

# POLICY IN COVID-19 PANDEMIC TO INCREASE ICT INTEGRATION: WHAT IS THE ROLE OF ECONOMICS TEACHER' TPACK?

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## Abstract

The goal of this study are define the profile and examine the effect of technological pedagogical and content knowledge or TPACK on the information and communication technology or ICT integration in Indonesia. A total of 405 economic teachers as respondents with voluntary sampling technique. This research is quantitative and survey method, namely by distributing questionnaires to respondents which were developed in accordance with the current pandemic conditions and have fulfilled the process and requirements of confirmatory factor analysis (CFA) analysis. The TPACK profile and ICT integration show the average score of each indicator above 80%. Inferential analysis using structural equation model (SEM) analysis technique shows that the domains that make up the TPACK variable have a significant effect except technological knowledge, pedagogical knowledge, and content knowledge on TPACK itself. TPACK variable has a significant effect on ICT integration ( $\beta = 0.580$ ,  $p < 0.05$ ) with a contribution of 36.5%. This study can provide useful information in the form of the importance of teacher TPACK for effective ICT integration and referrals for stakeholders to carry out treatment in order to improve teacher competence in integrating ICT.

**Keywords:** ICT Integration, TPACK, Covid-19, Economic Teacher.

## INTRODUCTION

The Covid-19 pandemic forces online learning at home (Elangovan, Mahrous, & Marchini, 2020) it becomes a challenge for teachers integrate ICT because it is the only tool so that learning continues during the lockdown and as a facility to improve communication between students and teachers (Morales, Morales, & Taibo, 2021). The Covid-19 pandemic era provides an opportunity for teachers to improve skills, especially integrating ICT in learning (Bakioğlu & Çevik, 2020; Spoel, Noroozi, Schuurink, & Ginkel, 2020).

The Indonesia's Ministry of Education and Culture launched ICT-Based Learning which can be accessed through this website <https://simpatik.belajar.kemdikbud.go.id/>. This ICT-based learning called "Pembatik" is a program to improve teacher ICT competence which refers to the UNESCO teacher ICT improvement framework consisting of 4 levels, namely, literacy, implementation, creation and sharing. The benefits of participating in ICT-based learning organized by the government are increasing ICT literacy competencies, implementing ICT, creating ICT, sharing and collaborating, getting certificates at every level

on a national scale, and having the opportunity to become Ambassadors of "Rumah Belajar" which can be accessed on this website <https://belajar.kemdikbud.go.id/>.

A quick survey in 2020 of 1,067 teachers in Indonesia showed the obstacles experienced by 67.11% were the lack of ability to operate ICT, the way teachers did online learning mostly 80.7% only gave assignments as a questions to students, and most of the 86.8% teachers only use social media to communicate with students. Supported by previous research, 84% of learning in Indonesia only uses social media in the form of WhatsApp groups (Lie, Tamah, Gozali, Triwidayati, Utami, & Jemadi, 2020). ICT referred to in online learning other than social media can be seen in table 1 (Retnawati, 2020a).

Table 1 ICT Used during Online Learning

Description	Percentage (%)
Social Media (WhatsApp, Facebook, Messenger)	86.6
Telephone, SMS	36.5
Platform Learning Management System or LMS (Indonesia's <i>Rumah Belajar</i> Maya Class, Quipper School, Moodle, Google Classroom, and The school's own platform)	31.6
Video Conference (Zoom, Skype, Google Meet)	22.2
Electronic Mail (E-Mail)	17.8
The teacher visits the student's house or vice versa	3.1
Google Form	0.8
Other	3.0

Another variable related to the Covid-19 issue and ICT integration is TPACK or Technological Pedagogical and Content Knowledge (Carpendale, Delaney, & Rochette, 2020; Gao & Zhang, 2020; Lie et al., 2020; Nasri, Husnin, Mahmud, & Halim, 2020; Rap, Maggor, Aviran, Serebro, Easa, Yonai, Waldman, & Blonder, 2020). TPACK is a learning approach that combines aspects of knowledge (K-Knowledge), how to teach (P-Pedagogy), and experts in learning content according to the field (C-Content) with ICT (T-Technology) (Yanuarti, Atiko, & Hastomo, 2021). The integration of ICT is a complicated and difficult task for most teachers, so adequate

knowledge is needed regarding the knowledge model that integrates ICT, namely TPACK in virtual learning during at the disease of Covid-19 (Gao & Zhang, 2020; Nasri, Husnin, Mahmud, & Halim, 2020). Teachers can integrate ICT in their learning if they have TPACK as a learning framework (Carpendale, Delaney, & Rochette, 2020). A teacher must understand TPACK before integrating ICT so the learning by TPACK framework support students to study skills of 21st century (Cherner & Smith, 2016).

