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Beyond the screen: Unveiling the drivers of Indonesian teachers' engagement in online professional development

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ABSTRACT

Teachers' professional development (TPD) plays a crucial role in enhancing teachers' knowledge and competencies. Due to rapid technological changes, online TPD has become popular worldwide, including in Indonesia. Nevertheless, teacher participation in online TPD in Indonesia remains relatively limited, primarily due to challenges commonly encountered in developing countries. This study aims to examine the determinants of teachers' engagement in online TPD by employing the Theory of Planned Behavior. This study employs an online survey involving 255 senior high school teachers and analyzes using structural equation modeling. The results demonstrate that teachers' engagement in online TPD is directly influenced by their intention and perceived behavioral control. Furthermore, teachers' intention is significantly shaped by three exogenous variables: attitudes toward the behavior, subjective norms, and perceived behavioral control. The findings also reveal that intention mediates the indirect effects of the three exogenous

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variables on teachers' engagement in online TPD. These results underscore the necessity of fostering a supportive environment through social encouragement from school administrators, colleagues, and professional networks. Moreover, adequate technological and financial support is essential to enhance teachers' effective use of online learning platforms. Emphasizing meaningful professional development beyond certification can promote more engaging and impactful learning experiences for teachers.

Keywords: teacher engagement, professional development, online course, theory of planned behavior (TPB).

Más allá de la pantalla: revelando los factores que impulsan la participación de los docentes indonesios en el desarrollo profesional en línea

RESUMEN

El desarrollo profesional del profesorado, en adelante TPD (Teachers' Professional Development), es crucial para mejorar sus conocimientos y habilidades. Con los rápidos avances tecnológicos, el TPD en línea se ha popularizado a nivel mundial, incluida Indonesia. Sin embargo, la participación de los maestros indonesios en el TPD en línea sigue siendo limitada debido a varias barreras propias de un país en desarrollo. Este estudio busca comprender los factores que influyen en el compromiso de los maestros con el TPD en línea en Indonesia, empleando la teoría del comportamiento planeado como marco teórico. Se utilizó un cuestionario en línea con 255 maestros de escuelas secundarias y se aplicó el modelado de ecuaciones estructurales para probar las hipótesis. Los resultados indican que el compromiso de los maestros en el TPD en línea está directamente influido por su intención y control percibido del comportamiento. La intención, a su vez, fue determinada por tres variables: actitud hacia el comportamiento, normas subjetivas y control percibido del comportamiento. Además, la intención media los efectos indirectos de estas variables sobre el compromiso de los maestros en el TPD en línea. Las implicaciones prácticas de estos hallazgos indican que la creación de un entorno de apoyo mediante el estímulo social de los administradores escolares, los colegas y las redes profesionales puede impulsar la participación de los docentes en el desarrollo profesional en línea. Además, ofrecer suficiente apoyo tecnológico y financiero permitirá a los docentes utilizar las plataformas de aprendizaje en línea de manera más eficaz. Al priorizar el desarrollo profesional significativo por sobre la mera certificación, los responsables de las políticas y los educadores pueden fomentar una experiencia de aprendizaje más atractiva y valiosa para los docentes.

Palabras clave: compromiso docente, desarrollo profesional, curso en línea, teoría del comportamiento planificado (TPB)

1. Introduction

Rapid technological changes have reshaped many sectors, including education. Traditional teaching methods are becoming less effective, requiring teachers to update their knowledge and skills continuously (Rafsanjani et al., 2023; Simplicio, 2000). This situation forces teachers to keep up with current knowledge and teaching skills. Previous studies also revealed the crucial role of teachers in achieving educational goals (Bellens et al., 2019; Coppe et al., 2025; Rahimi et al., 2024) and providing high-quality instruction (König et al., 2021; Schleicher, 2016). Consequently, engaging in Teacher Professional Development (TPD) is essential for teachers to enhance their pedagogical and content knowledge.

TPD is crucial for teachers to maintain their expertise post-graduation (Boeskens et al.,2020; van der Lans et al., 2024) and significantly improves their instructional quality (Coppe et al., 2024; Dulo, 2022; Kalinowski et al., 2020; Meyer et al., 2023; Richter & Richter, 2024). Today, with the rise of online learning, TPD is now available in online and offline settings (Bragg et al., 2021; Darling-Hammond & Hyler, 2020; Donitsa-Schmidt & Ramot, 2022).

