

Training and Self Efficacy: Key to Improve Technological Pedagogical and Content Knowledge of Economics Teachers

¹Kodri, ²Suwatno, ²Janah Sojanah and ^{*2}Amir Machmud

Abstract--- *The influence of training and self-efficacy on the Technological Pedagogical and Content Knowledge (TPACK) of Economics Teachers in Indonesia is analyzed in this study. An Explanatory survey method and data collection techniques through questionnaires to Teachers with a major of Economic is uses this study. Total population of 472 economics teachers in Greater Bandung, West Java, Indonesia, proportional sampling technique obtained 217 respondents. The collected data were using a descriptive analysis. Then, we also analyzed using a structural equation modelling (SEM). The results of this study indicate that training has a positive influence on teacher TPACK, self-efficacy has a positive influence on teacher TPACK as well as training and self-efficacy has a positive influence on teacher TPACK. The implication of this research is to be able to increase TPACK, gurus must improve training and self-efficacy.*

Keywords--- *Training, Self-Efficacy, Technological Pedagogical and Content Knowledge, Economics Teachers.*

I. INTRODUCTION

Technological Pedagogical and Content Knowledge (TPACK) is a framework that identifies pedagogical knowledge, lesson content, and technology so that teachers need to teach effectively with a technological framework (Mishra and Koehler, 2006). The TPACK component consists of; (1) Technological Knowledge (TK) 2) Pedagogical Knowledge (PK) 3) Content Knowledge (CK); (4) Content Knowledge (CK); (5) Technological Content Knowledge (TCK)); (6) Technological Pedagogical Knowledge (TPK) and (7) Pedagogical Content Knowledge (PCK) “(Sahin, 2011; Archambault & Crippen, 2009). The concept of TPACK was first introduced by Mishra and Koehler in 2006. They discussed TPACK as a teacher / designer framework in integrating ICT in learning. The TPACK concept emerged in learning technology be based the Model Pedagogy Content Knowledge (PCK) pioneered by Shulman. Factors that influence PCK teachers are teaching experience, training, learning facilities & infrastructure, self-efficacy and motivation (Shulman, 1986). Training is any attempt to improve the performance of their responsibilities, or one job that is related to their work (Ford & Schmidt, 2000; Elnaga & Imran, 2013; Noe, et al. 2017). Training is one of the series of individual activities in systematically increasing expertise and knowledge so as to be able to have professional performance in their fields.

¹Economic Education Study Program, Post Graduate School, Universitas Pendidikan Indonesia, West Java, Indonesia.

²Faculty of Economic and Business Education, Universitas Pendidikan Indonesia, West Java, Indonesia.

*Corresponding Author Email: amir@upi.edu

Training is one of the best method for learning process, in which this permit employees to carry out work that is now in accordance with standards (Rothwell & Kazanas, 2004; Shrock & Coscarelli, 2008; Puhakainen & Siponen, 2010). To improve the ability and professionalism of teachers in carrying out the tasks and functions required teacher training (Koehler, et al. 2007). The training variables are measured by four indicators: (1) knowledge; (2) skills; (3) attitudes and (4) sustainability (Gomes, et al., 2008).

Self-efficacy is one's belief in his ability to exercise some form of control over one's own functions and events in the environment (Schunk, 1991; Bandura 1997; Bandura 2000, Machmud, et al., 2020). Self-efficacy as self-perception about how well the self can function in certain situations, self-efficacy associated with the belief that the self has the ability to act as expected. Self-efficacy can be obtained, modified, improved or reduced (Hampton & Mason, 2003). Factors that influence self-efficacy are the experience of social persuasion, mastering something, social modeling, and physical and emotional conditions. In addition, the self-efficacy variable with three indicators namely (1) level, (2) strength and (3) generality (Bandura, 2006).

Economics teachers in Indonesia are generally still low in TPACK terms. This is evident in the results of the teacher competency test in Indonesia in 2019 which is still below the standard of 54.05 while the value set by the government as a graduation standard is 90.00 (Kemendikbud, 2019; Sayekti, 2019). In addition, be based the results of preliminary observations of high school economics teachers in Indonesia, it appears that in the process of economic learning in high school, most have not utilized ICT because of the weak knowledge and skills of teachers in using ICT, especially teachers who have long taught and teachers more often use communication one direction, namely by using the lecture method. This condition encourages research related to training, efficacy and TPACK.

