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The Power of Belief: How Self-Efficacy Shapes Teacher Readiness through Technological Pedagogical Content Knowledge-Based Dynamic Capabilities

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ABSTRACT. In the digital transformation era, differentiated learning is an important strategy for addressing diverse students' needs. This study examines the influence of teacher self-efficacy on readiness to implement differentiated learning and the mediating role of Technological, Pedagogical, and Content Knowledge (TPACK)-based Dynamic Capability. Using a quantitative approach and a survey of 73 economics teachers in Islamic high schools in Central Java, Indonesia, the data were analyzed using PLS-SEM. The results show that self-efficacy does not directly affect teacher readiness. However, self-efficacy significantly affects TPACK-based dynamic capability, which in turn significantly affects teacher readiness. The indirect mediation effect of TPACK-based dynamic capability reinforces the importance of adaptive professional capacity in e-learning integration. The main scientific contribution of this study is the introduction of a new construct, namely TPACK-based Dynamic Capability, which combines psychological theory (self-efficacy) with the TPACK framework through a dynamic capability perspective. This construct represents teachers' ability to adaptively integrate technological, pedagogical, and content knowledge in changing contexts. The practical implication is that teacher professional development programs must emphasize increasing self-efficacy and TPACK-based adaptive skills to create effective differentiated learning in the digital era.

Keywords: *Teacher Readiness, Self-Efficacy, TPACK, Dynamic Capabilities, Differentiated Learning*

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INTRODUCTION

In the era of digital transformation, the use of technology in learning is a necessity (Iwan et al., 2024). Teachers are required to understand teaching materials and pedagogical strategies and be competent in using technology effectively to improve the quality of learning (Alqurashi, 2019). Technology is a tool and a catalyst for developing adaptive learning models, including in the context of differentiated learning. Differentiated learning allows teachers to design learning experiences that are more personal, interactive, and influenced by student characteristic. Digital platforms, educational applications, and Learning Management Systems (LMS) can help teachers compile varied materials, conduct real-time formative assessments, and provide timely feedback (Bond et al., 2020). Technology supports differentiated learning by allowing educators to adapt instruction

based on student needs. The need for intentional technology integration, particularly relevant for teachers facing diverse classroom environments (Englund et al., 2017). Despite its potential, implementing differentiated learning still encounters significant challenges, especially in teacher readiness. Readiness encompasses teachers' cognitive, affective, and behavioral preparedness to plan and deliver instruction adapted to students' diverse needs (Goyibova et al., 2025). Preliminary data from 180 high school economics teachers in Central Java, Indonesia, shows that many still struggle with classroom management in differentiated learning contexts, primarily due to limited readiness in adjusting strategies to varied student characteristics (Figure 1).

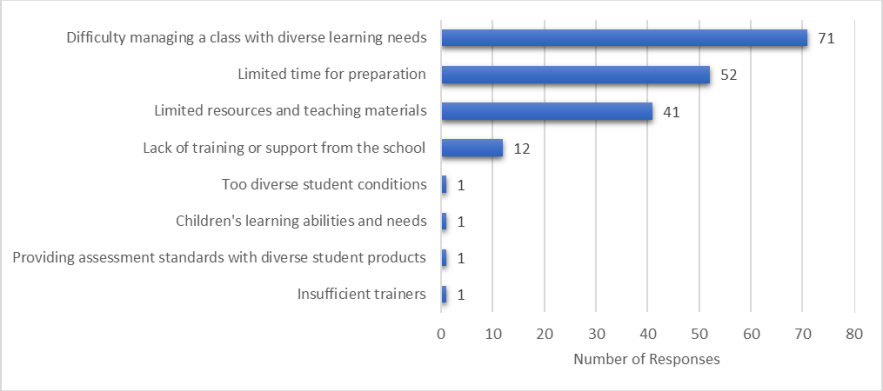

Figure 1 Teacher Obstacles in Implementing Differentiated Learning

Several studies have identified that teacher readiness is significantly influenced by two major constructs: self-efficacy (Endot & Jamaluddin, 2023; Hung, 2016; Musadad et al., 2022a; Ünsal et al., 2016) and teacher knowledge (Tyan et al., 2020). Self-efficacy refers to the general belief that an individual has to carry out any task (Bandura, 1978). Bandura's self-efficacy theory suggests that an individual's attitude toward competence in performing a particular task can influence emotional responses (including stress and anxiety) and actions (Dalimunthe et al., 2025; Gunartin et al., 2025). Based on the study's results, there is an inconsistency in the relationship between self-efficacy and teacher readiness. Self-efficacy is the most influential factor in teacher readiness (Endot & Jamaluddin, 2023). On the other hand, Kurniawan et al. (2023) explained that there is no correlation between the level of self-efficacy and readiness to teach in the future. It means that a teacher with low or high self-efficacy does not impact teaching readiness.

