FACTORS AFFECTING TEACHERS' ONLINE LEARNING EXPERIENCES IN PROFESSIONAL DEVELOPMENT PROGRAM: STRUCTURAL EQUATION MODELLING

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ABSTRACT

There is a sudden transition in education during this pandemic era of COVID-19. Students' learning which is previously conducted in an offline face-to-face meeting should shift to online learning. This sudden change surely affects students' learning experience. In the attempt to create a better online learning, this study investigates the interplay of the factors affecting participants' online learning experience namely self-directed learning and TPACK (Technological, Pedagogical, and Content Knowledge). A quantitative study using Partial Least Square- Structural Equation Modeling (PLS-SEM) model analysis was employed to explore this issue. A total of 434 in-service teachers joining an online Teacher Professional Development program participated in this study. The results show that Self-directed learning and TPACK are positively and significantly associated with online learning experience. It indicates that students with high self-directed learning skills and TPACK are predicted to have a positive and satisfying online learning experience. Further implication for pedagogy and future research recommendation is discussed.

Keywords: COVID-19, online learning, self-directed learning, TPACK.

INTRODUCTION

Pandemic era of COVID-19 has started in 2020 and has not ended yet. During this era, many sectors, including education, has been forced to adapt to this "new normal" era where offline meetings are limited and shortened. As teacher education is essential, government attempts to conduct it even in this "crisis". In Indonesia, in which this study was conducted, teacher education, or known as teacher professional development (TPD), was conducted virtually using Learning Management Systems (LMS) for avoiding the spread of the virus. While prior years give opportunities to teachers to upgrade their skills in offline programs, in this new era, they are accustomed to join it virtually. This forced condition surely has various impacts depending on many factors. Furthermore, teachers, specifically in Indonesia, struggled in facing online TPD due to lack of ICT literacy and skills (Sari, 2012; Widodo & Riandi, 2013). This phenomenon was seen from the lower participation on the online sessions compared to the face-to-face sessions. Voogt & Mckenney (2016) augmented that teachers faced difficulties in using technology in their courses. However, it surely depends on many factors. Every individual should have different impact of the sudden online learning implication.

While researchers proved the effectiveness of online learning (Harasim, 2017), others reported differently. The studies of Hart et al. (2019) and Panigrahi et al. (2018) reported that students struggled in online learning. This issue also probably happens to in-service teachers who are joining an online TPD. Furthermore, many skills are required to support teachers' success in online TPD. Maksum et al. (2021) showed that self-directed learning support online learning in a way where the participants have positive and satisfying learning experiences. However, since the context and subjects are different, the effect of self-directed learning skills for in-service teachers' joining an online TPD remains least explored.

Looking at the importance of TPD, it is no wonder that teacher professional development (TPD) has been a research interest for years. Reeves & Li (2012) reported that teachers viewed online TPD to be as effective as a face-to-face one. Meanwhile, Sato & Haegele (2017) examined PE teachers' experience in joining an online TPD and found that the teachers, despite its limited time of face-to-face meetings, experienced positive learning experiences. In the same year, Rodesiler reported an online teacher-developed professional program gave positive impact for teachers' development. Marin et al. (2018) explored how to support teachers in online collaboration in the case of teacher professional development. They found that prior learning experience is essential in online collaborative learning and that their proposed platform, ILDE, was somehow able to solve this problem. In 2019, Li et al. informed that teachers in rural area had positive perception of easy-of-use, usefulness, and satisfaction from an online TPD. Quinn et al. (2020) examined the challenges of an online professional learning and development (PLD) faced by teachers in rural area. They proposed that online PLD needs more technological supports and suitable approach for teachers in rural area. Last, Deiaco et al. (2021) found that videos, interactive activities, discussion forums were the activities fostering teachers' critical reflection which benefits for their future classes.

Viewed from those prior studies, students' online learning experience in TPD was frequently explored. However, while online learning experience may determine the success of an online TPD, the factors affecting this learning experience was rarely examined. To respond to this issue, this current study aims to find out the interplay of self-directed learning and TPACK to the students' online learning experience in a LMS-based online TPD using exploratory factor analysis with Partial Least Square- Structural Equation Modeling (PLS-SEM) model analysis. This study will shed light on the factors affecting online learning experience to create an effective and successful online TPD.

