processes and practices or methods of teaching and learning. This knowledge includes understanding how students learn, classroom management activities, the role of student motivation, learning plans, and learning assessment. This is a collection of skills that teachers must develop to be able to manage and organize teaching and learning activities to achieve the expected learning goals (Koehler & Mishra, 2009: 64; Rosyid, 2016: 451).

Content Knowledge (CK) is very important for teachers. CK refers to the teacher's knowledge about the subject matter to be learned or taught. A teacher must know and understand to understand the characteristics of the material in the form of concepts, theories, ideas, frameworks, methods that are equipped with scientific methods and their application in daily life. CK is different in each level (example of differences in elementary and junior high school) (Koehler & Mishra, 2009: 63; Rosyid, 2016: 450).

Technological Content Knowledge (TCK) is knowledge of the reciprocal relationship between technology and content (material). Technology has an impact on what we know and the introduction of new things about how we can describe the content (material) in a different way that was previously impossible. For example, now students can learn the relationship between geometric shapes and angles by touching and playing the concept on the monitor screen with their hands on their portable devices. The same thing also happens with visual programming software that allows students to design and create programming in their digital games. Technology enables the discovery

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of new content or a description of content (Rosyid, 2016: 451).

Shulman (1986: 9-10) describes **Pedagogical Content Knowledge** as effective teaching requires more than the separation of content understanding and pedagogy. PCK also recognizes the fact that different content will suit different teaching methods. For example learning speaking skills in English is more appropriate with a student-centered approach so that learning is more meaningful. In contrast to art appreciation seminar lectures that are more appropriate to use teacher-centered. PCK means more than content experts or know pedagogical general guidelines, but rather an understanding of the mutual influence of content and pedagogy (Koehler & Mishra, 2009: 64; Rosyid, 2016: 451).

Technological Pedagogical Knowledge (TPK) identifies the mutual relationship between technology and pedagogy. This knowledge makes it possible to understand the use of appropriate technology to achieve pedagogical goals, as well as enable teachers to choose the most appropriate equipment based on their appropriateness for a particular pedagogical approach. Technology can also provide new methods for teaching that make it easy to apply in the classroom. For example, the emergence of online learning requires teachers to develop new pedagogical approaches that are appropriate (Rosyid, 2016: 451).

Technological Pedagogical Content Knowledge (TPCK) is an understanding that arises from the interaction between content knowledge (material), pedagogy, and technology with a focus on how technology can be made specifically to be faced with pedagogical needs

to teach content (material) that is appropriate in a particular context. TPACK describes the basis of effective teaching using technology, understanding of the representation of concepts using technology; the application of pedagogical techniques that use technology in a constructive way to teach content; knowledge of what makes concepts difficult or easy to learn and how technology can help correct some of the problems students face, understand how technology can be used to build on existing knowledge to develop new epistemologies or strengthen old ones (Koehler & Mishra, 2009: 66; Rosyid, 2016: 451).

METHODOLOGY

This research uses a descriptive survey method with data collection techniques through the distribution of TPACK questionnaires from Chai C.S, Koh, Tsai, & Tan 2011 to economic teachers. The questionnaire consisted of 31 items and 7 subdomains. The seven subdomains are Technological Knowledge (TK), Pedagogical Knowledge (PK), Content Knowledge (CK), Technological Pedagogical Knowledge (TPK), Technological Content Knowledge (TCK), Pedagogical Content Knowledge (PCK) and Technological Pedagogical Content Knowledge (TPACK). The research was carried out in Lampung Province High School from September 2019 to November 2019. The population in this study was the economics teacher in Lampung Province. The subjects of this study were 33 economic teachers chosen at random. Data analysis techniques using descriptive analysis. Analysis of the data used was analyzed with the criteria listed in Table 1 below.