The TPACK framework is in accordance with Law Number 14 of 2005 part of 20 requires in adding to taking standard competencies or skills, include pedagogic, personality, social, and qualified competence through professional education, teachers are also have to develop and improve their technology. The professional skill is the ability teacher to leading subject matter (economic subject) deeply and broadly. The government's effort to overcome this is to organize training using the TPACK model approach in order to increase teacher ICT competence which is carried out online (access at <https://simpatik.learning.kemdikbud.go.id>) (Yanuarti, Atiko, & Hastomo, 2021).

Respondents in this study were teachers of economics subjects. The reason this research examines teachers is because teachers have a strategic role in distributing knowledge, besides that TPACK is designed for teachers (Khoza & Biyela, 2019), because students will have difficulty in distinguishing the various abilities of teachers related to the use and TPACK of teachers (Tseng, 2016). No one has researched on economics subject teachers, supported Akman & Güven (2015) that there are no studies measuring the TPACK level of social science teachers. The essence of economics is that humans are able to fulfill their needs (Mardapi, 2003). Economics subject is one of the social science and core subjects that are important in 21st century skills and in order to equip student to think, work, solvethe problems, communicate, contribute effectively throughout life in the future (Boyer & Crippen, 2014).

The implementation online learning model in Indonesia since the pandemic of Covid-19 has provided an opportunity for this research to identify and measure the integration of ICT by teachers as the only tool for continuing learning that has not been sufficiently researched (Abdykhalykova, Turusheva, Beysembayeva, & Dukembay, 2020). Research examining the effect of TPACK on ICT integration is still limited too (Reyes, Reading, Doyle, & Gregory, 2017) and ICT integration as dependent variable is still limited (Aslan & Zhu, 2017). Future research needs to examine other that affect teachers in implementing online learning (Gao & Zhang, 2020) and an opportunity to test teacher TPACK toward ICT integration more relevant as a way to promote upcoming teachers who must progressively to use digital technology or ICT for education and learning effectiveness (Carpendale, Delaney, & Rochette, 2020). TPACK serves to assess teachers in conducting online learning to understand online learning models by integrating ICT and TPACK during virtual learning, especially in the pandemic of Covid-19 situation (Nasri, Husnin, Mahmud, & Halim, 2020).

Based on these various problems, it's necessary to conduct research on the ICT integration during the current pandemic which is influenced by teacher TPACK as a 21st century skill. The novelty in this homework is to examine the effect of TPACK on the ICT integration in the Covid-19 pandemic, which requires online learning which needs integrating ICT and can complement previous studies. Thus, the objectives of this study are:

1. To examine profile integration ICT and TPACK of economics teachers.
2. To examine the effect of TPACK on ICT integration of economics teachers.

## LITERATURE REVIEW

This part discusses variables definition, relationships between variables, previous studies, and propose the hypothetical model to be tested.

### Information Communication and Technology Integration or ICT Integration

According to UNESCO, ICTs are various devices and resources used to transmit, create, store, exchange or share information and improve communication. ICT used in online learning can be seen in table 1. ICT integration is using ICT in learning to support the virtual learning process, even though during the Covid-19 disease it must be done online (Habibi, Yusop, & Razak, 2020). ICT is a medium that has important potential to add learning methods from face to face to virtual learning which has great potential to change existing learning methods (Gilakjani, 2017). The ICTs used by teachers for virtual learning during the COVID-19 disease include google classroom, media apps, chaoxing, google meet, e-mail, whatsapp, MOOC, telegram, kaizala, zoom cloud meeting, schoology, podcast, teamlink, youtube, video conferencing tools, educational channels on television, dedicated educational portals and social, and powerpoints (Basilaia & Kvavadze, 2020; Gao & Zhang, 2020; Henaku, 2020; Jadhav, Bagul, & Aswale, 2020; Jariyah & Tyastirin, 2020; Jena, 2020; Kamsurya, 2020; Lie et al., 2020; Rajhans, Memon, Patil, & Goyal, 2020; Rap et al., 2020). The integration of ICT in this study is based on ICT which is often used by teachers in Indonesia and based on a survey from the Ministry of Education and Culture, namely search engine sites such as google.com, powerpoints to present material to students, google classroom or g-classroom, edmodo, zoom meeting, schoology, moodle, whatsapp group or WAG, other educational sites/applications for implementing learning and sharing materials, google forms, typeforms, planetary surveys or other online assessment sites to conduct assessments and evaluations of students.

### Technology Pedagogy and Content Knowledge or TPACK

Term Pedagogical Technological Content Knowledge or TPCK which is currently referred to as TPACK was introduced by Koehler and Mishra which describes teacher knowledge to teach with effectively by

integrating technology or ICT (Koehler & Mishra, 2005). TPACK is a form teacher knowledge to teach with technology because it is not enough just to have knowledge of technology and as a whole the knowledge and insight that underlies the teacher's actions to integrate ICT (Voogt, Fisser, Tondeur, & Braak, 2016). TPACK separately consists of seven components including the intersection, namely TPACK or Technological Pedagogical

and Content Knowledge, PCK or Pedagogical Content Knowledge, TCK or Technological Content Knowledge, TPK or Technological Pedagogical Knowledge, CK or Content Knowledge, PK or Pedagogical Knowledge, TK or Technological Knowledge (Koh, 2020; Schilis & Lyublinskaya, 2019; Thinzarkyaw, 2019; Tseng, 2016). The definitions of the TPACK domain can be seen in Figure 2.