LITERATURE REVIEW

Online TPD

In joining an online TPD, one of required skills needed by students is self-directed learning. Those with this skill are eventually able to manage, maintain, monitor, and evaluate their learning which leads them into a successful and satisfying learning experience. Wong (2020) reported that students with high skill of self-directed learning, as well as in-service teachers joining an online TPD, have more benefits in online learning than those with the lower one. This skill probably leads them into a more positive view of online learning. Furthermore, Maksum et al. (2021) proved that self-directed learning skills contributed positively to the learning outcomes and experiences. It indicates that self-directed learning skills are required in achieving a successful online learning.

Researchers studied on how to improve and facilitate self-directed learning for years. Ladell-thomas (2012) designed a web-based module to facilitate the students in learning independently. This module somehow facilitated the students in their independent learning and improved their self-directed learning skills. Lai et al. (2016) reported that online platform training gave opportunities for the students to enhance their self-directed learning skills, specifically in using technology to support their learning. Furthermore, students' motivation also affected their willingness to join an online course (Song & Bonk, 2016). Also, Kara (2021) showed that self-directed learning skills, students' motivation, and students' characters were predictors to achieve a successful online learning. It indicates that students need to pay attention to these factors to achieve a successful online learning.

TPACK and Online Learning for Teacher Professional Development

TPACK (Technological Pedagogical and Content Knowledge) is a framework designed to achieve effective teaching and enhance students' learning using technology (Dimitrios & Athanassios, 2019). It means that this framework has aims to use technology effectively to support teaching and learning process. The study conducted by Chai et al. (2013) proved that TPACK is able to examine teachers' knowledge and skills in conducting class using ICT. Furthermore, this framework was also used to design and examine TPD which aims to integrate technology into classroom practices (Chai et al., 2017; Foulger et al., 2017). There are three main components of TPACK namely (1) Technological Knowledge (TK), (2) Content Knowledge (CK), and (3) Pedagogical Knowledge (PK) (Koehler et al., 2013).

Technological Knowledge (TK) is related to the teachers' knowledge of technologies which can support their teaching (Spector et al., 2014). This kind of knowledge is surely important when teachers join an online TPD and teach the students in their class. Specifically during this pandemic era of COVID-19, technological knowledge (TK) is essential to support teaching and learning process (Crawford et al., 2020). Furthermore, lack of this knowledge impedes teachers in learning and teaching since the whole activities are done using technologies. Sancar-tokmak & Yanpar-yelken (2015) reported that teachers' confidence in using technologies improved as they have prior experiences in using the technology (i.e. creating digital stories). Another study conducted by Rets et al. (2020) showed that teachers' TPACK developed through experiencing a virtual exchange (VE). It indicates that prior learning experience is closely related to teachers' TPACK development and confidence. Furthermore, Nazari et al. (2019) emphasized that experienced and novice teachers have differences in technological knowledge (TK). As predicted, novice teachers, who are commonly younger than experienced teachers, have higher technological knowledge (TK) than experienced teachers.

Content Knowledge (CK) is the teachers' knowledge on the subject they teach (Spector et al., 2014). When teachers have limited content knowledge (CK), they surely will not be able to teach well. Makumane (2021) showed that students in an online TPD supported online learning as it can be accessed anywhere and anytime. They enjoy online learning as they can somehow apply the same teaching method in their own classroom. Furthermore, their factual perception or content knowledge is influenced by their habitual perceptions (pedagogical knowledge) which means that their preference of the teaching method affects their online learning' acceptance.

Pedagogical Knowledge (PK) is the teachers' knowledge of pedagogical practices such as teaching strategies and methods to help students' learning (Spector et al., 2014). Nazari et al. (2019) reported that experienced teachers have higher Pedagogical Knowledge (PK) than novice teachers. The reason is probably because experienced teachers have many teaching experiences and have taught students from different backgrounds that their teaching strategies are milled and improved simultaneously. Having high pedagogical knowledge will somehow ease them in learning the materials in online TPD, so they are predicted to have enjoyable learning experience.