Online TPD offers benefits such as providing wider access, flexibility, and the ability to engage from home (Henderson et al., 2024; Mathisen & Søreng, 2024; Meyer et al., 2023; Powell & Bodur, 2019; Rodrigo et al., 2024). Despite these advantages, adoption in developing countries, including Indonesia, remains slow due to challenges like unequal internet access, insufficient technical skills, cultural barriers, and income disparities (Acharya & Lee, 2018; Baticulon et al., 2021; Lestariyanti, 2020; McIntyre, 2022; Rafsanjani et al., 2022; Saleh et al., 2023). Additionally, Indonesian teachers often rely on webinars for professional development rather than enrolling in more comprehensive online courses (Silvhiany, 2022).

The Indonesian government has introduced a TPD program called *Pengembangan Keprofesian Berkelanjutan (PKB)* through an online platform called *Platform Merdeka Mengajar (PMM)* ((Aulia et al., 2023; Tias & Tongjean, 2022). However, many teachers participate in these programs out of obligation rather than genuine interest, viewing the certification as more valuable than the learning experience (Revina et al., 2020). Therefore, although the TPD program was crucial for teachers, we can assume many Indonesian teachers are not interested in developing teaching skills and knowledge through the TPD program.

Recognizing the important role of professional development for teachers, the advantages of online TPD, the constraints of online learning adoption in developing countries, and the shortage of Indonesia teachers' interest in participating in online TPD, it is crucial to predict Indonesian teachers' intention and decision to engage in online TPD. To date, few studies have explored this topic, particularly in developing countries. Additionally, IT technical aspects were the main constraints of online learning adoption in developing countries. This study seeks to fill this gap by examining the psychological and social-environmental factors affecting teachers' participation in online TPD. By utilizing Ajzen's Theory of Planned Behavior (TPB) (1991) to predict teachers' intentions and actual behavior in online TPD, this study is expected to offer valuable insights to enhance teacher engagement and improve instructional quality.

2. Literature review

2.1. Teacher professional development (TPD) in online learning

Teacher Professional Development (TPD) refers to structured programs designed to help in-service teachers enhance their knowledge and skills (Abakah, 2023; Silvhiany, 2022; Sims et al., 2021). TPD activities include training, best practice experience discussion, classroom observation, and action research, focusing on improving teachers' pedagogical skills (Beijaard et al., 2000; Boström & Palm, 2020; Dulo, 2022; Sims et al., 2021).

Online TPD delivers these programs entirely online, allowing teachers to participate without attending in person (Ansyari et al., 2022; Bragg et al., 2021). It offers both synchronous (real-time interactions via video conferencing) and asynchronous (time-delayed interaction using emails or learning management systems) models. Online TPD offers several benefits, such as broader access, especially for teachers in remote areas, greater flexibility, reduced travel time, and lower costs than offline TPD (Ansyari et al., 2022; Meyer et al., 2023; Powell & Bodur, 2019; Yoon et al., 2020).

However, the scholars found several challenges of online TPD (Geri et al., 2017; Meyer et al., 2023). Utilizing the technologies in an online course sometimes makes it difficult for participants to engage actively. This situation leads to passive engagement and potential dropout. Additionally, online TPD limits opportunities for hands-on practice and direct feedback from instructors and peers.

Despite the challenges of online TPD, the literature found no differences in learning effectiveness and learning gain between online and offline TPD (Ansyari et al., 2022; Tømte & Gjerustad, 2020). Both can be equally effective if well-designed, with program structure being more important than the delivery method (Darling-Hammond et al., 2017; Fishman et al., 2013).

2.2. Prediction model of teachers' engagement in online TPD using the theory of planned behavior

This study uses the Theory of Planned Behavior (TPB) to examine the factors influencing teachers' intention and engagement in online professional development (PD). TPB, proposed by Ajzen (1991), is widely used to predict human behavior by focusing on psychological and socio-environmental factors (Ajzen, 1991; Dunn et al., 2018; Hall et al., 2019; Heuckmann et al., 2019; Sugeng & Suryani, 2023). The theory posits that behavior is primarily driven by intention, which is shaped by three key factors: attitude toward behavior (ATB), subjective norms (SN), and perceived behavioral control (PBC) (Ajzen, 1991; Sandri et al., 2024; Schettino et al., 2024).