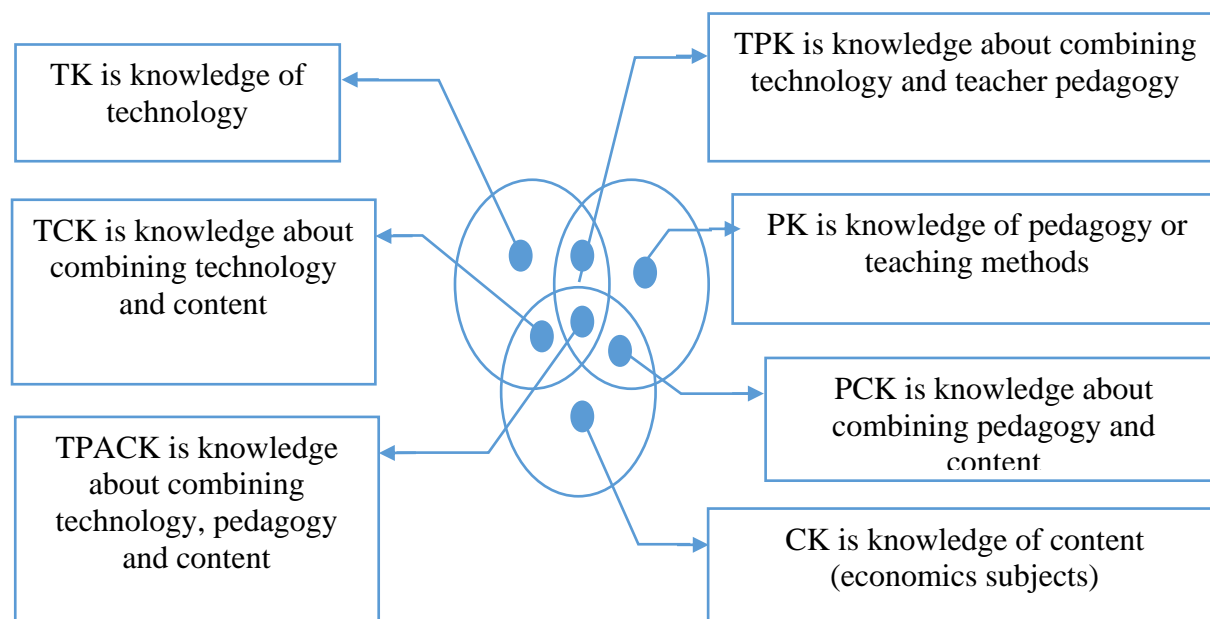


Figure 1. Definition of TPACK domains

Conceptual Framework: TPACK to ICT Integration

TPACK are various domains of teacher knowledge that cannot be separated and must be possessed to integrate ICT effectively (Manfra & Spires, 2013). Based on the theoretical study, it shows that there is a relationship and influence of various TPACK domains on the TPACK variable, but based on previous studies there is a research gap that can be seen in table 2, so that it becomes the reason for further examination. Research results by Habibi, Yusop, & Razak (2019) showed that

TPACK affects the use of ICT ( $\beta = 0.354$ ;  $p < 0.01$ ) supported by research Dong, Xu, Chai, & Zhai (2019) that TPACK is negative effect on teacher technostress is accepted ( $\beta = -0.209$ ,  $p < 0.05$ ) and research results by Özgür (2020) that TPACK helps reduce teacher technostress accepted ( $\beta = -0.244$ ;  $p < 0.05$ ), while the research results Joo, Park, & Lim (2018) showed that TPACK on intention to use technology is not significant ( $\beta = 0.00$ ,  $t = 0.000$ ,  $p > 0.05$ ). The existence of this gap requires further examination. The conceptual framework proposed in this research can be seen in figure 2.