Teacher knowledge is another factor that influences teacher readiness (Tyan et al., 2020). Knowledge refers to Shulman's opinion (1986), namely pedagogical knowledge and content knowledge (Pedagogical and Content Knowledge/ PCK), which are the basis for preparing to become teachers who can realize learning according to the demands of 21st-century learning. The knowledge possessed by teachers shows the quality of teachers (Mahardika et al., 2019). Teachers with a high level of content knowledge will produce a high level of teacher readiness (Tyan et al., 2020). Teachers will provide students with more learning resources to create a more enjoyable learning environment. This research began with a gap in research results showing that teacher content knowledge is not a predictor of teacher readiness to teach quantum physics to high school students (Sungkim, 2022), which is evidence that research results are still diverse regarding the influence of teacher content knowledge on teacher readiness.

Several studies have confirmed that teacher knowledge is shaped by self-efficacy. Teacher self-efficacy influences Technological Pedagogical and Content Knowledge (TPACK), which means that the stronger the teacher's self-efficacy, the higher the level of TPACK they obtain (Ladendorf et al., 2021; Sojanah et al., 2021; Tondeur et al., 2017). However, the impact of self-efficacy on TPACK elements is inconsistent. Self-efficacy has a direct impact on TPK but does not have a direct impact on TPCK in the use of digital textbooks. However, other research results state that pre-service teachers' TPACK significantly affects teacher self-efficacy (Joo et al., 2018). However, previous studies have shown inconsistent findings regarding the impact of self-efficacy and teacher knowledge on readiness. These contradictions indicate the need for a mediating

framework, such as TPACK-based dynamic capabilities, to better understand the mechanism underlying teacher readiness in differentiated instruction, especially in economics education (Dharin et al., 2025).

The TPACK concept developed so far is important knowledge for teachers to bring about change in the dynamic learning process. Related to the dynamic concept, teachers must have dynamic capabilities because they help teachers change and reconfigure their teaching strategies and abilities to quickly adapt to the environment (Fenech et al., 2021). The Dynamic Capabilities Theory was initially introduced by Teece et al. (1997) who stated that an organization is not enough to have ordinary capabilities; it needs dynamic capabilities to deal with change. Although originally developed in the business context, the concept of dynamic capabilities has been adapted to the education field to explain how teachers respond to change. Dynamic capabilities refer to a teacher's ability to adapt instructional strategies in response to students' diverse and evolving needs.

This research has original value, especially in involving dynamic capabilities which are currently being discussed at the individual level and in this context are teachers. The concept of dynamic capabilities is generally studied in the field of business. In addition to the business field, dynamic capabilities at the individual level have also been studied in education. Teachers who have dynamic capabilities are able to deal with volatility, uncertainty, complexity, and ambiguity, which means that teachers can adapt to uncertain and complex situations and face challenges in creative and innovative ways (Fenech et al., 2021). All teachers, including economics teachers, should possess dynamic capabilities.

As a dynamic subject, economics requires teachers to keep updated with the latest trends to improve their teaching and keep students informed about the latest advances in the field. Topic knowledge is essential in teaching economics, as it provides clear explanations, uses real-world examples, stimulates critical thinking, utilizes interactive teaching techniques, and always follows the latest research (Adu & Galloway, 2015). Since economics is a dynamic subject with constantly evolving content, economics teachers require up-to-date content knowledge and the ability to adapt teaching approaches. This condition underscores the relevance of integrating TPACK and dynamic capabilities in their professional readiness.

Dynamic capabilities, which refer to an individual's ability to adapt and innovate in the face of change, can be integrated with the TPACK framework to produce a more holistic approach to teaching and learning. TPACK emphasizes the importance of combining content, pedagogical, and technological knowledge in supporting teaching effectiveness. By integrating dynamic capabilities into the TPACK framework, educators can better understand and manage changes in educational technology and develop relevant strategies to enhance student learning. Based on these characteristics, TPACK-based Dynamic Capability is critical for economics teachers. TPACK-based Dynamic Capability, as a new concept, has an important role in linking self-efficacy to teacher readiness. Teachers who have high self-efficacy are more likely to develop the necessary TPACK-based Dynamic Capability, which then helps them to be more prepared to use technology, master content, and understand pedagogy effectively in differentiated learning, which ultimately improves teacher readiness as a whole to deal with different learning needs of students. The synthesis between Dynamic Capabilities and TPACK produces a new construct called TPACK-based Dynamic Capabilities. These capabilities can be defined as the ability possessed by an educator to continuously adapt, develop themselves, and apply technology effectively in the learning process through a combination of pedagogical knowledge (teaching methods), content (teaching materials), and technology. Individuals with dynamic capabilities can explore various technological tools to support more interactive and practical learning.