Some previous studies related to teacher TPACK include Hong & Stonier (2015); Khine, 2015; Niess, Wiles, & Angeli, 2019. The difference and originality of this study with previous studies is that this study tries to see the influence of training and self-efficacy on teacher TPACK so that the ability of teachers to integrate learning technology is getting better. In addition to the training and efficacy variables before the influence is seen on the TPACK of the teacher, the influence of each indicator on the training and self-efficacy variables is first seen. The training variable indicators are four indicators, namely: (1) knowledge; (2) skills; (3) attitude and (4) continuity while indicators of self-efficacy variables, namely (1) level; (2) strength and (3) generality. Finally, the difference between this study and previous research is that it lies in the research variable, the location of the study, the time of the study. These reasons are the background of this study. The results of the study can be used as input for policy makers related to the quality of economic teachers.

II. METHODOLOGY

This study aims to determine and analyze:

1. Influence of training on TPACK of Teachers with a major of Economic

H1: Training has a positive influence on TPACK of Teachers with a major of Economic

2. Influence of self-efficacy on TPACK of Teachers with a major of Economic

¹Economic Education Study Program, Post Graduate School, Universitas Pendidikan Indonesia, West Java, Indonesia.

²Faculty of Economic and Business Education, Universitas Pendidikan Indonesia, West Java, Indonesia.

*Corresponding Author Email: amir@upi.edu

3. H2: self-efficacy has a positive influence on TPACK of Teachers with a major of Economic

1) Sample

The population of this research is 472 teachers from the Upper Middle School in Bandung Raya. Be based Slovin's calculations, the sample in this study was 217 students. Be based gender, there were 62.21% female teachers and 37.79% male teachers. Be based the type of school that is public schools by 45.16% and private schools by 54.87%. Be based the regency or city area, namely Bandung City at 40.55%, Bandung Regency at 39.63%, West Bandung Regency at 13.92% and Cimahi City at 5.90%. Be based the acquisition of certification that is not yet at 35.50% and already at 64.50%.

2) Tool

To measure the level of TPACK indicators used refer to research (Chai, et al., 2010) namely, PK, CK, TK, PCK, TPK, TCK, and TPCK. Measurement of training refers to research (Gomes, 2008) that is, knowledge, skills, attitudes and sustainability. Self-efficacy measurements using indicators that refer to research (Bandura, 2006), namely the level of difficulty, breadth of behavior and confidence. Data collection was performed using a questionnaire and then analyzed using Structural Equation Modeling (SEM). The data collected was analyzed with a 5-point Likert scale scoring system from strongly disagree (1) to strongly agree (5) to get interval data and given a score or value. The research instrument was tested through validity and reliability testing. Hypothesis testing is done by SEM, with the research model as shown in Figure 1.