Table 2 Gap of Research of TPACK

Hypothesis				Supported?					
TK→TPK	Yes***	Yes**	Yes***	Yes	Yes****	So Weak	Yes****	Yes***	Yes**
TK→TCK	No	No	Yes***	Yes	Yes****	Weak	Yes****	Yes***	Yes**
PK→TPK	Yes***	Yes**	Yes***	Yes	Yes****	Weak	Yes****	Yes***	Yes**
PK→PCK	No	No	Yes***	Yes***	Yes****	Weak	Yes****	Yes***	Yes**

CK→TCK	No	No	Yes***	Yes	Yes****	Moderate	Yes***	Yes***	Yes**
CK→PCK	No	No	No	Yes	Yes****	Strong	No	Yes***	Yes**
TK→TPACK	Yes***	No	No	Yes	No	No	No	Yes***	No
PK→TPACK	Yes***	Yes**	No	Yes	Yes**	No	No	Yes***	No
CK→TPACK	Yes*	Yes**	No	No	No	No	Yes*	Yes***	No
TPK→TPACK	Yes***	No	Yes***	Yes	No	Weak	Yes****	Yes***	Yes**
TCK→TPACK	No	No	Yes***	Yes	Yes****	Moderate	Yes****	Yes***	Yes**
PCK→TPACK	No	No	Yes***	No	Yes****	Weak	No	Yes***	Yes**
Research Result by	Ching Sing Chai, Koh, Tsai, & Tan (2011)	Ching Sing Chai, Koh, Ho, & Tsai (2012)	Ching Shing Chai, Ng, Li, Hong, & Koh (2013)	Koh, Chai, & Tsai (2013)	Celik, Sahin, & Akturk (2014)	Akman & Güven (2015)	Dong, Cha, Sang, Koh, & Tsai (2015)	(Nordin & Ariffin, 2016)	Habibi, Yusop, & Razak (2019)

Note: ( $p < 0.0001$ )\*\*\*\*, ( $p < 0.001$ )\*\*\*, ( $p < 0.01$ )\*\*, ( $p < 0.05$ )\*

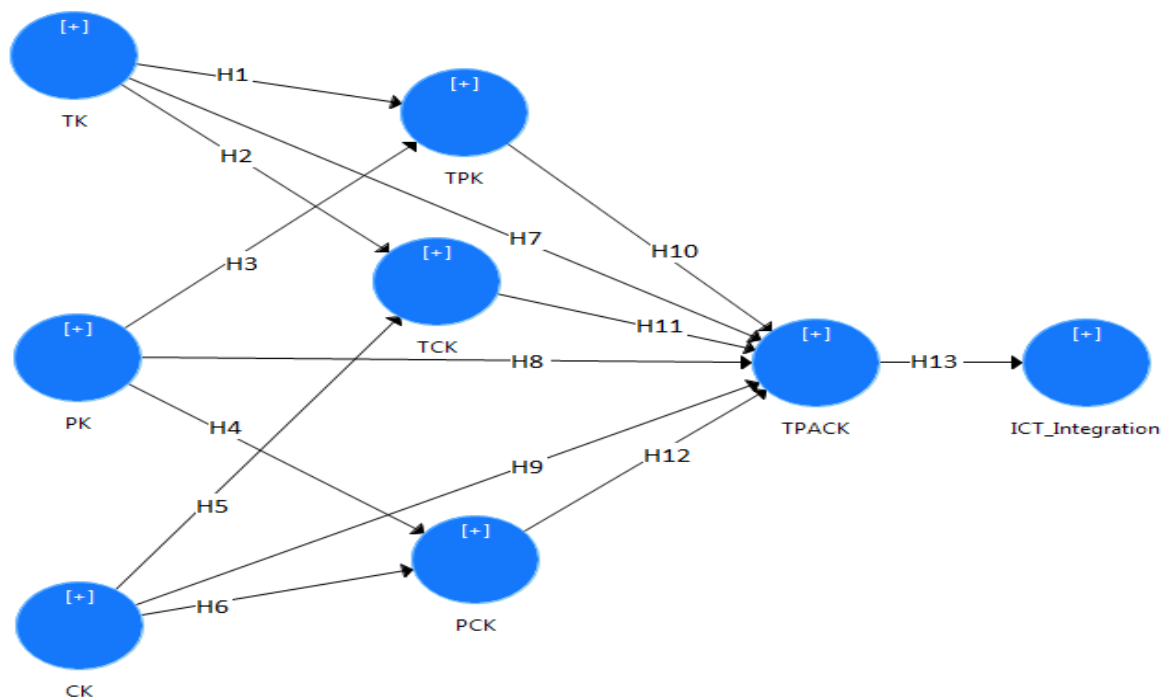


Figure 2. Conceptual Framework

## METHODS

The research method is designed to test the hypothetical model illustrated in Figure 2, so that it uses Structural Equation Modeling analysis techniques.

### Research Design

This research used quantitative technique with a survey method. The data was analyzed descriptively and inferentially. Data analysis technique by confirmatory factor analysis (CFA), calculating the average score, and SEM with the SmartPLS Version 3.3.3 analysis tool. The instrument used 20-item questionnaire with a 6-point likert scale (1 or Strongly Agree, 2 or Agree, 3 or Slightly Agree, 4 or Slightly Disagree, 5 or Disagree, 6 or Strongly

Disagree). Voluntary sampling technique with an online used Google form distributed through social media and then filled by economics teachers voluntarily become research respondents in Indonesia until get enough datas to be processed which was also done by previous studies (Alharbi, 2019; Castéra, Marre, Yok, Sherab, Impedovo, Sarapuu, Pedregosa, Malik, & Armand, 2020; Mulyadi, Wijayatingsih, Budiastuti, Ifadah, & Aimah, 2020; Oakley, 2020; Özgür, 2020; Prasoj, Habibi, Mukminin, Sofyan, Indrayana, & Anwar, 2020; Sanchez & Trigueros, 2020).