Research Model and Hypothesis

The research purpose is to examine the the interplay of self-directed learning and TPACK to the students' online learning experience. Reviewing the theories and previous studies, the three variables, namely TPACK, Self-directed learning, and online learning experience, are expectedly associated to one another. Students with high self-directed learning skills and TPACK can be assumed to have positive and satisfying online learning experience. Figure 1 represents the conceptual framework with eight potential hypotheses.

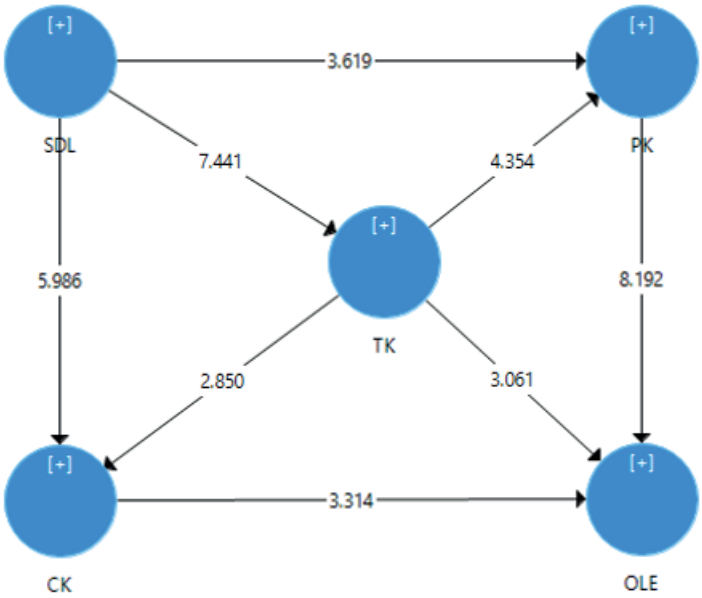

Figure 1. The conceptual framework

Looking at the conceptual framework, explicitly stated, this study tested these eight hypotheses as follows:

H1: Content Knowledge (CK) is associated with online learning experience.

H2: Pedagogical Knowledge (PK) is associated with online learning experience.

H3: Self-directed learning is associated with Content Knowledge (CK).

H4: Self-directed learning is associated with Pedagogical Knowledge (PK).

H5: Self-directed learning is associated with Technological Knowledge (TK).

H6: Technological Knowledge (TK) is associated with Content Knowledge (CK).

H7: Technological Knowledge (TK) is associated with online learning experience.

H8: Technological Knowledge (TK) is associated with Pedagogical Knowledge (PK).

Also, since this study examines the interplay of self-directed learning (SDL), technological pedagogical and content knowledge (TPACK), and online learning experience, this research questions are stated as follows:

RQ1: Is self-directed learning (SDL) associated with technological pedagogical and content knowledge (TPACK)?

RQ2: Is technological pedagogical and content knowledge (TPACK) associated with online learning experience?

METHOD

Research Design and Data Collection

This exploratory research examined the factors (i.e., self-directed learning, technological knowledge (TK), Content Knowledge (CK), and Pedagogical Knowledge (PK)) affecting students' online learning experience regarding LMS implementation for teacher professional development program in Indonesia, specifically in this pandemic era of COVID-19. This study employed quantitative approach using Partial Least Square-Structural Equation Modeling (PLS-SEM) (Ringle et al., 2015) model analysis. It was conducted from November to December 2021. The participants were students, who are in-service teachers, joining a Teacher Professional Development (TPD) program named Pendidikan Profesi Guru (PPG) in two universities in Papua, Indonesia. The participants were 434 in total (female = 76% and male = 24%). Furthermore, the participants were in various major namely early childhood education (42%), mathematics (12%), Chemistry (25%), and physics (21%). The number of the online classes in last year were 1-5 classes (54,9%), 6-10 classes (21,1%), and >10 classes (14,1%).