This study aims to: 1) Analyze the influence of teacher self-efficacy on the readiness of differentiated learning of economics teachers; 2) Analyze the influence of teacher self-efficacy on dynamic capabilities based on Technological Pedagogical and Content Knowledge (TPACK); 3) Analyze the influence of Dynamic Capabilities based on Technological Pedagogical and Content Knowledge (TPACK) on the readiness of differentiated learning of economics teachers; and 4)

Analyze the influence of teacher self-efficacy on the readiness of differentiated learning of economics teachers mediated by Dynamic Capabilities based on Technological Pedagogical and Content Knowledge (TPACK).

METHOD

This study employed a quantitative research approach using an explanatory survey method. The purpose of this method was to collect data from a population group to understand the research objective better. It allowed for examining relationships between variables and provided structured, measurable results suitable for statistical analysis.

The population in this study consisted of all economics teachers at Islamic Senior High Schools in Central Java Province, Indonesia. From this population, 73 teachers responded completely to the questionnaire. Table 1 presents a demographic summary of these respondents. Most were women (76.71%), and most had teaching experience ranging from 1 to 25 years. A significant proportion (91.78%) were from private schools, and 58.90% had received training for working with diverse student populations.

Table 1 Respondent Demographic Data Summary

Demographics		Number of Respondents	Percentage (%)
Gender	Man	17	23.29
	Woman	56	76.71
Years of Teaching	< 1 years	3	4.11
	1 – 5 years	13	17.81
	6 – 10 years	13	17.81
	11 – 15 years	11	15.07
	16 – 20 years	18	24.66
	21 – 25 years	14	19.18
	> 25 years	1	1.37
School status	Public	6	8.22
	Private	67	91.78
Training for Diverse Student Populations	Yes	43	58.90
	No	30	41.10

The primary instrument for data collection was a structured questionnaire distributed online to economics teachers. It used a 7-point Likert scale with various statements to gather perceptions and attitudes relevant to the study. The questionnaire's structure and scale allowed for consistent and reliable responses, enhancing the quality of the collected data.

This study used the Structural Equation Model (SEM) analysis technique. SEM is a statistical technique used to analyze the relationship pattern between latent constructs and their indicators, the relationship between one latent construct and another, and to accommodate measurement errors directly. SEM is a family of dependent multivariate statistics that allows direct analysis between several dependent and independent variables (Hair et al., 2019). Data analysis with SEM-PLS is carried out in three stages: outer model analysis (measurement model), inner model analysis (structural model), and hypothesis testing. First, the measurement model analysis (outer model) evaluates the validity and reliability of the indicators by looking at the loading factor, AVE, and composite reliability values. The outer model, namely the specification of the relationship between latent variables and their indicators, also called the outer relationship or measurement model, defines the characteristics of a construct with its manifest variables (Kusairi et al., 2021). Second, the structural model analysis (inner model) assesses the relationship between latent constructs through R^2, f^2, and Q^2 to see how much the independent variables explain the dependent variable. Third, hypothesis testing uses the bootstrapping method to test the significance of the influence between constructs based on the t-statistic and p-value values.

RESULT AND DISCUSSION

Result

The initial step was a descriptive comparison of the average scores of each variable based on Islamic school type, namely, public and private Islamic schools. This analysis aimed to identify initial trends in teacher readiness, self-efficacy, and TPACK-based dynamic capabilities across two distinct institutional contexts. The results of this comparison provide an initial foundation for understanding the potential influence of the school environment on teacher perceptions and abilities, before further testing using measurement and structural models. The following table summarizes the average scores of the three main variables by school type category.

Table 2 Comparison of Respondents' Average Scores Based on School Type

Variable	State Islamic School	Private Islamic School
Teacher Readiness	5.99	5.81
Self-Efficacy	6.27	5.77
TPACK based Dynamic Capabilities	6.26	5.62

Overall, teachers at State Islamic Schools showed higher scores than teachers at Private Islamic Schools on the three variables measured: Teacher Readiness, Self-Efficacy, and TPACK-based Dynamic Capabilities. Table 3 compares the number of teachers in state and private Islamic schools who participated in differentiated learning training.

Table 3 Comparison of the Number of Teachers Who Attended Training Based on School Type

Islamic School Types	Differentiated Learning Training	
	Yes	No
State Islamic School	4	2
Private Islamic School	39	28

At State Islamic Schools, 4 out of 6 teachers, or 66.7%, have participated in differentiated learning training. At Private Islamic Schools, 39 out of 67 teachers, or 58.2%, have participated in similar training. Although private schools have a significantly larger number of teachers, the proportion of teachers who have participated in training is higher in state schools (66.7%) than in private schools (58.2%). This result indicates that, as a percentage, state schools have a higher level of training participation.

