PROFESI PENDIDIKAN DASAR
Volume 12, Issue 2, August 2025, pp. 113-132
p-ISSN: 2503-3697, e-ISSN: 2541-2590
https://journals2.ums.ac.id/index.php/ppd

# The Essential Role of Teacher Self-Efficacy and Teacher Acceptance for Differentiated Learning

**Husnul Khotimah[1*], Nandang Hidayat[2], Nur Shahira Binti Abdul Rashid[3]**
[1]Institut Pembina Rohani Islam Jakarta, Indonesia
[2]Universitas Pakuan, Indonesia
[3]Universiti Sultan Azlan Shah, Malaysia
*Corresponding Author's email: husnul.khot1978@gmail.com

**How to cite:** Khotimah, H., Hidayat, N., & Abdul Rashid, N. S. B. (2025). The Essential Role of Teacher Self-Efficacy and Teacher Acceptance for Differentiated Learning. *Profesi Pendidikan Dasar*, 12(2), 113–132. https://doi.org/10.23917/ppd.v12i2.9215

**Keywords:**
*teacher self-efficacy; teacher acceptance; teacher readiness; differentiated learning; implementation*

**Article History:**
Submitted: 2025-05-11
Revised: 2025-08-01
Accepted: 2025-08-21

**Abstract**

*The heterogeneous characteristics of students require teachers to be creative in implementing innovative learning strategies that can meet the various needs of students. This study explores the influence of differentiated learning management on teacher readiness to implement differentiated learning, by analysing teacher self-efficacy and acceptance of differentiated learning as moderator variables. The study involved 162 Elementary School (ES) and Madrasah Ibtidaiyah (MI) teachers from 49 schools in three sub-districts, namely Tapos District, Depok City, Cimanggis District, Bogor Regency, and Kelapa Dua Wetan District, East Jakarta City, Indonesia. This research uses quantitative methods. Data collection used three instruments in the form of questionnaires, namely instruments to measure differentiated learning management (DLM), teachers' readiness to implement differentiated learning (RIDL), teacher self-efficacy (TSE), and acceptance of differentiated learning (ADL). Data were analyzed using partial least squares structural equal modelling (PLS-SEM) with the help of SmartPLS 3 software. The results showed that differentiated learning management, self-efficacy, and teacher acceptance of differentiated learning had a direct and significant effect on teacher readiness to implement differentiated learning. This study has implications for the importance of core support, professional development, and other policies and resources to support teachers' readiness to implement differentiated learning.*

## INTRODUCTION

### Background of the Study

In each regular class, it is filled with students with heterogeneous characteristics, such as their previous knowledge, interests, talents, learning styles, and learning speed (Albanese et al., 2021; Cooper et al., 2025; Organisation for Economic Co-operation and Development [OECD], 2020; Rahmadani & Kurniawati, 2021; Tomlinson, 2018). Facing this diversity requires teachers to be creative in adapting their instructional strategies to meet students' needs across a broad spectrum (Kalinowski et al., 2024; Nusser & Gehrer, 2020). Differentiated learning (DL) has been recognized as an effective pedagogical approach to respond to these challenges (Deunk et al., 2018; Goyibova et al., 2025; Inman & Roberts, 2022; Ramaila, 2025; Subban et al., 2025; Suprayogi et al., 2017; Wibowo et al., 2025). Recent systematic reviews confirm that differentiated instruction significantly enhances student

outcomes when applied consistently (Kahmann et al., 2022; Pozas et al., 2022; Smale-Jacobse et al., 2019). In the post-pandemic context, differentiated learning practices have expanded into hybrid and technology-assisted modes. Teachers now integrate digital platforms, AI-powered adaptive systems, and online collaboration to personalize instruction (Christina & Panagiotidis, 2024; Fletscher et al., 2024; Janahi et al., 2023; Kotorov et al., 2025). These shifts emphasize the importance of teacher readiness not only in classroom differentiation but also in technology-mediated differentiation.

In Indonesia, the implementation of DL has been strongly emphasized in the Merdeka Curriculum. However, in practice, teacher readiness to adopt this approach remains a challenge (Andarwulan et al., 2021; Nurtanto et al., 2021; Winarto et al., 2025). Teachers often report being unprepared to implement DL consistently (Sofiana et al., 2024). This fact shows that even though DL is mandated, there is still a gap between curriculum policy and classroom reality. Most prior Indonesian studies on differentiated learning have relied on descriptive surveys or qualitative accounts, which provide valuable insights into teacher perceptions but offer limited explanatory power for testing complex theoretical relationships (Sofiana et al., 2024; Suprayogi et al., 2017). By employing Partial Least Squares Structural Equation Modeling (PLS-SEM), this study advances the field by quantifying the strength of associations among DL management, self-efficacy, acceptance, and readiness, while simultaneously testing moderation effects. This methodological contribution helps bridge the gap between largely narrative or exploratory research and more rigorous, theory-driven empirical analysis in the Indonesian context.