Research Instrument

Google form-based online questionnaires were employed to gather the data. The variables of this study were technological-pedagogical-content knowledge (TPACK), self-directed learning (SDL), and online learning experience (OLE). The researcher adapted the instrument from the previous study conducted by Schmid et al. (2020)which beside their inherent methodological limitations present constraints related either to the validity, reliability, or practical applicability of existing instruments. Furthermore, the internal structure of the TPACK framework is a topic of debate. The two goals of this study were (1 for the TPACK variable, Chung et al. (2020) for the self-directing learning variable, and Okwumabua et al. (2011) for the online learning experience variable. This study formulated 12 questionnaire items to do the measurement. The researcher conducted a back translation in the instrument by translating the language from English to Indonesia which was done by a doctoral student majoring in translation study. This study used 5-point Likert scale with 1 = very disagree to 5 = very agree. Besides, the researcher also gathered demographic information of the participants in the instrument such as their gender, discipline, time using laptop, and time spending to access internet. Furthermore, to adapt to the context and conditions of the participants who came from Papua, the researcher ensured the reliability and validity of the instrument by carrying out several stages. First, this study used face validity by involving three experts from the fields of education, linguistics, and technology. Based on the face validity, the experts revised two items on Content Knowledge (CK) and one item on Self-directed

learning (SDL). Then, the researcher also involved five potential participants in conducting content validity. Then, this study evaluated the reliability and validity of the items by conducting pilot testing on 50 PPG program students at other universities in Papua. The data obtained from the pilot testing was then analyzed using the SPSS 23 program with the results of Cronbach's alpha = .813 and r value = .62 - .82. Thus, the instrument is categorized as having a good degree of reliability and validity.

Data Analysis Procedures

This study employed PLS-SEM analysis rather than CB-SEM since an exploratory research is unsuitable to be conducted using CB-SEM which is commonly used to confirm established theory (Joe F. Hair Jr. et al., 2017) knowing the appropriate technique can be a challenge. For example, when considering structural equation modelling (SEM. The researcher used the SmartPLS 3.2 (Ringle et al., 2015) software in conducting PLS-SEM analysis. This study designed a reflective model based on the focus of the variables. In evaluating the reflective model, the researcher carried out two stages of analysis, namely measurement model and structural model assessment (Joseph F Hair Jr et al., 2021). In conducting the measurement model assessment, this study formulated the model (inner and outer). Then, the researcher analyzed the outer model to obtain the value of indicator loading, internal consistency reliability, convergent validity, and discriminant validity. Last, the study conducted a structural model assessment to obtain the value of Variance Inflation Factor (VIF), path coefficients, coefficient determination, and effect size.