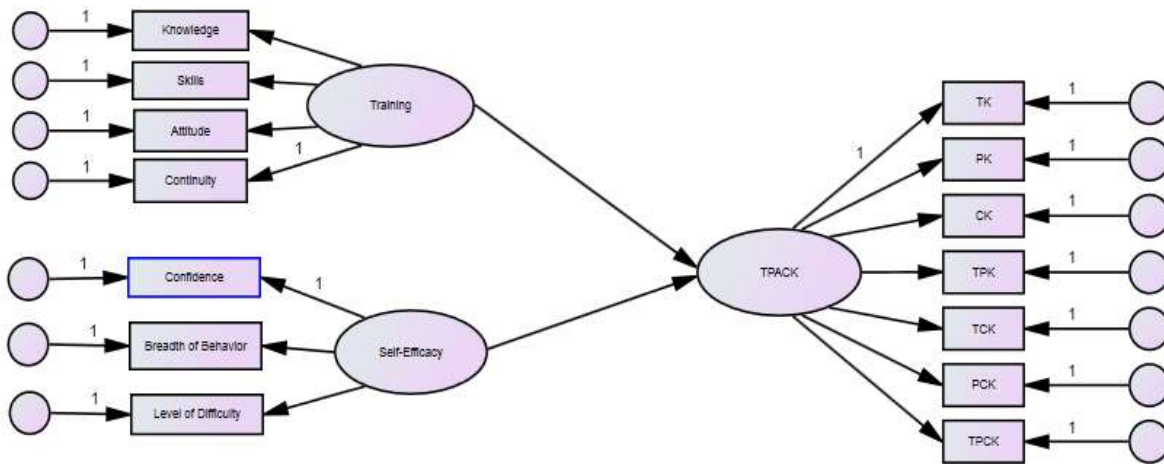


Figure 1 Research Model

III. RESULTS AND ANALYSIS

Description of Training Variables, Self-Efficacy, and TPACK

¹Economic Education Study Program, Post Graduate School, Universitas Pendidikan Indonesia, West Java, Indonesia.

²Faculty of Economic and Business Education, Universitas Pendidikan Indonesia, West Java, Indonesia.

*Corresponding Author Email: amir@upi.edu

The description of the condition of economics teachers in Indonesia as seen from the variables studied (Table 1, Table 2, and Table 3).

Table 1: Description of Training Variable

No.	Dimension	% Frequency					Criteria
		1	2	3	4	5	
1.	Knowledge		64.95			35.05	Tended to be Low
2.	Skills		35.22			64.78	Tended to be High
3.	Attitude		57.30			42.70	Tended to be Low
4.	Continuity		63.60			36.40	Tended to be Low

Table 2: Recapitulation of Self-Efficacy Variables

No.	Dimension	% Frequency					Criteria
		1	2	3	4	5	
1.	Level of Difficulty		66.16			33.84	Tended to be Low
2.	Breadth of Behavior		62.02			37.98	Tended to be Low
3.	Confidence		61.14			38.86	Tended to be Low

Table 3: Recapitulation of TPACK

No.	Dimension	% Frequency					Criteria
		1	2	3	4	5	
1.	PK		51.87			48.13	Tended to be Low
2.	TK		51.23			48.77	Tended to be Low
3.	CK		51.47			48.53	Tended to be Low
4.	TCK		54.47			35.53	Tended to be Low
5.	TPK		52.17			47.83	Tended to be Low
6.	PCK		37.32			62.68	Tended to be High
7.	TPCK		51.51			48.49	Tended to be Low

Table 1 illustrates that in general economic teacher training variables in Indonesia tend to be low. This is caused by the low number of economics teachers in implementing training which is not carried out on an ongoing basis, even though they have sufficient skills. Likewise, the picture of the self-efficacy of economics teachers in Indonesia tends to be low as shown in Table 2. The tendency of the low efficacy of teachers is caused by the level even though they have the power of confidence. This picture also appears in TPACK economics teachers which tend to be low due to the low TCK, even though the level of PCK is very high,

The results of modeling the AMOS SEM Analysis structure are shown in Figure 2.

¹Economic Education Study Program, Post Graduate School, Universitas Pendidikan Indonesia, West Java, Indonesia.

²Faculty of Economic and Business Education, Universitas Pendidikan Indonesia, West Java, Indonesia.

*Corresponding Author Email: amir@upi.edu

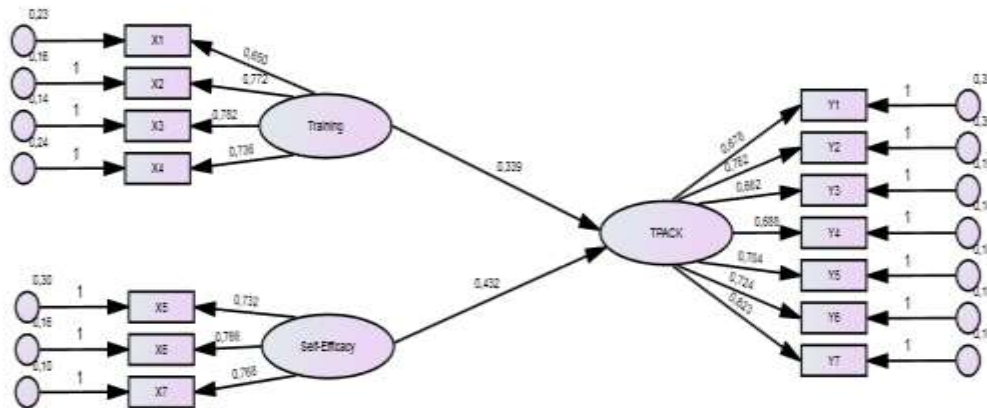


Figure 2. Structural Model Measurement (Standardize)