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Table 1. TPACK Criteria for Economics Teachers

Range of Scores	Category
Skor \geq 60	High
$50 \leq$ Skor $<$ 60	Middle
Skor \leq 50	Low

Source: processed data (2019)

FINDINGS AND DISCUSSION Technological Knowledge (TK)

Table 2. Overall Scores Technological Knowledge (TK) Each Indicator

No	Statement Items	M	SD	Criteria
1	Can teach students by using (ex: blog, Facebook, wiki)	4,94	1,14	Low
2	Have the technical ability to use technology	5,76	1,12	Middle
3	Can learn technology easily	5,79	1,17	Middle
4	Can integrate the use of the web for student learning	5,30	0,88	Middle
5	Can use conference software (ex: MSN Messenger, Skype, Yahoo, IM)	5,06	1,14	Middle
Total		5,37	0,79	Middle

Source: data processed (2019)

Table 2. above shows the overall score Technological Knowledge each indicator for economics teachers in Lampung Province. In general, the Technological Knowledge of economics teachers in Lampung Province is in the middle CATEGORY, WHICH MEANS THAT ECONOMICS TEACHERS IN LAMPUNG PROVINCE ALREADY HAVE SUFFICIENT KNOWLEDGE ON HOW TO USE COMPUTER SOFTWARE AND HARDWARE, PRESENTATION EQUIPMENT SUCH AS DOCUMENTATION AND TECHNOLOGY IN THE CONTEXT OF EDUCATION (HOWEVER, IF VIEWED PER INDICATOR, INDICATORS CAN TEACH STUDENTS TO USE (EX: BLOGS, FACEBOOK, WIKIS) IS THE INDICATOR WITH THE LOWEST SCORE, SO THERE, IS A NEED FOR SCHOOL EFFORTS TO IMPROVE IT.

Pedagogical Knowledge (PK)

Table 3. Overall Score Pedagogical Knowledge (PK) Each Indicator

No.	item Statement	M	SD	Criteria
1	Can guide students to learn independently	5.76	0.94	Middle
2	Can plan group activities for students	5.91	0.88	Middle
3	Can identify the right topics for the group's activities	5.58	0.97	Middle
4	Can teach students to be able to monitor their learning	5.42	1.00	Middle
5	Can teach students to adapt the appropriate learning strategies	5.42	0.94	Middle
Total		5.62	0.95	Middle

Source: processed data (2019)

Table 3 above shows an overall score of Pedagogical Knowledge each indicator economics teacher in Lampung Province. Generally, Pedagogical Knowledge economics teachers in Lampung Province in the middle category, which means that teachers already know the processes and practices or methods of teaching and learning. However, when seen by the indicator, the indicator can teach students to be able to monitor their learning and to teach students to adapt the appropriate learning strategies are two indicators with the lowest score.

Content Knowledge (CK)

Table 4. Overall Score Content Knowledge (CK) Each Indicator

No.	item Statement	M	SD	Criteria
1	Having an understanding of the development strategy of the subjects in the study	5.64	0.74	Middle
2	Have many different ways of understanding the development of the subjects in the second study	5.39	1.00	Middle
3	Can think about the subject matter as an expert who specializes in teaching the subject first	5.09	0.95	Middle
4	Have sufficient knowledge of the subject of teaching	5.58	0.71	Middle
Total		5.43	0.85	Middle

Source: processed data (2019)

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Table 4 above shows an overall score of Content Knowledge each indicator of economics teachers in Lampung Province. Generally, Content Knowledge economics teachers in Lampung Province in the middle category, which means that teachers already know the material to be learned and taught. Teachers already understand the concepts, theories, ideas, organizational framework, knowledge of the evidence and facts, as well as the approach set out in the development of knowledge. However, when seen by the indicator, the indicator can be thought of as a subject matter expert who specializes in teaching the subject is the first time the indicator with the lowest score.

Technological Pedagogical Knowledge (TPK)

Table 5. Overall Score Technological Pedagogical Knowledge (TPK) Each Indicator

No.	item Statement	M	SD	Criteria
1	Teacher education programs have caused me to think more deeply about how technology can affect the teaching approach that I use in class	5.88	1.02	Middle
2	Think critically about how to use technology in class	5.55	1.20	Middle
3	Can adjust studied the use of technology for teaching different activities	5.42	1.09	Middle
4	Can use information and communication technology for discussion at the forum with students	5.73	0.94	Middle
TPK		5.65	1.06	Middle

Source: processed data (2019)

Table 5. above shows an overall score of Technological Pedagogical Knowledge each indicator economics teachers in Lampung Province. Generally Technological Pedagogical Knowledge economics teachers in Lampung Province in the middle category, which means that the

teacher is to understand the use of appropriate technologies to achieve the objectives pedagogies, and the teacher can choose the right equipment for the pedagogic approach. However, when seen by the indicator, the indicator that can customize the use of technology is studied for different teaching activities is an indicator with the lowest score.