As explained in the introduction, the current study tries to understand why Indonesian teachers are not interested in online TPD provided by the government. We use the TPB framework to understand this situation by examining the predictor of teachers' engagement in online PD using three beliefs of TPD (behavioral beliefs, normative beliefs, and control beliefs) as antecedents and intention toward behavior as a mediating variable.

Attitude toward behavior (ATB) refers to individuals' perceptions of the potential outcome of certain behavior, whether negative or positive (favorable or unfavorable). In this study, teachers' ATB toward online TPD is measured by perceived usefulness (expected benefits) and perceived ease of use (ease of participation).

Subjective norm (SN) reflects the perceived social pressure to engage in or avoid a behavior influenced by important figures like students, colleagues, and superiors. We use these groups as proxies for teachers' subjective norms toward online TPD participation.

Perceived behavioral control (PBC) is the perception of one's ability and resources to perform a behavior, including factors like self-efficacy, time, and skills. Here, self-efficacy reflects teachers' confidence in their ability to participate, while controllability refers to the availability of resources and skills needed to engage in online TPD.

According to the TPB framework, we hypothesize that the three beliefs (ATB, SN, and PBC) collectively influence teachers' intentions to engage in online TPD. Stronger intentions are expected to increase teachers' likelihood of participating in online TPD. We also propose that intention mediates the indirect effect of ATB, SN, and PBC on engagement, while PBC may also directly impact teachers' participation. Based on these assumptions, we propose the following research hypotheses.

H1. Attitude toward online TPD engagement positively affects the intention to engage in online TPD.

H2. Subjective norms positively affect the intention to engage in online TPD.

H3. Perceived behavioral control positively affects the intention to engage in online TPD.

H4. Perceived behavioral control positively affects the actual engagement.

H5. Intention to engage in online TPD positively affects the actual engagement.

H6. Intention to engage in online TPD mediates the indirect effect of attitude, subjective norm, and perceived behavioral control on actual engagement in online TPD.

3. Current study

This study investigates the factors influencing Indonesian teachers' engagement in online TPD. Previous research shows that many teachers participate in TPD only to obtain certificates, with limited genuine interest. Additionally, studies on online TPD in developing countries like Indonesia remain scarce. To address these gaps, this study explores the psychological and socio-environ-

mental factors affecting teachers' participation, using Ajzen's Theory of Planned Behavior (1991) as the theoretical framework. The model of the relationships between variables is presented in Figure 1.

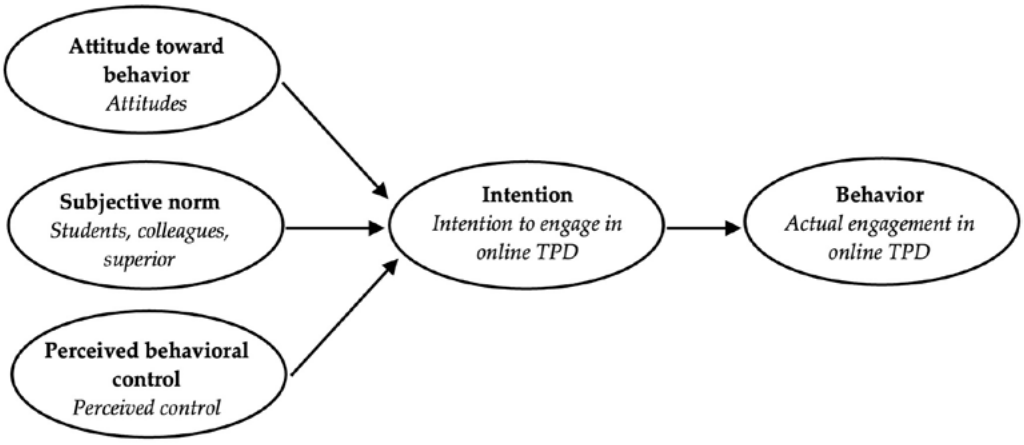

Figure 1. *Conceptual model, adopted from the theory of planned behavior (Ajzen, 1991)*

4. Methodology

4.1. Procedure and participants

This study, conducted from May to July 2024, used convenience sampling to select senior high school teachers from Java Island. We selected Java as the research sample because it represents more than 55% of Indonesia's population. Additionally, while Java has better infrastructure and technological access compared to other regions, some areas still face limitations similar to those found elsewhere in Indonesia. Given this diversity, Java serves as a representative sample for this study.