Outer Model

The first stage after collecting the data is assessing its validity and reliability. Data validity and reliability are measured using the Average Variance Extracted (AVE), Composite Reliability, and Cronbach's Alpha values. This study includes 58 indicators from the Teacher Readiness (TR), Teacher Self-Efficacy (TSE), and TPACK-based Dynamic Capability (TDC) variables. Based on Table 4, it is known that almost all indicators in each variable have a loading factor value greater than 0.7. Several indicators have loading factors between 0.4 and 0.7. Hair *et al.* (2019) stated that loading factors between 0.4 and 0.7 can still be used and do not need to be deleted if they do not cause a significant increase in composite reliability. Based on these criteria, the indicators in each variable can be declared valid. Each variable also has an AVE value greater than 0.50, which describes convergent validity, meaning that one latent variable can explain more than half of the variance of its indicators on average (Ghozali, 2016). Furthermore, the Cronbach's alpha value (> 0.60) and Composite Reliability (> 0.70) indicate the reliability of the research variables (Hair et al., 2017). Based on the reliability test, all research variables in this study have a Cronbach's Alpha value greater than 0.60, namely: Teacher Readiness (0.935), Teacher Self-Efficacy (0.898), and TPACK based Dynamic Capabilities (0.986). Furthermore, all variables have a Composite Reliability value greater than 0.70, namely: Teacher Readiness (0.943), Teacher Self-Efficacy (0.921), and TPACK

based Dynamic Capabilities (0.987). Therefore, all indicators used in this study are considered reliable to proceed to the next stage.

Table 4 Measurement Model

Variabel	Measurement Items		AVE	Cronbach's alpha	Composite reliability	Outer Loading
	Indicator Variable	**Construct**	**0.524**	**0.935**	**0.943**	
Teacher Readiness (TR)	Content Readiness for Differentiated Learning	TR1				0.661
		TR2				0.794
		TR3				0.743
	Process Readiness for Differentiated Learning	TR4				0.735
		TR5				0.756
		TR6				0.751
		TR7				0.648
		TR8				0.655
	Product Readiness for Differentiated Learning	TR9				0.647
		TR10				0.729
	Environmental Readiness for Differentiated Learning	TR11				0.797
		TR12				0.826
		TR13				0.679
		TR14				0.717
		TR15				0.686
	Indicator Variable	**Construct**	**0.599**	**0.898**	**0.921**	
Teacher Self-efficacy (TSE)	The perceived level of task difficulty that is achievable	TSE1				0.756
		TSE2				0.471
	The degree to which a person believes their ability to face various challenges or situations	TSE3				0.803
		TSE4				0.896
		TSE5				0.733
	The degree to which a person believes their success in one area can be applied to other contexts or tasks	TSE6				0.689
		TSE7				0.909
		TSE8				0.844
	Indicator Variable	**Construct**	**0.678**	**0.986**	**0.987**	
TPACK-based Dynamic Capabilities (TDC)	Facing Complexity Based on TPACK	TDC1				0.854
		TDC2				0.831
		TDC3				0.799
		TDC4				0.793
		TDC5				0.771
	Self-Reflection Based on TPACK	TDC6				0.837
		TDC7				0.871
		TDC8				0.850
		TDC9				0.898
		TDC10				0.876
		TDC11				0.839
		TDC12				0.792
	Combination Based on TPACK	TDC13				0.858
		TDC14				0.777
		TDC15				0.866
		TDC16				0.870
		TDC17				0.803
		TDC18				0.853
		TDC19				0.837

Variabel	Measurement Items		AVE	Cronbach's alpha	Composite reliability	Outer Loading
	Cooperation Based on TPACK	TDC20				0.877
		TDC21				0.922
		TDC22				0.825
		TDC23				0.883
		TDC24				0.869
		TDC25				0.663
		TDC26				0.783
		TDC27				0.802
		TDC28				0.694
		TDC29				0.889
		TDC30				0.787
		TDC31				0.809
		TDC32				0.734
		TDC33				0.814
		TDC34				0.797
		TDC35				0.716

Source: Processed Primary Data (2025)

Discriminant validity is related to the principle that different construct measures should not be highly correlated. Discriminant validity with the Heterotrait-Monotrait Ratio of Correlations (HTMT) indicator is below the threshold of 0.9, as suggested by Henseler et al. (2015). The results, as shown in Table 5, show that all HTMT values are below the threshold of 0.9. It indicates that each construct has a significant difference compared to other constructs, thus meeting the criteria for discriminant validity.