## Research Sample

Respondents were 405 economics teachers and the distribution of demographic factors can be seen in table 3.

Table 3 Respondent's Demographic Factors

Demographic Factors	Amount	Percentage (%)
Gender		
Female	283	69.9
Male	122	30.1
Age		
21-30	40	9.9
31-40	63	15.6
41-50	165	40.7
> 50	137	33.8
Grade of Education	315	77.8
Bachelor	90	22.2
Master		
School		
Public School	313	77.3
Private School	92	23.0
Experience		
Teaching	38	9.4
1-5	28	6.9
6-10	67	16.5
11-15	132	32.6
16-20	140	34.6
> 20		
Certification		
Yet	331	18.3
Not Yet	74	81.7

The results of previous studies show that there not significant difference in the practice of TPACK-based teacher educators in terms of gender (Adulyasas, 2017; Junnaina & Hazri, 2012; Koh & Sing, 2011; Thinzarkyaw, 2019), there is no significant difference based on age (Ching Sing Chai, Koh, & Tsai, 2010; Koh & Sing, 2011), not influenced by teaching experience (Adulyasas, 2017; Wulansari, Adlim, & Syukri, 2020), there is no significant difference in teacher TPACK based on grade level (Thinzarkyaw, 2019), professional certification has no significant effect on increasing TPACK (Wulansari, Adlim, & Syukri, 2020). Schools are institutions or buildings for teaching and learning and play an main role in the implementation of the educational process to develop the potential of students so that public schools and private schools both graduate quality human resources in accordance with the goals of national

education in Indonesia. Demographic factors based on previous research there are no significant differences so that the research is continued for the data analysis stage.

## Data Collection Instrument

Questionnaire items in this research were obtained by adopting previous research questionnaire items. Each TPACK construct consists of 2 items adopted from Barišić, Divjak, & Kirinić (2017), Castéra et al. (2020), Habibi, Yusop, & Razak (2020), and Schmid, Brianza, & Petko (2020). The ICT integration construct consists of 3 indicators, namely learning preparation, learning process, and learning evaluation based-ICT each consists of 2 items adopted from Habibi, Yusop, & Razak (2020), Hsu (2017), and Türel, Özdemir, & Varol (2017).

## Data Analysis

Data analysis was done based on the results of CFA to test indicators through measurements of convergent validity, discriminant validity, and construct reliability (cronbach alpha and composite reliability), Goodness of fit, calculating the average score and SEM for hypothesis testing ( $t_{\text{statistic}} > t_{\text{table}}$  (1.966) and p-value) and R Square.

## RESULTS

### Confirmatory Factor Analysis (CFA)

The initial step of confirmatory factor analysis is convergent validity test, it is found that the result in the ICT1 code is less than 0.7 so it is invalid and the item must be removed from the model and continue to discriminant validity test with valid result can be seen in APPENDIX. Confirmatory Factors Analysis. The reliability test has fulfilled so that it continues to goodness of fit.

### Goodness of Fit (GoF)

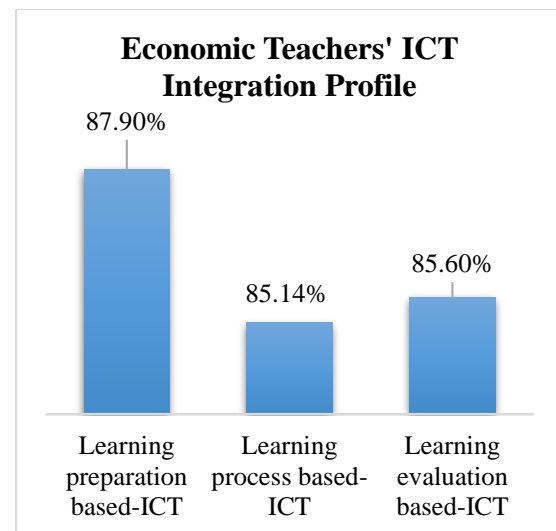
Goodness of fit shown in table 5 is a fit model to continue in hypothesis test.