We collaborated with the Indonesian Teachers Association in each province to recruit participants. The inclusion criteria of the current research were being a teacher in senior high school and having participated in online TPD during the last three years. The survey was distributed via Google Forms through WhatsApp groups and mailing lists, with the invitation outlining the study's objectives, ensuring anonymity, and clarifying voluntary participation. In the first stage, 219 teachers participated, with 27 excluded for not meeting the criteria. In the second stage, 68 teachers responded, with 5 excluded. The final sample comprised 255 teachers (58.43% female, 41.57% male), with an average age of 36.8 years and 11.4 years of teaching experience.

4.2. Instruments

We utilized measurement instruments from prior studies to assess all variables in this research. Since these instruments were initially in English, we made necessary adjustments to fit the research context. To ensure that participants could easily understand the questionnaire, we translated it into Indonesian. To minimize linguistic biases and ensure accurate translation, we followed a rigorous process involving experts in both language and education. This included a forward translation by a bilingual expert, which was then reviewed and refined by subject matter specialists to maintain the conceptual equivalence of the items. We also performed a back-translation by an independent translator to verify consistency with the original English version and to identify any discrepancies. Finally, we pre-tested the translated questionnaire with a small group of participants to assess clarity and address any potential misunderstandings before finalizing the instrument.

We adopted the instruments developed by Kao et al. (2014) to measure the attitude toward behavior. This variable was measured in two dimensions: perceived usefulness and perceived ease of use, with a total of six items. To measure the remaining variables (subjective norms, perceived behavioral control, intention toward behavior), we adopted the instruments from Sugeng & Suryani (2023). The instruments of subjective norm comprise three items that capture the variable from three proxies (students, peers, and superior/institution). The instruments of perceived behavioral control consist of four items, which capture the variables from self-efficacy and controllability (skills/competency and resources) aspects, while the intention toward behavior consists of three items. Last, for the actual behavior variable, we adopted the instruments from Schetino et al. (2024) consisting of two items that measure the frequency of teacher involvement and completion in online TPD in the last three years. All the instruments employed a five-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree) except the actual behavior variable that used the frequency in online TPD engagement.

4.3. Data Analysis

Before performing the data analysis, we scrutinized all returned questionnaires to ensure that all the participants met the criteria and that the data set was complete. Of the 287 returned questionnaires, 32 were dropped because they did not match the criteria and/or the incomplete responses. Therefore, this study used 255 data eligible for analysis.

We employed structural equation modeling (SEM) with a partial least square (PLS) approach to examine the research hypotheses. We adopt the multi-stage process by Hair et al. (2014) which involves outer model evaluation (validity and reliability of the constructs) and inner (structural) model evaluation (R^2, Q^2, f^2, and path coefficients).

5. Result

5.1. Outer model evaluation

In the outer model, we evaluate the measurement model of each construct, including validity and reliability. For the validity, we use the convergent and discriminant validity to examine each construct. Table 1 exhibits that the outer loading of all items and the AVE of each construct are above 0.7 and 0.5, respectively (Hair & Alamer, 2022; Hair et al., 2017). Hence, the measurement model is considered to meet the convergent validity requirement. The discriminant validity of the current measurement model was examined through the Heterotrait-Monotrait Ratio (HTMT). The result (table 2) indicates all the values of each construct are under the threshold of 0.85 (Hair & Alamer, 2022; Sarstedt et al., 2017), which means the discriminant validity of the current measurement model was established.

Table 1
Construct measurement evaluation (mean, outer loading, VIF, and AVE)

Abbrev	Constructs and items	Mean	Loading	VIF	AVE
ATB	**Attitude toward behavior**				
ATB1	For me, online TPD helps to increase my creativity for instructions	3.358	.817	2.309	
ATB2	For me, online TPD effectively enhances my learning	3.132	.802	1.951	
ATB3	For me, online TPD improves my professional knowledge	3.092	.839	2.296	.664
ATB4	For me, it is convenient to receive TPD by using online delivery	3.147	.796	2.123	
ATB5	For me, the content in online TPD is clear and easy to access for learning	3.083	.821	2.230	
ATB6	For me, the learning of online TPD is flexible	3.349	.813	2.145	
	Mean score of ATB	**3.193**			
SN	**Subjective norms**				
SN1	Engaging in online TPD enables me to conduct teaching as my colleagues do	3.367	.855	1.916	
SN2	My superior think 1 should participate in online TPD	3.271	.897	2.144	.770
SN3	Engaging in online TPD enables me to conduct a teaching design relevant to my students' need	3.139	.880	2.289	
	Mean score of SN	**3.259**			
PBC	**Perceived behavioral control**				
PBC1	I am confident that have enough readiness to engage in online TPD	3.249	.791	1.615	
PBC2	I feel confident about selecting appropriate online TPD program	3.157	.803	1.772	.641
PBC3	I have adequate resources (e.g., internet connection, personal computer, IT support from school) to engage in online TPD	2.614	.777	1.719	
PBC4	I have adequate knowledge and skills to use ICT facilities during online TPD	3.018	.830	1.946	
	Mean score of PCB	**3.010**			