Table 5 Heterotrait-monotrait ratio (HTMT) - Matrix

	TPACK-based Dynamic Capabilities	Teacher Readiness	Teacher Self-efficacy
TPACK-based Dynamic Capabilities			
Teacher Readiness	0.785		
Teacher Self-efficacy	0.689	0.678	

Inner Model

The coefficient of determination (R Square) is a way to assess how much the exogenous construct can explain the endogenous construct. The results of the R-square analysis indicate that the research model has a reasonably good ability to explain the variability in the dependent variables. Figure 3 shows that the R-square value for TPACK-based Dynamic Capabilities is 0.422. The adjusted R-square is 0.414, which means that the Teacher Self-Efficacy variable can explain TPACK-based Dynamic Capabilities by 41.4%. With an R-square value of 0.628 and an adjusted R-square of 0.617 for Teacher Readiness, Teacher Self-Efficacy, and TPACK-based Dynamic Capabilities, it can explain teacher readiness in differentiated learning by 61,7% (strong model).

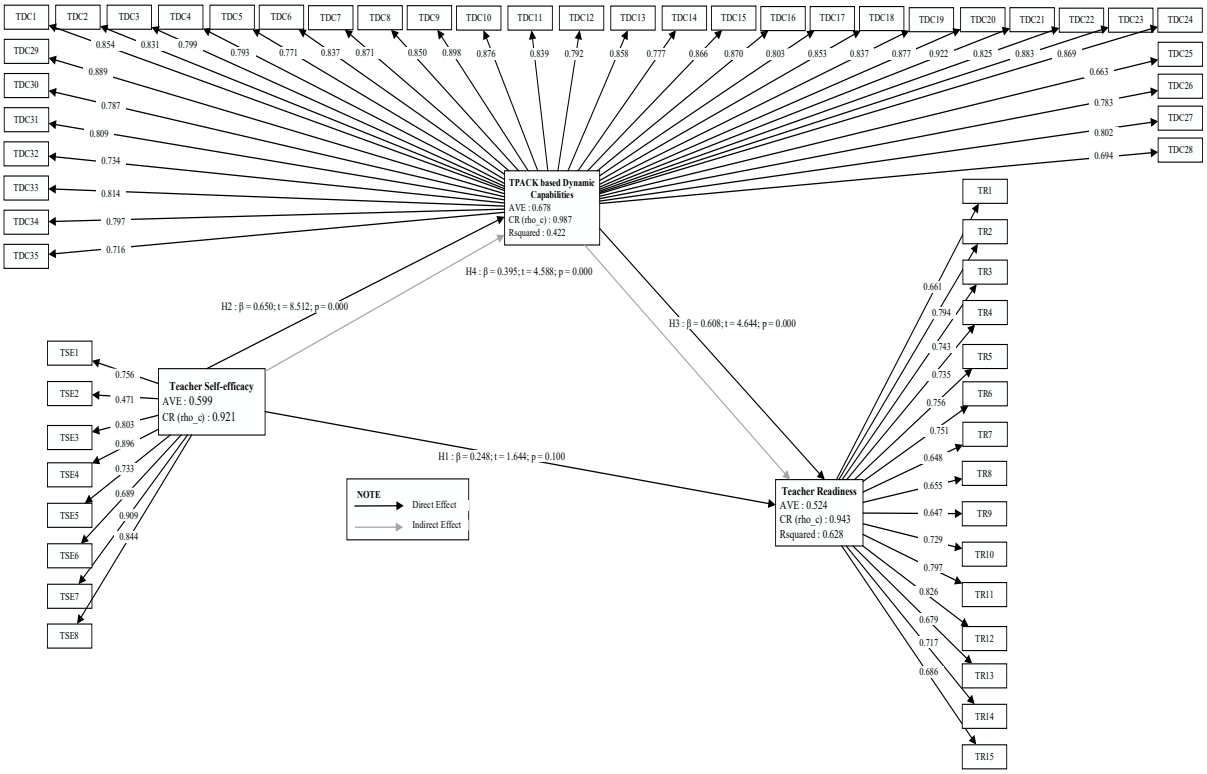

Figure 2 Measurement and Structural Model Results

Based on the structural model analysis results using PLS-SEM, the F-square (Table 6) value was obtained for the relationship between Teacher Self-efficacy and TPACK-based Dynamic Capabilities, which showed an F-square value of 0.731. This value far exceeds the threshold of 0.35, which is categorized as a significant effect according to Cohen & Levinthal (1990), so it can be concluded that Teacher Self-efficacy has a very large influence on TPACK-based Dynamic Capabilities. It shows that the level of teacher self-efficacy plays a crucial role in forming and strengthening TPACK-based dynamic capabilities. The relationship between TPACK-based Dynamic Capabilities and Teacher Readiness has an F-square value of 0.575. This value is in the moderate to approaching large category, showing that TPACK-based dynamic capabilities substantially influence teacher readiness to implement differentiated learning. It emphasizes the importance of mastering technology, pedagogy, and content in an integrated manner to improve teacher readiness. The direct relationship between Teacher Self-efficacy and Teacher Readiness shows an F-square value of 0.096. This value is included in the small effect category, indicating that teacher self-efficacy also significantly influences teacher readiness, although not as large as the influence through TPACK-based Dynamic Capabilities mediation. These findings indicate that TPACK-based Dynamic Capabilities play an important mediator role in the relationship between teacher self-efficacy and readiness. Interventions to improve teacher readiness in differentiated learning should consider efforts to strengthen self-efficacy while improving TPACK-based dynamic capabilities.