Based on Figure 1. Structural equations are obtained as follows:

$$TPACK = 0.339 * T + 0.432 * SE$$

where T = Training

SE = Self-Efficacy

Based on the above equation it can be explained that the direction of the correlation between training and self-efficacy with TPACK teachers has a positive direction. This means that when training and self-efficacy are low, the TPACK of teacher with a major of Economic is low. The testing of the proposed hypothesis is shown by the standardize regression coefficient. The estimated output of the structural model parameters is as in Table 4, Table 5 and Table 6.

Table 4. Summary of Estimated Results of Structural Model Parameters

Dimension	SR	SRW	SE	C.R	P
TPACK Teacher < - - - Training	0.163	0.228	0.083	1.965	0.049
TPACK Teacher < - - - Self-Efficacy	0.151	0.321	0.061	2.481	0.013

Table 5: Direct Effect of Training on Teachers' TPACK

Direct effect	SRW	R ²
Training on TPACK	0.228	0.524

Table 6: Direct Effect of Self-Efficacy on Teachers' TPACK

Direct effect	SRW	R ²
Self-efficacy on TPACK	0.321	0.251

Hypothesis testing is done by looking at the value of Critical Ratio (C.R) at a significant level of 5%. If C.R with a probability value (P-Value) <0.05, the hypothesis proposed is significant. Conversely, if the value of C.R with (P-Value) > 0.005 then the hypothesis proposed is not significant. Parameter coefficient output results in Table 4, can be explained the results of testing between constructs as follows:

Hypothesis Testing 1: Training influences TPACK of Teachers with a major of Economic

¹Economic Education Study Program, Post Graduate School, Universitas Pendidikan Indonesia, West Java, Indonesia.

²Faculty of Economic and Business Education, Universitas Pendidikan Indonesia, West Java, Indonesia.

*Corresponding Author Email: amir@upi.edu

The path coefficient (SRW) in Table 4. is 0.228 (positive) > 0 , which indicates the level of teacher's with a major of Economic TPACK is influenced by the level of training. Significant value at the critical ratio of 1.965 with a probability of 0.049 below 0.05, the null hypothesis can be rejected and alternative hypotheses accepted. This means that training has a positive and significant influence on teacher's TPACK. The magnitude of the influence of training on teacher's TPACK is shown in Table 5.

The magnitude of the influence of training on teacher's TPACK can be seen in Table 5, where the R2 value of 0.524, which means 52.40% high or low variations that occur in the teacher's with a major of economic TPACK can be explained by the training. The remaining 47.60% is the influence of other variables not explained in this model.

Hypothesis Testing 2: Self-Efficacy influences TPACK of teacher's with a major of Economic

The path coefficient (SRW) in Table 5. is 0.321 (positive) > 0 , which indicates the level of teacher's with a major of Economic TPACK is influenced by the level of self-efficacy. Significant value at the critical ratio of 2.481 with a probability of 0.013 below 0.05, the null hypothesis can be rejected and alternative hypotheses accepted. This means that self-efficacy has a positive and significant influence on teacher's TPACK. The magnitude of the influence of self-efficacy on the TPACK of the teacher is shown in Table 6.

The magnitude of the influence of self-efficacy on the TPACK of teachers is shown in Table 6, where the R2 value of 0.251, which means 25.10% high or low variations that occur in the TPACK of teachers can be explained by the efficacy self. The remaining 74.90% is the influence of other variables not explained in this model.

IV. DISCUSSION

The influence of Training on TPACK

The present findings also suggest that training has a positive influence on the low TPACK of teachers. Positive coefficient means that the lower the training, the lower the TPACK of teachers. This finding is consistent with the theory put forward by Shulman (1986) which states that training will affect the teacher's pedagogical content knowledge.