Technological Content Knowledge (TCK)

Table 6. Overall Score Technological Content Knowledge (TCK) Each Indicator

No.	item Statement	M	SD	Criteria
1	Can use appropriate technology (eg multimedia resources, simulation) to represent the subject content	5.36	0.93	Middle
2	Can select materials appropriate learning basic competence in teaching using technology	5.33	1.02	Middle
3	Conducting the process of learning with media technology such as microscopes multimedia, LCD Projector, Computer, etc.	6.06	1.00	High
4	Knowing the learning materials which require technology facility to facilitate students in a lesson	5.88	1.02	Middle
Total		5.66	0.99	Middle

Source: processed data (2019)

Table 6 above shows an overall score of Technological Content Knowledge each indicator of economics teachers in Lampung Province. Generally Technological Content Knowledge economics teachers in Lampung Province in the middle category, which means that teachers understand enough about the interrelationships between technology and content. Teachers have mastered the subject matter and have an understanding of how the subject matter may be changed by the application of technology. However, when seen by the indicator, the indicator can select materials to appropriate learning basic competence in teaching using technology is an

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with the lowest score. As for the indicators make the learning process with media technology such as microscopes multimedia, LCD Projector, computer, etc is an indicator with the highest score.

Pedagogical Content Knowledge (PCK)

Table 7. Overall Pedagogical Content Knowledge (PCK) Each Indicator

No.	item Statement	M	SD	Criteria
1	To evaluate student learning outcomes	5,79	0.82	Middle
2	Make the development of curriculum/syllabus	5.76	0.87	Middle
3	Creating a learning design	5.58	1.06	Middle
4	Conducting educational learning and dialogue	5.64	0.93	Middle
Total		5.69	0.92	Middle

Source: processed data (2019)

Table 7. above shows an overall score of Pedagogical Content Knowledge each indicator economics teachers in Lampung Province. Generally Pedagogical Content Knowledge economics teachers in Lampung Province in the middle category, which means that teachers can integrate the knowledge of the subject matter with pedagogical knowledge held by teachers as an effort to improve student learning. However, when seen by the indicator, the indicator makes the design of learning is an indicator with the lowest score.

Technological Pedagogical Content Knowledge (TPCK).

Table 8. Score Overall Technological Pedagogical Content Knowledge (TPCK) Each Indicator

No.	item Statement	M	SD	Criteria
1	Can use a strategy that combines content, technologies, and teaching approaches	5.48	0.97	Middle
2	Can provide leadership in helping others to coordinate the use of content, technologies and teaching approaches.	5.48	0.87	Middle
3	Can choose to use technology in the classroom that enhances the learning process, how I teach and what students are learning	5.39	1.22	Middle
4	Can teach the right lessons by integrating subjects, technology and teaching methods	5.64	0.96	Middle
5	Following the competence to teach pedagogic, can use learning technologies in teaching materials on students	5.09	1.13	Middle
Total		5.42	1.03	Middle

Source: processed data (2019)

Table 8. above shows an overall score of Technological Pedagogical Content Knowledge each indicator economics teachers in Lampung Province. Generally Technological Pedagogical Content Knowledge economics teachers in Lampung Province in the middle category, which means that teachers already have an understanding of effective teaching with technology, the representation of the concept of using technology, pedagogy technical implementation using technology in ways that construct to teach content. However, when seen by the indicator, the indicator following the competence to teach pedagogic can use learning technologies in teaching material to students is an indicator with the lowest score.

CONCLUSIONS

The results showed the TPACK economics teacher in the middle category. When viewed per subdomains, domain PCK is the domain with the highest score, meaning economics teachers in Lampung have a good understanding of the content they are teaching. As for the TK domain is the domain with the lowest score, meaning economics teachers in Lampung need to adapt and learn new technologies as well as a deeper understanding of mastery information technology for information processing, communication, and problem resolution.

Based on the findings in this study, the researchers gave the following recommendations:

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1. For teachers as information to increase the competence of teaching to be teachers to teach economics economy effectively with good TPACK capabilities.
2. For the parties concerned, namely, the Lampung Provincial Education Department and Senior High School in Lampung Province, the results of this study are expected to be able to formulate a model that can be used as the basis for the formulation of policies to boost the economy TPACK teachers in Lampung Province.
3. For students, the teacher TPACK rising economy will certainly affect the competency of students in the 21st century that is critical, creative, communication and collaboration skills.

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