Table 6 F-square Test

	f-square
TPACK-based Dynamic Capabilities -> Teacher Readiness	0.575
Teacher Self-efficacy -> TPACK-based Dynamic Capabilities	0.731
Teacher Self-efficacy -> Teacher Readiness	0.096

Source: Processed Primary Data (2025)

The Goodness of Fit (GoF) test assesses how the tested structural model fits the existing data. One of the indicators used is the Standardized Root Mean Square Residual (SRMR) value, which, according to Hu and Bentler (1999), is considered good if it is in the range of 0 to 0.08. In addition, the Normed Fit Index (NFI) developed by Bentler and Bonett (1980) has a scale between 0 and 1, where values approaching 1 indicate a better level of model fit. Based on the results in Table 7, the SRMR value of 0.084 indicates that the model has a good fit. Meanwhile, the NFI value of 0.479 also shows that the model is appropriate for the data analyzed, although it has not reached a perfect value.

Table 7 Goodness of Fit (GoF)

	Saturated model	Estimated model
SRMR	0.084	0.0837545
d_ULS	12.002	12.00235078
d_G	18.308	18.30765189
Chi-square	3862.560	3862.559564
NFI	0.479	0.479287447

Source: Processed Primary Data (2025)

Hypothesis Testing

Hypothesis testing uses path coefficient analysis to understand the relationship between variables. This test aims to measure the strength and direction of the model's relationship between independent variables, mediation, moderation, and dependent variables. The test results are summarized in Table 8, which presents the path coefficient, t-statistic, and p-value for each hypothesis tested.

Table 8 Path Coefficient

	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistics (|O/STDEV|)	P values
TPACK-based Dynamic Capabilities -> Teacher Readiness	0.608	0.591	0.131	4.644	0.000
Teacher Self-efficacy -> TPACK-based Dynamic Capabilities	0.650	0.661	0.076	8.512	0.000
Teacher Self-efficacy -> Teacher Readiness	0.248	0.273	0.151	1.644	0.100

Source: Processed Primary Data (2025)

The t-table value is 1.96. The relationship is considered statistically significant if the t-statistic value is greater than or equal to the t-table. A p-value <0.05 is used to determine the significance of the relationship between variables. Table 8 presents the path coefficient analysis of the relationships among teacher self-efficacy, TPACK-based dynamic capabilities, and teacher readiness. The results indicate that TPACK-based dynamic capabilities have a significant positive effect on teacher readiness, with an original sample coefficient of 0.608, a t-statistic of 4.644, and a p-value of 0.000, below the 0.05 significance level. In addition, teacher self-efficacy significantly positively influences TPACK-based dynamic capabilities, with a path coefficient of 0.650, a t-statistic of 8.512, and a p-value of 0.000, confirming a strong and statistically significant relationship. However, the direct effect of teacher self-efficacy on teacher readiness is not statistically significant, as reflected by a path coefficient of 0.248, a t-statistic of 1.644, and a p-value of 0.100, which exceeds the 0.05 threshold. These findings suggest that teacher self-efficacy influences teacher readiness indirectly through TPACK-based dynamic capabilities rather than directly.

Table 9 shows the specific indirect effect of teacher self-efficacy on teacher readiness through TPACK-based dynamic capabilities. The analysis reveals that this indirect path is positive and

statistically significant, with an original sample coefficient of 0.395. The t-statistic is 4.588, and the p-value is 0.000, indicating a significant effect at the 0.05 level. This result confirms that teacher self-efficacy indirectly influences teacher readiness by enhancing TPACK-based dynamic capabilities, improving teacher readiness. The significant indirect effect supports the role of TPACK-based dynamic capabilities as a mediating variable in this relationship.