Table 5 Goodness of Fit

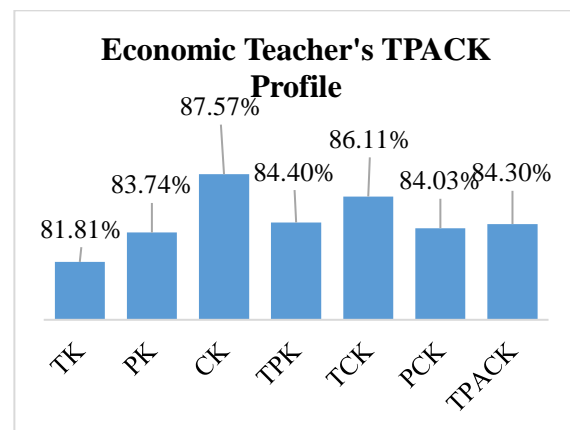
Model Fit Index	Cut Off Value	Output Model	Status
SRMR	SRMR < 0.1	0.1	Fit
d_ULS	> 0.05	5.408	Fit
d_G	> 0.05	0.983	Fit
NFI	<i>Almost 1</i>	0.741	Fit
RMS Theta	<i>Almost 0</i>	0.16	Fit

## Economic Teachers' Profile

The economics teachers' ICT integration and TPACK profile can be seen in Figure 3 which shows the average score of more than 80%. This average score obtained from the sample in this study was 405 respondents. The profile of the economics teacher related to the variables used in this study, which consisted of ICT integration and TPACK and their domains. ICT integration variable consists of 3 dimensions or constructs and TPACK consists of 7 dimensions including TPACK itself. Each construct or dimension describes how much the teacher's ability



(a)



(b)

Figure 3. Profile Economic Teacher: (a) ICT Integration, (b) TPACK

## Hypothesis Test

Table 6 Hypothesis Test

Hypothesis	R <sup>2</sup>	Path Coef.	T-Statistic	T-Table	P-value	Supported?
1 TK→TPK	-	0.332	4.982	1.966	0.000	Yes
2 TK→TCK	-	0.518	11.593	1.966	0.000	Yes
3 TK→TPACK	-	0.063	1.468	1.966	0.143	No
4 PK→TPK	-	0.494	6.692	1.966	0.000	Yes
5 PK→PCK	-	0.476	9.353	1.966	0.000	Yes
6 PK→TPACK	-	0.058	1.326	1.966	0.186	No
7 CK→TCK	-	0.351	5.081	1.966	0.000	Yes
8 CK→PCK	-	0.375	6.219	1.966	0.000	Yes
9 CK→TPACK	-	0.015	0.417	1.966	0.677	No
10 TPK→TPACK	-	0.162	3.120	1.966	0.002	Yes
11 TCK→TPACK	-	0.276	6.985	1.966	0.000	Yes
12 PCK→TPACK	-	0.444	8.825	1.966	0.000	Yes
13 TPACK→ICT Integration	0.365	0.580	5.978	1.966	0.000	Yes

Based on Table 6 there is an influence between the variables is unidirectional or positive which

can be seen in the beta value or path coefficient which is positive. The hypothesis is accepted if

tstatistic > ttable and P-value < 0.05 (Sarwono & Narimawati, 2015; Wiyono, 2020). Ttable at the level of significance 5% is 1.966, so it can be concluded that most models have a significant effect because tstatistic bigger than ttable supported P-value less than 0.05, except for TK, PK, and CK on TPACK with tstatistic (1.468; 1.326; and 0.417) less than ttable (1.966) so it has no significant effect supported P-value more than 0.05 are 0.143; 0.186; and 0.677. Overall, the influence of the TPACK components in this study supports the results of previous studies Habibi, Yusop, & Razak (2019). This is due to the fact that teachers' TPACK knowledge is influenced by the intersection of TPACK components, namely TPK, TCK, PCK and it is not enough if only one-unit knowledge is TK, PK, and CK.

Based on tstatistic the effect of TPACK on ICT integration is 5.978 more than ttable so that TPACK has a significant influence on ICT integration and supports previous research by Habibi, Yusop, & Razak (2019) because the use of the TPACK framework can help reduce the pressure on teachers to use ICT (Dong, Xu, Chai, & Zhai, 2019; Özgür, 2020) and reject the results of other previous studies by Joo, Park, & Lim (2018) which show that TPACK has no effect on intention to use technology. The contribution of TPACK's influence on ICT integration is 36.5% obtained from the value of R square.

## DISCUSSION

### Economic Teachers' ICT Integration Profile

Based on Figure 3 point (a), for learning preparation based-ICT the highest is 87.90% which indicates that economics teachers have made better preparations because teachers have a lot of time to look for materials, prepare materials, compile materials, make powerpoints, study ICT to be used, and determine the ICT used including google classroom, schoology, edmodo, zoom cloud meeting, moodle, whatsapp group, other educational sites or applications. The economics teacher's learning process based-ICT is at least 85.14%, his can be caused by

problems in the online learning process such as difficult signals and student unpreparedness so that it is not in accordance with the learning implementation plan which consists of material presentation processes and online learning with lectures, discussions or to respond to questions asked by students via google classroom or g-classroom, edmodo, moodle, zoom cloud meeting schoology, whatsapp group or other educational sites / apps referenced by the school. Followed by 85.60% learning evaluation based-ICT, it shows that the teacher's ability is slightly higher than the online learning process because it can be prepared in advance such as making questions first and uploading questions on online assessment sites, then students just work on them through google form, typeform, planet survey or other online assessment sites.