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Abbrev	Constructs and items	Mean	Loading	VIF	AVE
ITB	**Intention toward behavior**				
ITB1	I intend to engage in online TPD on a regular basis	2.965	.864	1.879	.769
ITB2	I have a strong desire to enhance my teaching skills by engaging in online TPD	2.729	.882	2.195	
ITB3	I commit to registering in online TPD program soon.	3.022	.884	2.233	
	Mean score of ITB	**2.905**			
AB	**Actual behavior**				
AB1	How many times you engage in online TPD in the last three years	3.034	.873	1.358	.757
AB2	How many online TPD have you completed in the last three years	2.335	.867	1.358	
	Mean score of AB	**2.685**			

Table 2
Discriminant validity (Heterotrait-Monotrait Ratio / HTMT)

	Attitude toward behavior	Subjective norm	Perceived behavioral control	Intention toward behavior	Actual behavior
Attitude toward behavior	—				
Subjective norm	.545	—			
Perceived behavioral control	.695	.615	—		
Intention toward behavior	.578	.586	.477	—	
Actual behavior	.582	.509	.470	.652	—

For reliability, we examined each construct's measurement model through Cronbach's alpha and Composite reliability. The result (table 1) indicates all the constructs are above 0.7 (Hair & Alamer, 2022; Hair et al., 2019), which means the outer model of the current study has internal consistency and reliability.

Table 3
Reliability

	Cronbach's alpha	Composite reliability
Attitude toward behavior	.899	.922
Subjective norm	.851	.909
Perceived behavioral control	.813	.877
Intention toward behavior	.850	.909
Actual behavior	.831	.861

5.2. Inner (structural) model evaluation

After the outer model measurement is established, the inner model evaluation, including coefficient of determination (R^2), cross-validated redundancy (Q^2), effect size (f^2), and path coefficients, follows. However, as suggested by Hair & Alamer (2022), the inner model should be examined for collinearity to ensure it is free from high correlation among the constructs. The result (table 1) shows all the VIF values are below the threshold of 3.0, which means the measurement model is free from multicollinearity problems (Hair et al., 2020).

Table 4 demonstrates the structural model evaluation of current research. R^2 refers to the proportion of the variance of the endogenous variables explained by the predictor variables, with a rule of thumb of 0.75, 0.50, and 0.25 considered substantial, moderate, and weak, respectively (Hair et al., 2019). The higher the R^2, the greater the structural model's explanatory power, which leads to better prediction of predictor variables. The results show that the R^2 of actual behavior is 0.621, which means that 62.1% of the variance

of actual behavior is explained by intention toward behavior and categorized as moderate predictive power. Meanwhile, the R^2 of intention toward behavior is 0.542, indicating that the exogenous variable (ATB, SN, and PBC) could explain a 54.2% variance of ITB and is also classified as moderate predictive power.

The current research also utilizes Stone-Geisser's Q^2 (cross-validated redundancy) to examine the model's predictive accuracy with a rule of thumb larger than zero to indicate the model's predictive accuracy is acceptable (Hair et al., 2019; Sarstedt et al., 2017). The result (table 4) shows the Q^2 of actual behavior and intention toward behavior is 0.455 and 0.394, which means all exogenous variables in the current model have significant predictive accuracy on the endogenous variable. Furthermore, we also examine the f^2 (effect size) of each predictor. The f^2 represents the change in R^2 when the specified predictor is dropped from the model; in other words, the f^2 represents the relative contribution of predictors in explaining the endogenous variables (Hair et al., 2019). The rule of thumb for effect size is larger than 0.02, 0.15, and 0.35, categorized as small, medium, and large effects. If the effect size is below 0.02, it indicates no effect size of the exogenous variables and is considered negligible. Table 4 exhibits that all the predictor variables of intention toward behavior (ATB, SB, and PBC) have an f^2 value larger than 0.02. Meanwhile, the f^2 value of ITB and PBC on actual behavior was 0.489 and 0.099, respectively. Therefore, all the predictor in the current research model has a relative contribution in explaining the endogenous variable.