FINDINGS

Measurement Models

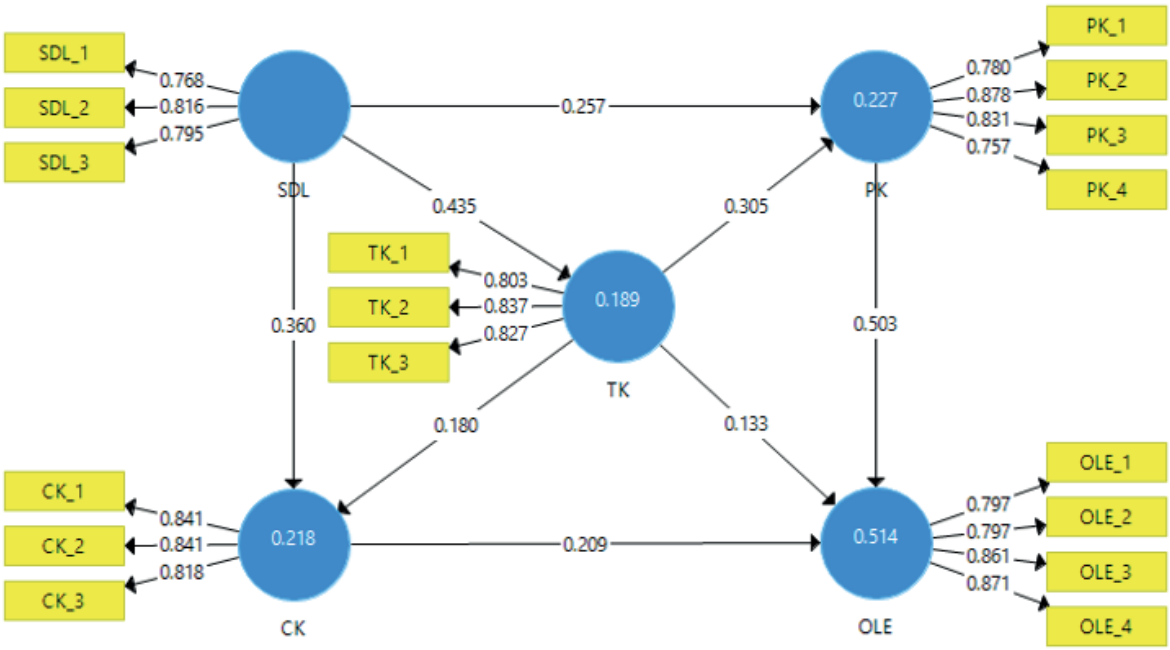

Figure 2. The proposed model

In carrying out the measurements model assessment, the researcher took the first step by proposing a specification model. The specification model (see Figure 2) is categorized as a reflective model where the construct is manifested in Hair indicators. In detail, the exogenous construct contained in the model is self-directed learning (SDL) which has three indicators. Then, the exogenous and endogenous model includes pedagogical knowledge (PK) with four indicators, technological knowledge (TK) and content knowledge (CK) with three indicators for each. Last, the endogenous construct is online learning experience (OLE) with four indicators.

Outer Model Evaluation

Table 1. Measurement model of reflective construct

Construct	Cronbach's Alpha	rho_A	Composite Reliability	AVE
CK	0.781	0.783	0.872	0.695
OLE	0.851	0.853	0.900	0.693
PK	0.828	0.835	0.886	0.661
SDL	0.706	0.712	0.836	0.629
TK	0.764	0.775	0.863	0.677

Then, this study conducted an outer model evaluation to ensure the validity and reliability of the instrument by assessing the indicators. This stage was used to obtain the value indicator loading, Cronbach's Alpha, composite reliability, Average Variance Extracted (AVE), Fornell-Larcker criterion, Heterotrait-monotrait Ratio (HTMT). Indicator loading (see Figure 2.) in the construct SDL = 0.768-0.816, TK = 0.803-0.837, PK = 0.757-0.878, CK = 0.818-0.841, OLE = 0.797-0.871. Based on the loading indicator obtained in the range of 0.757-0.871, the range of numbers met the recommended threshold of > 0.708 (Joseph F. Hair et al., 2019), so convergent validity was achieved. Furthermore, in ensuring internal consistency reliability, this study referred to Cronbach's alpha (α) and composite reliability (CR) scores (see Table 2). The score is above the recommended threshold > 0.600 (Tavakol & Dennick, 2011) and the composite reliability obtained is above the recommended threshold, which is between 0.70-0.90 (Joe F. Hair et al., 2014). Furthermore, the AVE obtained is in the range of 0.629-0.695 which is in accordance with the recommended minimum threshold of 0.500 (Joe F. Hair et al., 2014).

Table 2. Fornell-Larcker criterion

Construct	CK	OLE	PK	SDL	TK
CK	**0.834**				
OLE	0.554	**0.832**			
PK	0.597	0.683	**0.813**		
SDL	0.438	0.372	0.390	**0.793**	
TK	0.336	0.412	0.417	0.435	**0.823**

In evaluating discriminant validity to ensure that each construct is different from other constructs, so this study expanded the analysis by comparing the scores on the Fornell–Larcker criterion with the AVE. The obtained value on the AVE must be lower than the value on the shared variance of all constructs in the Fornell–Larcker criterion. Based on the score for the Fornell-Larcker criterion (see bold value in Table 3), the obtained score is higher than the score in the AVE (see Table 2). Finally, the researcher evaluated the acquisition value on the Heterotrait-Monotrait-Ratio (HTMT) with a threshold not exceeding 0.850 (Joseph F Hair Jr et al., 2021). The obtained values in HTMT (see Table 4) are in the range of 0.426-0.808. Based on the obtained value in the AVE analysis, Fornell–Larcker criterion, and HTMT, it can be concluded that discriminant validity was achieved.