### Economic Teachers' TPACK Profile

Based on Figure 3 point (b), the lowest TK is 81.81% this can be due to the teacher's lack of knowledge about various applications and online learning sites or websites but even so, the teacher's knowledge is more than 80%, such as google classroom, schoology, edmodo, zoom cloud meeting, moodle, whatsapp group, other educational sites or apps referenced by the school. The PK teacher 83.74% indicates that the pedagogical knowledge of the teacher is slightly higher than the knowledge of technology, this can be due to the teaching experience of the teacher who has long taught in the field of education such as learning methods and assess student learning outcomes. The CK component is the highest level of 87.57% this can be because the material has been studied by the teacher since taking education in the economics education department and they have a way of increasing their knowledge and understanding of economic subjects such as searching the internet. The intersection of the TPACK components, namely TPK, TCK, and PCK respectively 84.40%, 86.11%, and 84.03% indicates that teacher knowledge has reached 80% which can be caused by the teacher's habit of combining TK with PK, TK with CK, and PK with CK during the pandemic until now. Meanwhile, the TPACK of teachers shows that



84.30% is the result of a combination of knowledge of technology, pedagogy, and content.

#### TPACK to ICT Integration

Based on the hypothesis test, TPACK is formed from the intersection of the TK, PK, and CK, namely TPK, TCK, and PCK. This is supported by the statement of Celik, Sahin, & Akturk (2014) and Dong et al. (2015) that TPACK is a construct formed from the intersection of TPK, TCK, and PCK. To be clearer about the TPACK construct framework, it can be seen in Figure 4 that what is meant by TK in this study is teacher knowledge about the internet, powerpoint, social media in the form of whatsapp groups, video conferences (zoom, g-meet, skype), learning management system or LMS. (g-classroom, edmodo, schoology, moodle, or other educational sites or applications referred by the school), online assessment or evaluation sites (g-form, typeform, survey panet or other online

assessment sites) and various ways to use the ICT. Then PK is related to the learning model used during the pandemic, namely the online learning model that can be combined with the lecture, discussion, or question-and-answer method, as well as giving independent assignments to follow up on students who are lacking in minimum completeness criteria. While the CK referred to in this study is the content or material for economic subjects at the high school level and its equivalent in both public and private schools. TPK is the teacher's knowledge to combine their technology and pedagogy. TCK is the teacher's knowledge to combine technology and content or subject matter. PCK is teacher knowledge to combine pedagogy and content or subject matter. The final result is TPACK, namely teacher knowledge to combine a set of ICT with pedagogical knowledge possessed and knowledge of content or economic subject matter.