Table 4
Predictive power/accuracy

Variable	R^2	Q^2	f^2
Actual behavior	.621	.455	
Intention toward behavior (ITB)	.542	.394	.489
Attitude toward behavior (ATB)			.061
Subjective norm (SN)			.082
Perceived behavioral control (PBC) on intention toward behavior (ITB)			.035
Perceived behavioral control (PBC) on actual behavior (AB)			.099

Last, we examine the path coefficient through the bootstrap resampling procedure to determine the significance of the structural relationship among the variables as hypothesized in the theoretical framework section. Table 5 shows that all the path coefficients have a positive value and are significant under the *p*-value of 0.05. The result indicates that all the research hypotheses were confirmed, both direct effect and indirect effect.

Table 5
Path coefficient

Relationship	*Coefficient*	STDEV	*p-val*ue
Direct effect			
ATB → ITB	.261	.106	.014
SN → ITB	.318	.122	.009
PBC → ITB	.232	.110	.036
PBC → AB	.263	.112	.019
Indirect effect			
ATB → ITB → AB	.153	.074	.040
SN → ITB → AB	.186	.065	.005
SN → ITB → AB	.136	.070	.049

Note: ATB = Attitude toward behavior; SN = Subjective norm; PBC = Perceived behavioral control; ITB = Intention toward behavior; AB = Actual behavior

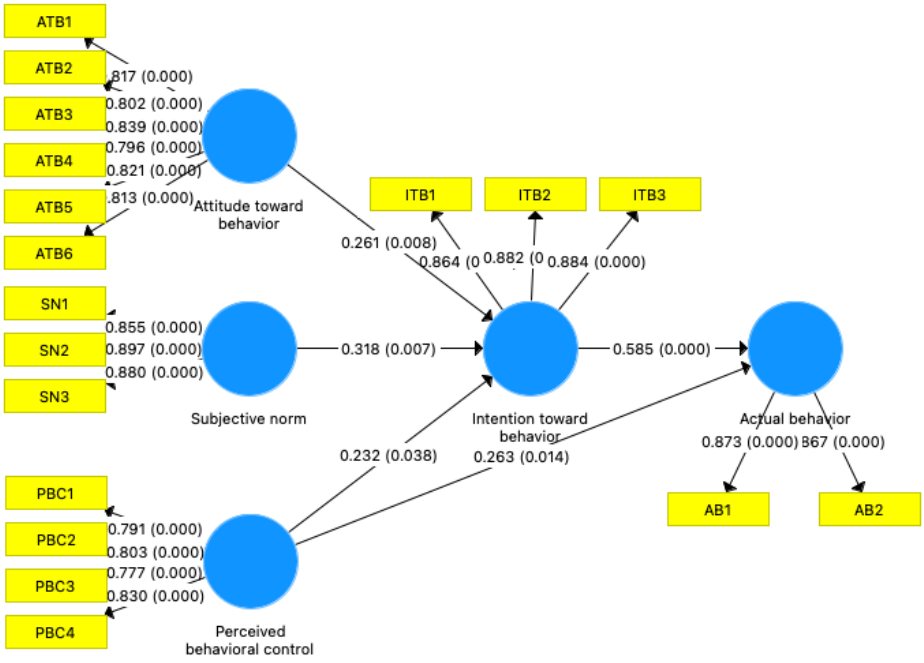

Figure 2. *Result of structural model analysis with standardized path coefficient*

6. Discussion

This study aimed to examine psychological and social-environmental factors that affect teachers' engagement in online TPD using the theory of planned behavior (TPB). The findings exhibit that teachers' engagement is directly influenced by both intention and perceived behavioral control (PBC). Meanwhile, teachers' intention was shaped by attitude toward behavior (ATB), subjective norm (SN), and PBC, with intention acting as a mediator between these predictors and actual engagement. These result indicates that all proposed hypotheses (H1–H6) were supported and provide empirical evidence for the applicability of TPB in the context of teacher professional development in a developing country setting.