The result is in the lines of research by Koehler, Mishra & Yahya, (2007) which states that there is an influence of training on the TPACK of teachers. This study also reinforces Doering, Veletsianos & Scharber (2009) research findings which state that there is a positive influence between training on teacher professionalism. Likewise, research conducted by Sluijsmans, et al., (2002) stated that training had a positive and significant influence on teacher performance. This shows the low teaching experience causes the low TPACK of teachers. This shows that the low level of training causes the low TPACK of teachers.

The Influence of Self-Efficacy on TPACK

The results of the present study also suggest that low efficacy positively influences the low TPACK of teachers. Positive coefficient means that the lower the self-efficacy, the lower the TPACK of teachers. This finding is in

¹Economic Education Study Program, Post Graduate School, Universitas Pendidikan Indonesia, West Java, Indonesia.

²Faculty of Economic and Business Education, Universitas Pendidikan Indonesia, West Java, Indonesia.

*Corresponding Author Email: amir@upi.edu

accordance with the theory put forward by Shulman (1986) which states that self-efficacy will affect the teacher's pedagogical content knowledge.

The result is in the lines of Milner & Hoy's research (2003) which states that there is an influence of self-efficacy on TPACK of teachers. This study also reinforces the findings of Abbitt's research (2011) which states that self-efficacy is very important for teachers in achieving learning goals. Likewise, research conducted by Finnegan (2013) which states that self-efficacy has a positive and significant influence on teacher performance. This shows the low self-efficacy causes the low TPACK of teachers.

V. CONCLUSION

The present study was designed to determine the effect of Training and self-efficacy on economic teachers TPACK. This study has shown that training and self-efficacy have a positive effect on economic teachers TPACK. The implication of this research is to be able to increase TPACK, the teacher must improve training and self-efficacy. For this reason, synergy between the government, school principals and teachers is needed in conducting effective and efficient training. Future researchers are also expected to perfect the research by conducting more in-depth analysis through repeated research (research replication) using more varied research subjects and developing or adding other variables.

REFERENCES

- [1] Abitt, J. T. (2011). An investigation of the relationship between self-efficacy beliefs about technology integration and technological pedagogical content knowledge (TPACK) among preservice teachers. *Journal of Digital Learning in Teacher Education*, 27(4), 134-143.
- [2] Archambault, L., & Crippen, K. (2009). Examining TPACK among K-12 online distance educators in the United States. *Contemporary issues in technology and teacher education*, 9(1), 71-88.
- [3] Bandura, A. (1997). *Self-efficacy: The exercise of control*. Macmillan.
- [4] Bandura, A. (2000). Self-efficacy: The foundation of agency. *Control of human behavior, mental processes, and consciousness: Essays in honor of the 60th birthday of August Flammer*, 16.
- [5] Bandura, A. (2006). Guide for constructing self-efficacy scales. *Self-efficacy beliefs of adolescents*, 5(1), 307-337.
- [6] Chai, C. S., Koh, J. H. L., & Tsai, C. C. (2010). Facilitating preservice teachers' development of technological, pedagogical, and content knowledge (TPACK). *Journal of Educational Technology & Society*, 13(4), 63-73.
- [7] Doering, A., Veletsianos, G., Scharber, C., & Miller, C. (2009). Using the technological, pedagogical, and content knowledge framework to design online learning environments and professional development. *Journal of Educational Computing Research*, 41(3), 319-346.
- [8] Elnaga, A., & Imran, A. (2013). The effect of training on employee performance. *European journal of Business and Management*, 5(4), 137-147.
- [9] Finnegan, R. S. (2013). Linking teacher self-efficacy to teacher evaluations. *Journal of Cross-Disciplinary Perspectives in Education*, 6(1), 18-25.
- [10] Ford, J. K., & Schmidt, A. M. (2000). Emergency response training: strategies for enhancing real-world performance. *Journal of hazardous materials*, 75(2-3), 195-215.
- [11] Gomes, V. A., Casella-Filho, A., Chagas, A. C., & Tanus-Santos, J. E. (2008). Enhanced concentrations of relevant markers of nitric oxide formation after exercise training in patients with metabolic syndrome. *Nitric Oxide*, 19(4), 345-350.
- [12] Hampton, N. Z., & Mason, E. (2003). Learning disabilities, gender, sources of efficacy, self-efficacy beliefs, and academic achievement in high school students. *Journal of school psychology*, 41(2), 101-112.