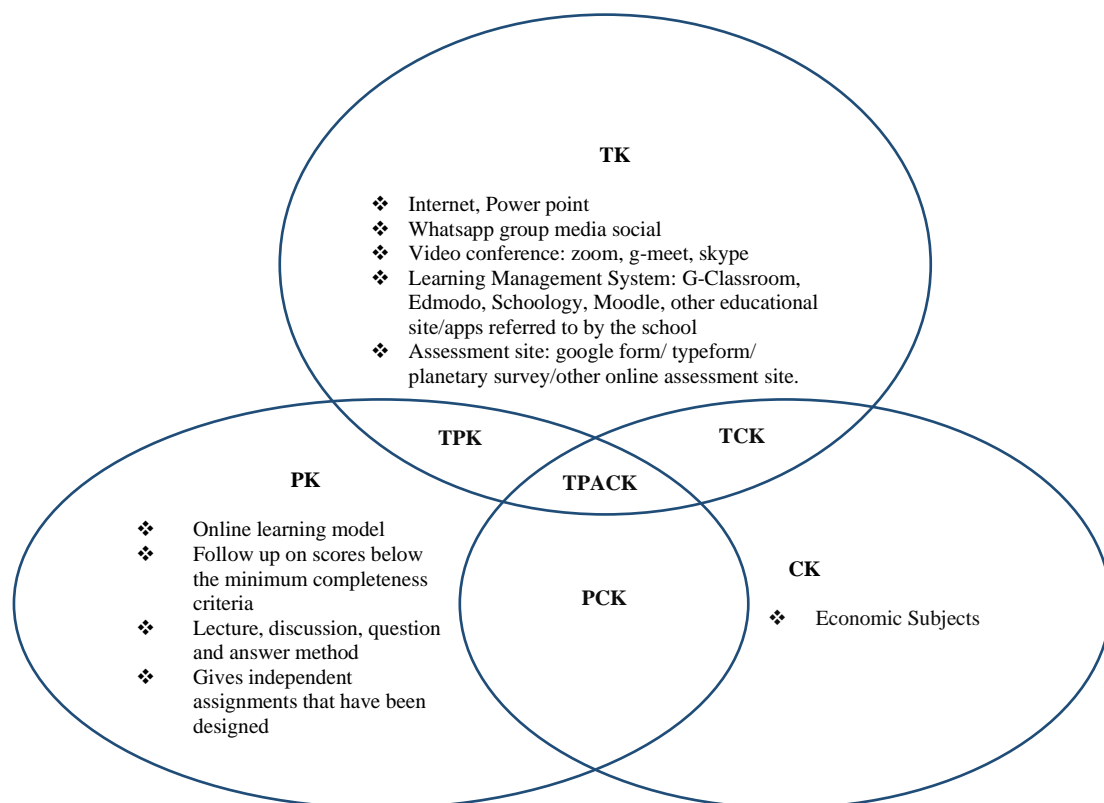


Figure 4. TPACK Construct Mapping

Based on the hypothesis test, it shows that TPACK has an effect on ICT integration. Then

the average TPACK score and teachers' ICT integration is more than 80% this can be caused

by the habits that teachers do during the pandemic so that the TPACK knowledge and teachers' ICT integration skills become honed and increase. Supported by the results of a survey from the Indonesian's Ministry of Education and Culture that pandemic the Covid-19 requires online learning to increase mastery of technology that supports learning, more varied teaching methods, increased ability to assist remote students, increased learning assessments, and increased ability to plan lessons (Retnawati, 2020b). Although conventional learning methods are still dominant, more varied learning methods in the form of utilizing digital learning resources, providing interactive materials, and making creativity projects are also increasingly being carried out (Retnawati, 2020b). For the lowest TPACK component in technological knowledge (TK) this can be caused by the lack of teacher literacy in ICT according to previous research that learning in Indonesia is mostly still using WhatsApp group (WAG) social media only with a percentage of 84% (Lie et al., 2020). So that a workshop or training is needed to study ICT-based learning, this is because the TK of teachers based on the results of this study is still low which has been attempted by the Ministry of Education and Culture in an online and free teacher ICT competency improvement program called "Pembatik" or "ICT-based learning". In addition to the teacher's ICT competency improvement program, several efforts can be made, including (1) Providing and improving the condition of online learning support facilities such as electricity, internet, gadgets, and computer/laptop devices, (2) Providing training and assistance in distance learning management and the use of media. The online learning to school principals and teachers, (3) Conducting socialization on the Circular Letter of the Minister of Education and Culture No. 4 of 2020 regarding the Implementation of Education in the Emergency Covid-19 intensively, (4) Encouraging teachers to optimize the use of communication media, especially social media as a means of providing more interactive learning, (5) Monitoring and evaluating teacher performance during implementation of learning from home, and (6)

Expanding the use of online learning platforms (Retnawati, 2020b).

Based on the research results, TPACK has a significant influence in integrating ICT but less than 50% so that it can examine other variables or factors that can influence teachers in ICT integration. Meanwhile, 36.5% of ICT integration is influenced by TPACK while the remaining 63.5% is influenced by other factors. In addition to TPACK that can affect the integration of ICT to support online learning during the Covid-19 pandemic, are creativity, readiness, and other teacher competencies (Anoba & Cahapay, 2020; Basilaia & Kvavadze, 2020; Cascini, Nagai, Georgiev, & Zelaya, 2020; Chemi, 2020; Hadar, Ergas, Alpert, & Ariav, 2020; Kallou, Mitchell, & Kamalodeen, 2020; Morales, Morales, & Taibo, 2021; Nuere & de Miguel, 2020). Another reference also mentions that other factors besides TPACK that affect ICT integration before adopting and integrating ICT in learning are the teacher's self-assessment ability, use and integration of ICT, teacher beliefs, access constraints, resources for professional development, leadership, needs and desires, and demographics (O'Reilly, 2016).

## **CONCLUSION AND RECOMMENDATIONS**

This study provides education stakeholders with new insights regarding the integration of ICT used and teacher TPACK to find out the profile of teacher ICT integration and TPACK in Indonesia. This quantitative research study will also suggest gaining a deeper understanding of TPACK in relation to ICT integration and gaining deeper insight into the factors influencing ICT integration. The instrument has been tested and fulfills the validity and reliability tests or fulfills the CFA requirements then goodness of fit to proceed to hypothesis testing. Data analysis is in accordance with the statement items filled out by the respondents. It can be concluded that to be able to integrate ICT, teachers need to have TPACK. TK shows the lowest value so that

treatment needs to be continued to increase teacher knowledge on aspects of technology used in learning, especially online learning. Then teachers must also improve their competence and skills independently by attending seminars, workshops, or competency improvement programs organized, especially by the Ministry of Education and Culture. This study only aims to determine the profile and influence of TPACK on ICT integration for economics teachers without any treatment, so that future research can provide training, workshops, seminars, or socialization in order to improve teacher competence in integrating ICT.

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