If we look at the path coefficient value of the three predictors of teacher intention, SN emerged as the strongest predictor of intention among the others (ATB and PBC). This suggests that social influence, including peer pressure and directives from superiors, plays a crucial role in motivating teachers to participate in online TPD. This study offers insight into how teachers in developing countries, such as Indonesia, often perceive professional development participation as a response to expectations from school administrators or colleagues, rather than a purely self-driven decision. Our findings strengthen the previous study by Sugeng and Suryani (2023), which found that social-environmental pressures are the main determinant of Indonesian teachers' intentions.

Surprisingly, this finding differs from those in developed countries such as the USA, Taiwan, and Turkey, where the most influential factors on teacher intention in professional development are PBC (Dunn et al., 2018) and ATB (Demir, 2010; Kao et al., 2018). The dominance of SN in this study reflects Indonesia's sociocultural environment, where regulatory requirements and hierarchical organizational structures strongly influence teacher behavior. The study by Revina et al. (2020) and Ansyary et al. (2022) reported that Indonesian teachers frequently engage in professional development primarily to fulfill mandatory certification requirements rather than to gain meaningful learning experiences.

Next, ATB was found to be the second strongest predictor of teachers' intention to engage in online TPD. This study indicates that teachers perceived online TPD offers flexibility, convenience, and opportunities to enhance teaching creativity and effectiveness. These positive perceptions became the main reasons for shaping teachers' willingness to engage in online TPD. In this regard, the current study supports previous studies that indicated teachers' attitudes toward online professional development related to their intention to engage in online professional development programs (Demir, 2010; Dunn et al., 2018; Kao et al., 2018; Sugeng & Suryani, 2023).

This study found that PBC is a direct predictor of intention and actual engagement in online TPD. The result exhibits that the teachers who felt confident in their ICT skills and had access to reliable technological resources (e.g., stable internet connection, personal devices, or adequate IT support) were more likely to engage in online TPD actively. Conversely, those lacking essential resources will make them less likely to engage, even if they intended to do so. Therefore, this finding aligns with the previous studies that revealed the higher the perceived behavioral control, the greater the behavioral intention (Demir, 2010; Dunn et al., 2018; Kao et al., 2018; Sugeng & Suryani, 2023).

The study also shows that teachers' intention (ITB) positively influences teachers' engagement in online TPD. This finding supports the Theory of Planned Behavior (Ajzen, 1991) and aligns with previous research indicating that stronger intentions lead to higher participation (Archie et al., 2022; Gupta, 2021; Sugeng & Suryani, 2023; Zhao et al., 2020). Besides the intention, the result also exhibits that perceived behavioral control (PBC) directly affects teachers' engagement in online TPD (actual behavior). Additionally, perceived behavioral control (PBC) directly impacts engagement, as teachers lacking resources like time or IT skills are less likely to participate, regardless of intention. This reinforces the idea that adequate resources and skills are essential for successful engagement (Archie et al., 2022; She et al., 2024; Sugeng & Suryani, 2023). The research also reveals that teachers' intention mediates the effects of ATB, SN, and PBC on actual behavior. Teachers with a positive attitude toward online TPD, adequate resources, and social pressure from peers or superiors are more likely to develop strong intentions to engage, which ultimately increases their likelihood of participating in online TPD.

According to the current findings, several practical recommendations can be proposed. First, we recommend that policymakers and school leaders leverage subjective norm by fostering a collaborative culture that frames online TPD as a professional responsibility rather than a compliance activity. They can implement several programs, such as mentorship programs, peer support networks, and provide institutional incentives (recognition, career advancement opportunities, or financial rewards) to encourage teachers' commitment to professional development programs. Second, policymakers and school leaders should clearly communicate the benefits of the TPD programs to elevate a positive attitude among teachers. Ensuring teachers understand that online TPD platforms are user-friendly, interactive, and aligned with teachers' professional needs will enhance their engagement. Furthermore, providing high-quality, engaging content and incorporating features like interactive modules, discussion forums, and personalized learning pathways can make online TPD more attractive for teachers and lead to greater participation. Last, stakeholders should consider teachers' digital literacy and access to the resources to elevate teachers' intention and participation in online TPD. Offering ICT training to address teachers' digital skills, improving technological infrastructure, subsidizing internet access, and providing digital devices, especially for teachers in rural or underserved areas, can help increase teachers' engagement in online TPD, which in turn enhances the effectiveness and inclusivity of online TPD.