Table 3. HTMT

Construct	CK	OLE	PK	SDL	TK
CK					
OLE	0.675				
PK	0.744	0.808			
SDL	0.582	0.485	0.506		
TK	0.426	0.501	0.505	0.585	

Structural Model Assessment

Then, the researcher conducted a structural model assessment. The first step was to conduct a collinearity test to obtain the Variance Inflation Factors (VIF) value. This stage was carried out to ensure that there was no multicollinearity issue that can impact the patch significance test which can be affected by reliability and validity (Kock & Lynn, 2012). The threshold required in the VIF is not more than 3,300 (Joseph F Hair Jr et al., 2021) . The obtained value of VIF (see Table 5) is in the range of 1,000-1,693 on the five constructs. Based on these figures, it can be concluded that there is no issue of multicollinearity.

Table 4. VIF Values

Construct	CK	OLE	PK	SDL	TK
CK		1.578			
OLE					
PK		1.693			
SDL	1.233		1.233		1.000
TK	1.233	1.228	1.233		

Then, this study conducted a boostrap using the significance level of 0.05. Based on the results of the path analysis (see Figure 3), each value in each construct shows (+1) which is categorized as having a strong positive relationship (Joe F. Hair et al., 2014). The next stage was the hypothesis examination using the t-value criteria > 1.96 which is used as a reference in accepting the hypothesis based on the significance level of 0.05 (Joseph F. Hair et al., 2019). Based on the t-value (see T statistics in Table 6), it shows that all the hypotheses formulated are accepted. SDL is a significant predictor for PK ($\beta = 0.257$; $t = 3.619$; $p < 0.000$); TK ($\beta = 0.435$; $t = 7.441$; $p < 0.000$); and CK ($\beta = 0.360$; $t = 5.986$; $p < 0.000$). Meanwhile, TK is a significant predictor for PK ($\beta = 0.305$; $t = 4.354$; $p < 0.000$) and CK ($\beta = 0.180$; $t = 2.850$; $p < 0.005$). Furthermore, PK, TK, and CK are the significant predictor for OLE ($\beta = 0.503$; $t = 8.192$; $p < 0.000$); ($\beta = 0.133$; $t = 3.061$; $p < 0.002$); ($\beta = 0.209$; $t = 3.314$; $p < 0.001$).