Table 9 Specific Indirect Effect

	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistics (|O/STDEV|)	P values
Teacher Self-efficacy -> TPACK-based Dynamic Capabilities -> Teacher Readiness	0.395	0.387	0.086	4.588	0.000

Discussion

The data analysis found that teachers at State Islamic Schools scored higher than teachers at Private Islamic Schools on all three measured variables: Teacher Readiness, Self-Efficacy, and TPACK-based Dynamic Capabilities. This result reflects that teachers in public schools are better prepared to face learning challenges, have higher self-confidence, and can adaptively integrate pedagogical, content, and technological knowledge. Despite a greater number of teachers from Private Islamic Schools participating in differentiated learning training, only four teachers from State Islamic Schools were involved. However, the state school teachers' participation rate was higher when viewed proportionally. This discrepancy highlights that more training participants do not necessarily lead to better pedagogical outcomes. Though fewer in training, teachers from state schools demonstrated higher competency scores. This result suggests that factors such as the quality of training, teaching experience, or institutional support may have a more substantial influence. Therefore, it is essential for education stakeholders to broaden access to training and prioritize its relevance and effectiveness. Further research is needed to explore additional factors that may impact teacher performance across both school types.

The Influence of Teacher Self-Efficacy on Teacher Readiness of Differentiated Learning of Economics Teachers

The results of this study indicate that the direct relationship between teacher self-efficacy and teacher readiness at Islamic Senior High Schools is not statistically significant. A teacher's confidence in their abilities (self-efficacy) does not automatically translate into readiness to face educational challenges or implement innovations without other supporting factors. These findings contradict previous studies, which generally show a significant positive relationship between teacher self-efficacy and teacher readiness. For example, Granziera and Perera (2019) revealed that teachers with high self-efficacy tend to be more involved in their work, while Wang (2022) found that teachers with strong self-efficacy demonstrate greater enthusiasm and commitment. Kim and Seo (2018) highlighted the close link between self-efficacy, lesson planning, and teachers' belief in student success. Furthermore, teacher self-efficacy has been shown to play a crucial role in implementing educational reforms (Gordon et al., 2023; Musadad et al., 2022). Scherer and Teo (2019) identified self-efficacy as an important predictor of teacher readiness for digital learning in the context of technology integration. The inconsistency between this study and prior research may be explained by contextual factors, such as differences in institutional culture, access to technological resources, or specific challenges faced by Islamic Senior High Schools in Central Java. It suggests that teacher self-efficacy alone is not sufficient. External support systems and TPACK-based dynamic capabilities are essential to translate self-belief into actual teacher readiness for educational innovation.

The Influence of Teacher Self-Efficacy on Dynamic Capabilities Based on Technological Pedagogical and Content Knowledge (TPACK)

Other analysis results show a highly significant direct relationship between Teacher Self-Efficacy and TPACK-based Dynamic Capability. This finding confirms that teacher self-efficacy is a key factor in forming and developing dynamic capabilities integrated into the TPACK framework, which includes teachers' ability to combine pedagogical, content, and technological knowledge adaptively according to learning needs. Self-efficacy is the foundation of individual proactive actions, including in professional contexts such as teacher self-development. This ability is the essence of dynamic capabilities, namely the capacity to integrate, build, and configure competencies to respond to environmental changes (Teece et al., 1997).

Mishra, P., & Koehler (2006), as the initiators of the TPACK framework, emphasized that developing TPACK knowledge requires courage and self-confidence in facing new technologies and pedagogical practices. This framework guides teachers in designing, developing, and implementing effective teaching using technology in learning contexts appropriate to the subject content (Krisnaresanti, Ahman, et al., 2024). Research by Zeng, Wang and Li (2022) showed that teachers' with information technology integration Self-efficacy is significantly positively correlated with TPACK. Teachers with high self-efficacy are more likely to develop TPACK knowledge actively and flexibly, and adjust it to the dynamics of students' learning needs.

Based on the study's results, Teacher Self-efficacy is an important internal driver in forming dynamic capabilities based on TPACK. Teacher self-efficacy can be improved through training programs (Almajnuni & Alwerthan, 2024). The relationship between effective training programs and self-efficacy suggests that teachers need to be scheduled for meaningful training programs according to their needs, which can be obtained from school leaders and teacher supervisors (Krisnaresanti, Suwatno, et al., 2024). Training programs can also effectively contribute to developing and improving teachers' TPACK. Ultimately, increased teacher self-efficacy and TPACK will improve their ability to effectively integrate technology into their teaching practices.

The Influence of Dynamic Capabilities based on Technological Pedagogical and Content Knowledge (TPACK) on Teacher Readiness of Differentiated Learning

Further research findings show a significant direct relationship between TPACK-based Dynamic Capability and Teacher Readiness. Theoretically, this relationship can be explained through the concept of dynamic capability developed by Teece et al. (1997), which refers to the capacity of an organization or individual to systematically create, expand, and adapt competencies in order to respond to environmental changes. In the context of education, TPACK-based dynamic capability reflects the ability of teachers to continuously adjust their teaching practices to technological advances, curriculum needs, and student characteristics.