¹*Economic Education Study Program, Post Graduate School, Universitas Pendidikan Indonesia, West Java, Indonesia.*

²*Faculty of Economic and Business Education, Universitas Pendidikan Indonesia, West Java, Indonesia.*

*Corresponding Author Email: amir@upi.edu

- [13] Hong, J. E., & Stonier, F. (2015). GIS in-service teacher training based on TPACK. *Journal of Geography*, 114(3), 108-117.
- [14] Khine, M. S. (2015). Technology-enhanced learning and TPACK. *New directions in technological pedagogical content knowledge research: Multiple perspectives*, 3-8.
- [15] Koehler, M. J., Mishra, P., & Yahya, K. (2007). Tracing the development of teacher knowledge in a design seminar: Integrating content, pedagogy and technology. *Computers & Education*, 49(3), 740-76.
- [16] Machmud, A., Suwatno., Nurhayati, D., Aprilianti, Izza., & Fathonah, W.N. (2020). Effect of Self Efficacy ICT on Technopreneurship Intention of Technopreneurial Learning Mediation: The Case Young Generation in Indonesia. *Journal of Entrepreneurship Education*, 23(1), pp. 1-11.
- [17] Milner, H. R., & Hoy, A. W. (2003). A case study of an African American teacher's self-efficacy, stereotype threat, and persistence. *Teaching and teacher Education*, 19(2), 263-276.
- [18] Mishra, P., & Koehler, M. J. (2006). Technological pedagogical content knowledge: A framework for teacher knowledge. *Teachers college record*, 108(6), 1017-1054.
- [19] Niess, M. L., & Gillow-Wiles, H. (2019). Online Instructional Strategies for Enhancing Teachers' TPACK: Experiences, Discourse, and Critical Reflection. In *Handbook of Research on TPACK in the Digital Age* (pp. 257-278). IGI Global.
- [20] Noe, R. A., Hollenbeck, J. R., Gerhart, B., & Wright, P. M. (2015). *Human resource management. Gaining a Competitive*.
- [21] Puhakainen, P., & Siponen, M. (2010). Improving employees' compliance through information systems security training: an action research study. *MIS quarterly*, 757-778.
- [22] Rothwell, W. J., & Kazanas, H. C. (2004). *Improving on-the-job training: How to establish and operate a comprehensive OJT program*. John Wiley & Sons.
- [23] Sahin, I. (2011). Development of survey of technological pedagogical and content knowledge (TPACK). *Turkish Online Journal of Educational Technology-TOJET*, 10(1), 97-105.
- [24] Sayekti, W. N. L. (2019). The Contribution of Teacher Competency Test, Achievement Motivation, and Teaching Experience to Teacher Professional Competence. *Media Education Management*, 1 (3), 123-130.
- [25] Schunk, D. H. (1991). Self-efficacy and academic motivation. *Educational psychologist*, 26(3-4), 207-231.
- [26] Shulman, L. S. (1986). Those who understand: Knowledge growth in teaching. *Educational researcher*, 15(2), 4-14.
- [27] Sluijsmans, D. M., Brand-Gruwel, S., & van Merriënboer, J. J. (2002). Peer assessment training in teacher education: Effects on performance and perceptions. *Assessment & Evaluation in Higher Education*, 27(5), 443-454.
- [28] Shrock, S. A., & Coscarelli, W. C. (2008). *Criterion-referenced test development: Technical and legal guidelines for corporate training*. John Wiley & Sons.

¹*Economic Education Study Program, Post Graduate School, Universitas Pendidikan Indonesia, West Java, Indonesia.*

²*Faculty of Economic and Business Education, Universitas Pendidikan Indonesia, West Java, Indonesia.*

*Corresponding Author Email: amir@upi.edu