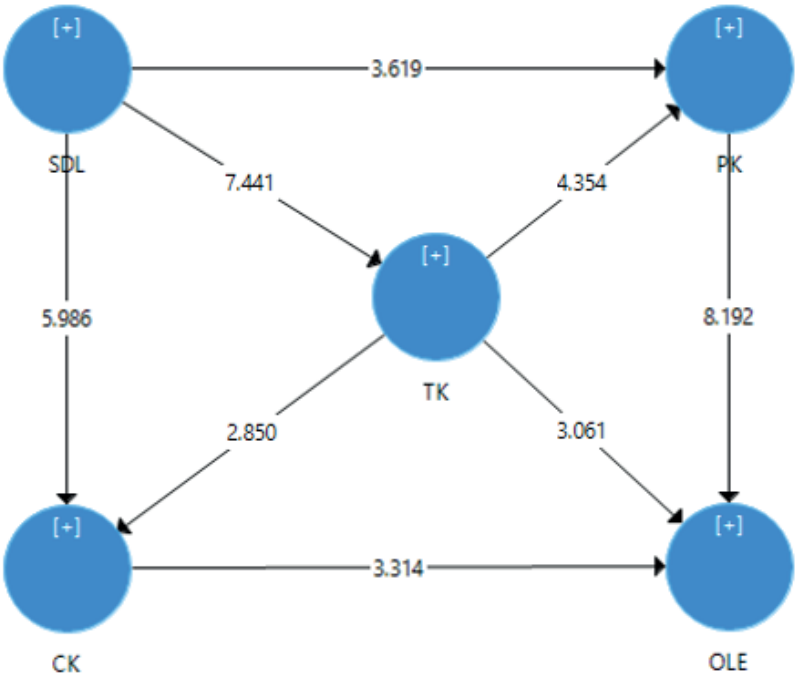

Figure 3. Bootstrap results for path analysis

Table 5. Summary of the final result

Path	β	Mean	SD	T Statistics	P Values	Sig
SDL -> PK	0.257	0.262	0.071	3.619	0.000	Yes
SDL -> TK	0.435	0.436	0.058	7.441	0.000	Yes
SDL -> CK	0.360	0.366	0.060	5.986	0.000	Yes
TK -> PK	0.305	0.300	0.070	4.354	0.000	Yes
TK -> CK	0.180	0.176	0.063	2.850	0.005	Yes
PK -> OLE	0.503	0.505	0.061	8.192	0.000	Yes
TK -> OLE	0.133	0.134	0.043	3.061	0.002	Yes
CK -> OLE	0.209	0.211	0.063	3.314	0.001	Yes

Table 6. Coefficient determination (R^2)

	R Square	R Square Adjusted	Consideration
CK	0.218	0.212	Substantial
OLE	0.514	0.508	Moderate
PK	0.227	0.221	Substantial
TK	0.189	0.186	Substantial

Furthermore, the researcher performed an analysis to obtain the coefficient of determination (R^2) which is the variance proportion parameter to determine how exogenous variables can predict endogenous variables. There are three levels namely 0.75, 0.50, 0.25 (substantial, moderate, weak) (Joe F. Hair et al., 2014). The R^2 value (see Table 7) shows that only OLE has moderate level coefficient of determination. Meanwhile, other variables (CK, PK, and TK) have a substantial level. Then, the last analysis step is to determine the effect size (f^2). f^2 has a range of levels in the form of .02, .15, and .35 (small, medium, large) (Joseph F Hair Jr et al., 2021). Based on the results of the analysis (see Table 8) CK and TK have a small effect, while PK and SDL have a medium effect.

Table 7. Effect size (f^2)

Construct	f^2	Effect size
CK	0.057	small
PK	0.307	medium
SDL	0.146	medium
TK	0.054	small

DISCUSSIONS

This study aimed to explore the factors affecting students' online learning experience as they joined an online TPD using Learning Management System (LMS) in universities in Indonesia. The students here are in-services teachers from childhood education, mathematics, Chemistry, and physics. The analysis of this study reveals that there is a positive and significant relationship between Content Knowledge (CK) and online learning experience, Pedagogical Knowledge (PK) and online learning experience, Self-directed learning and Content Knowledge (CK), Self-directed learning and Pedagogical Knowledge (PK), Self-directed learning and Technological Knowledge (TK), Technological Knowledge (TK) and Content Knowledge (CK), Technological Knowledge (TK) is associated with online learning experience, and also Technological Knowledge (TK) and Pedagogical Knowledge (PK). Thus, all eight hypotheses of this study were accepted.

The first, second, and third results show that Self-directed learning is positively and significantly associated with Pedagogical Knowledge, Technological Knowledge, and Content Knowledge. It indicates that students' good self-directed learning skills coincide with the higher Technological, Pedagogical, and Content Knowledge (TPACK). As students with self-directed learning manage to maintain, monitor, and evaluate their learning (Wong, 2020), they will surely manage to learn more easily than those with low self-directed learning skills in comprehending the knowledge including TPACK, specifically in an online TPD in which this study was taken in. Having good self-directed learning makes students motivated and interested in the learning (Cho et al., 2021). This high motivation leads the students to learn more about the materials in their class, including TPACK, and it results in their TPACK development. The finding of this present study informs another predictor affecting students' TPACK, specifically in online learning.