Teachers who possess strong TPACK-based dynamic capabilities are more equipped to adapt to shifts in the educational landscape, such as transitioning to digital, hybrid, or differentiated learning models. Teachers also have the flexibility to design and adjust technology-based learning strategies according to context. Teachers are more proactive in finding solutions when facing learning obstacles in complex and heterogeneous classes. Chai, Koh and Tsai (2013) emphasized that teachers who actively develop TPACK have greater readiness to implement learning innovations. In addition, research by Rosenberg and Koehler (2018) shows that teacher readiness in a digital context can navigate TPACK relevantly. Thus, this finding confirms that dynamic capabilities based on TPACK are important determinants in shaping teacher readiness. Teachers who adaptively respond to educational dynamics through flexible integration of TPACK knowledge will be better prepared to face curriculum challenges, technological demands, and the diversity of student needs.

The Influence of Teacher Self-efficacy on Teacher Readiness of Differentiated Learning Mediated by Dynamic Capabilities based on Technological Pedagogical and Content Knowledge (TPACK)

The last findings reveal a statistically significant indirect effect of teacher self-efficacy on teacher readiness mediated by TPACK-based dynamic capabilities. This relationship aligns with Social Cognitive Theory (Bandura, 1978), which posits that individuals with high self-efficacy are likelier to initiate, persist, and adapt to complex tasks. In educational contexts, teacher self-efficacy affects motivation, openness to innovation, and resilience in dealing with instructional challenges (Gratacós et al., 2023). Such psychological attributes are essential in fostering the willingness and ability to acquire TPACK-based dynamic capabilities, defined as a teacher's capacity to reconfigure and adapt pedagogical strategies by integrating technological tools with content and pedagogy in response to contextual changes (Chai et al., 2013; Schmidt et al., 2009).

Through this pathway, self-efficacy acts as a cognitive and affective driver for the continual development of dynamic teaching competencies. Once these capabilities are established, teachers become more ready to implement innovative instructional practices, manage diverse classrooms, and deliver context-sensitive teaching. This finding is supported by Williams *et al.* (2023), who found that self-efficacy significantly predicts technology integration proficiency in classrooms. Moreover, research by Schubatzky *et al.* (2025) emphasizes that the development of TPACK requires both technological knowledge and the motivational belief (i.e., self-efficacy) to apply it in pedagogically meaningful ways. The results highlight the mediating role of TPACK-based dynamic capabilities in transforming self-efficacy into tangible instructional readiness.

CONCLUSION

The results of this study provide important contributions to understanding the factors that influence teacher readiness in implementing technology-based differentiated learning, especially in the context of the Independent Curriculum and 21st-century learning. First, Teacher Self-Efficacy is proven to have no direct influence on Teacher Readiness. It means that even though a teacher has high self-confidence in their teaching ability, it does not necessarily prepare them for differentiated learning.

Second, Teacher Self-efficacy also has a substantial direct effect on TPACK-based Dynamic Capabilities, which means that teacher self-efficacy encourages them to continue learning, innovating, and building adaptive capabilities in combining technology, pedagogy, and content. This capability is crucial in differentiated learning because it requires teachers to dynamically adjust strategies, media, and assessments to students' individual characteristics. Third, TPACK-based Dynamic Capabilities significantly affect Teacher Readiness, which confirms that teacher readiness is not only determined by psychological factors (self-confidence), but also by professional competence in implementing TPACK integration responsively to changing learning situations. In the context of differentiated learning, teachers must be able to choose and adapt technology and pedagogical approaches according to the diverse needs of students.

Fourth, Teacher Self-efficacy significantly indirectly affects Teacher Readiness through TPACK-based Dynamic Capabilities. This finding confirms that the influence of Teacher self-efficacy on their readiness is mediative, where TPACK-based dynamic capabilities are a key mechanism in transforming self-confidence into tangible and measurable readiness in technology-based differentiated learning practices. Thus, this study concludes that strengthening self-efficacy and developing TPACK dynamic capabilities are strategic foundations in improving teacher readiness to implement technology-based differentiated learning. Therefore, teacher professional development programs must focus on two main things: (1) building teacher self-confidence to have dynamic capabilities based on TPACK, and (2) strengthening teacher abilities in integrating technology, pedagogy, and content adaptively to meet individual student learning needs.

This study has limitations in that it only recorded whether teachers attended training but did not evaluate the training's quality, duration, or relevance to implementing technology-based differentiated learning. Furthermore, the relationships between variables were explored using a correlational/structural approach, thus failing to fully explain the causal relationship between self-efficacy, TPACK, and teacher readiness. Further studies are needed to explore the effectiveness of teacher training, examining its design, implementation, and impact on actual changes in teaching practice. Future research also involves a larger number of teachers from different school types, geographic regions, and educational levels to increase the generalizability of the findings.

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