All these recommendations are based not only on the findings of this study, but also on previous studies. Several studies indicate that government policy is prominent in increasing teacher engagement in professional development programs. For example, in Ghana, the government has increased the funding for TPD to enhance teacher participation (Salifu et al., 2024). Similarly, the Brazilian government expanded internet access through a huge broadband expansion policy in 2008 to improve digital infrastructure, which indirectly benefits teachers in rural areas to have internet access (Henriksen et al., 2022). Meanwhile, the Chinese government was improving teachers' technological literacy through state-funded training programs to enhance TPD engagement (Zhou & Eslami, 2023). Last, the US government was providing financial incentives for teachers who engage in professional development outside of working hours (Zhang et al., 2020). Accordingly, the Indonesian government could adopt similar policies to encourage teachers to participate in professional development programs.

7. Conclusion and implications

As proposed in the introduction section, this study tries to unveil the determinants of Indonesian teachers' intention and decision to engage in online TPD by employing the theory of planned behavior as theoretical framework. The results indicate that teachers' engagement in online PD was predicted directly by their intention and behavioral control. This study also discloses that teachers' attitudes, subjective norms, and perceived behavioral control predicted teachers' intentions. Besides, teachers' intentions also significantly mediated the relationship between the three predictors (ATB, SN, and PBC) and teachers' actual engagement in online TPD.

The current study provides theoretical and practical implications. Theoretically, this study contributes to the literature by expanding our understanding of the predictors of teachers' intention and willingness to engage in online TPD from both psychological and social-environmental factors. The psychological factors represented the attitude toward behavior (ATB), behavioral control (PBC), and intentions (ITB). Meanwhile, the social-environmental is represented by subjective norms (SN). Accordingly, we can argue that the theory of planned behavior helps us to understand teachers' intentions and actual behavior (teachers' engagement) in online TPD.

For practical contributions, our findings revealed that lack of resources (e.g., unreliable internet access, lack of personal computers, and insufficient IT support from schools—are the main challenges teachers face) become the main barriers teachers face. Accordingly, we highly suggest that the Indonesian government address these issues by providing real solutions, such as providing digital training programs for teachers and improving the internet infrastructure in rural areas. Additionally, providing non-monetary incentives, such as career advancement opportunities as recognition for teachers who participate and complete the online professional programs, is expected to increase teacher engagement in online TPD. We also recommend that other stakeholders—such as program administrators, school principals, and related institutions—focus on fostering a positive attitude among teachers toward professional development. Raising awareness about the value of these programs as enriching learning experiences rather than just obligations is crucial. Additionally, providing resources like financial and technical support can enhance teachers' sense of control and boost their engagement.

8. Limitation

We acknowledge several limitations of the current study. First, the research participants were all from Java, which is considered the most developed region in Indonesia when compared to other islands (e.g., Sumatera, Kalimantan, Sulawesi, and Papua). Java has a more equitable distribution of technology infrastructure, such as better coverage and internet connection, which may create a favorable atmosphere for teachers to participate in online training. The current findings may not fully capture the challenges that teachers encounter in less developed locations, where infrastructural gaps persist. As a result, the current findings may not apply to the broader Indonesian setting. Second, the collected data from all constructs were based on self-reported data, which may have been under- or over-reported, which leads to the accuracy of the statistical test results. Third, this study employed a cross-sectional design to address the proposed hypotheses.

Future studies should consider drawing a more varied sample from the regions of Indonesia that were not covered in this study, such as Sumatra, Kalimantan, Sulawesi, and Papua, to improve generalizability. These regions have varying technological infrastructure, socio-economic settings, and educational development levels, which may affect teachers' contribution to online TPD. A comparative study across multiple regions would offer wider lenses into the varying factors that influence participation in online TPD and even help identify region-specific barriers and solutions. Besides, future studies should consider employing a mixed-method approach, combining the quantitative with qualitative, improving the validity and reliability of the current findings. Last, a longitudinal approach could be employed in future research to follow teachers' participation in online TPD activities over an extended time. This would allow researchers to examine long-term behavioral changes, understand how attitudes, subjective norms, and perceived behavioral control evolve, and assess whether online TPD participation leads to improvements in teaching effectiveness and student learning outcomes. By overcoming these limitations, future studies will be capable of capturing a more nuanced, generalizable, and precise comprehension of teachers' participation in online TPD and offer more effective policy proposals directed toward increasing teachers' instruction quality.

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