The fourth and fifth results show that Technological Knowledge (TK) is positively and significantly associated with Pedagogical Knowledge (PK) and Content Knowledge (CK). These findings indicate that having high Technological Knowledge will make the students, who are in-service teachers, have Pedagogical Knowledge and Content Knowledge, specifically in online learning. These findings inform how those students, who are in-service teachers, manage their class after finishing their online TPD and starting teaching in their own classes. As teaching online requires different technological skills and pedagogical approaches that offline face-to-face learning (Gurley, 2018), when teachers have good technological knowledge, they will somehow manage their teaching strategies and improve their knowledge of the subject' content they teach, supported by their technological knowledge. Furthermore, Howard et al. (2020) reported that due to sudden transition from face-to-face learning to online learning, teachers have only limited time to upgrade their skills and prepare the courses which may results in the decreasing of the teaching and learning quality. This problem may be solved easier when the teachers have good technological knowledge. They will be more ready to upgrade their skills and subject materials which are easily found online.

The sixth, seventh, and eighth results show that Pedagogical Knowledge (PK), Technological Knowledge (TK), and Content Knowledge (CK) are positively and significantly associated with Online Learning Experience. It indicates that students' TPACK affects their online learning experience. Students with high TPACK should have more positive and satisfying online learning experience. As reported by Rets et al.'s (2020) that teachers' TPACK were developed through joining an online courses, this finding somehow gives new additional insight that students' TPACK supports online learning experience positively. Nasri et al. (2020) revealed that the forced shift from face-to-face learning to online learning may be stressful for both the teachers and students, so they will need something to support them adapt to this new learning technique. This TPACK may be the solution to solve problems regarding technology in online learning. Furthermore, Badiozaman (2021) showed that technological competence affects students' readiness in online learning. It means that when the students are more ready to join online learning for having good technological

competence, they will surely have more positive online learning experience. In sum, this finding that TPACK may give support and ease online learning can be a consideration to improve this TPACK to achieve a more effective, positive, and satisfying online learning experience.

As this study' model represents, self-directed learning skill also indirectly affects the students' online learning experience. This finding somehow supports Maksum et al.'s (2021) that self-directed learning skills affect online learning outcomes and experiences. It probably happens because students with good self-directed learning skills will be able to manage their learning better than those with low self-directed learning skills. It implies that those with good skills in managing their learning may have positive and satisfying online learning experience. However, this finding cannot be generalized to students with different learning styles. Students who expect structured learning will be somehow anxious when they are asked to manage their learning independently (Randi & Corno, 2021). Students with this learning style may prefer guidance and close supervision from their teachers. Still, this topic is beyond this study's scope. Thus, it needs further investigation to confirm the findings.

CONCLUSION

This study investigated the interplay of factors affecting online learning experience namely self-directed learning and TPACK. The results show that there is a positive and significant relationship between self-directed learning, TPACK, and online learning experience. In sum, this study indicates that students' self-directed learning skills and TPACK (Technological, Pedagogical, and Content knowledge) affect their online learning experiences. Students with high self-directed learning skills and TPACK are predicted to have positive, effective, and satisfying online learning experiences.

This study contributes on how to create an effective and satisfying online learning experience by informing the factors affecting their online learning experience namely self-directed learning skills and TPACK. Thus, educational practitioners should consider these factors in conducting online learning. They may provide trainings on how to do self-directed learning and how to use technology to support the students' learning. Otherwise, students are not able to "enjoy" online learning with these skills. Also, as online learning requires more technological supports, government and educational practitioners may support online learning by providing adequate technological supports.

Despite its findings and contribution, this present study has limitations. First, the participants of this study are in-service teachers, so the results may be applied for pre-service teachers who may have different characteristics and condition. Similar research with different participants, for instance pre-service teachers, may be worthwhile to conduct. Second, this study was conducted in Papua, Indonesia, in which technological supports were limited. Further studies may address students with better technological supports, for instance in a big cities with enormous technological supports, to obtain different views regarding this issue. Last, this study only employed quantitative data, so future studies may use various data, for instance interview and document analysis, to enrich the results.

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