Many factors influence readiness to implement DL. Several factors affect teachers' readiness for DL, including lack of opportunities and involvement in professional development such as workshops and training sessions that focus on differentiated learning (Hidayat & Patras, 2024; Jager, 2017; Khairiah et al., 2024; Sofiana et al., 2024; Yunaini et al., 2024), teacher self-efficacy related to DL (Wan, 2016; Yildiz, 2023), student diversity and class size (Hidayat et al., 2024; Santoso et al., 2022; Sofiana et al., 2024), and ability to adapt pedagogy to student profiles (Bi et al., 2024; Shruthi et al., 2025). In addition, acceptance of innovation and teachers' attitudes toward DL is crucial for sustained adoption (Bi et al., 2024; Porta et al., 2022; Pozas et al., 2022). Structural barriers faced by teachers, such as lack of time, support, and cooperation, cause teachers' acceptance of the DL approach to be low. (Hartwig & Schwabe, 2018; Mengistie, 2020; Shareefa et al., 2019). Every teacher faces the same structural barriers, but because of individual differences between teachers, the acceptance and self-efficacy of teachers to implement DL varies from one teacher to another. On the one hand, there are teachers who try hard to understand conceptually and operationally so that they are ready to implement differentiated learning, on the other hand, there are teachers who do not do this so that they are not ready to implement DL. This raises the question, why is the readiness to implement DL varied among teachers.

This study aims to investigate whether DL management activities contribute to teacher readiness in implementing DL. In examining the relationship between the two variables, we analyze self-efficacy and teacher acceptance of the DL approach as moderator variables. This research design is new in the context of DL implementation studies.

## Problem of the Study

Teachers often perceive DL as complex and demanding, particularly in the context of large classes, diverse student profiles, and limited instructional resources. Time constraints and workload further discourage teachers from adopting DL consistently. In Indonesia, most previous research addressing teacher readiness and differentiated learning has been largely descriptive or qualitative, focusing on perceptions, challenges, and case-based narratives. While such studies provide valuable insights, they do not adequately test the theoretical mechanisms through which TSE and ADL shape readiness for implementation.

To address this gap, the present study explicitly tests a structural model of teacher readiness for differentiated learning using Partial Least Squares Structural Equation Modeling (PLS-SEM). This approach allows simultaneous estimation of multiple relationships between DLM, TSE, ADL, and RIDL, while also examining potential moderation effects. PLS-SEM is particularly suitable given the predictive orientation of this research, the moderate sample size, and the inclusion of both direct and moderating paths (Hair et al., 2021). Accordingly, the problem addressed in this study is not only whether teachers

are ready for differentiated learning, but more importantly, how DL management, teacher self-efficacy, and teacher acceptance interrelate within a tested structural framework. By adopting PLS-SEM, the study moves beyond descriptive accounts and advances toward rigorous, theory-driven empirical testing in the Indonesian educational context.

The unit of analysis was Elementary School (ES) and Madrasah Ibtidaiyah (MI) teachers, both state and private. Including both ES and MI is important because, while they serve comparable grade levels, they operate under different administrative and cultural contexts—ES under the Ministry of Primary and Secondary Education and MI under the Ministry of Religion. By involving both school types, this study allows for an explicit comparison of readiness and perceptions across these parallel systems. Demographic information of respondents such as gender, age, qualifications, and teaching experience, was collected (see Table 2). The sample was broadly representative of the teacher population in the participating districts, with balanced proportions of male and female teachers, a distribution of age groups ranging from early-career to senior teachers, and inclusion of both undergraduate and postgraduate degree holders. Likewise, teaching experience varied across novice (1–5 years), mid-career (6–15 years), and veteran teachers (16+ years). This representativeness ensures that the research captures perspectives across key demographic subgroups, even though no subgroup comparisons were formally tested."

## Research's State of the Art

This study draws on two major frameworks: 1) Bandura's Self-Efficacy Theory, which posits that individuals' confidence in their abilities influences motivation and behavior (Bourne et al., 2021; Omotoy, 2023; Schunk & DiBenedetto, 2021). In teaching, higher self-efficacy predicts persistence and adaptability in implementing complex strategies like DL (Kalinowski et al., 2024; Lai et al., 2020; Suprayogi et al., 2017). 2) Davis's Technology Acceptance Model (TAM), which suggests that perceived usefulness and ease of use shape acceptance of innovations (Ballat, 2024; Luk et al., 2018; Zhang, 2025). In the DL context, teacher acceptance determines whether teachers integrate differentiation as part of their practice (Akram et al., 2022; Lai et al., 2022). By integrating Bandura's theory with TAM, this study positions teacher self-efficacy (TSE) and teacher acceptance of DL (ADL) as interrelated factors that condition the relationship between DL management and teacher readiness.

The study contributes by integrating Bandura's Self-Efficacy Theory and the Technology Acceptance Model (TAM). It also advances Indonesian research on differentiated learning by moving beyond predominantly qualitative or descriptive studies. Through PLS-SEM, this study not only establishes causal inferences with greater statistical rigor but also demonstrates how attitudinal and psychological factors interact within a structural model (Hair et al., 2021; Henseler et al., 2015). This addresses a critical methodological gap in Indonesian educational research, where theory testing with robust quantitative approaches remains underdeveloped.

Differentiated learning is based on the premise that students' characteristics are different and they learn in different ways (Jepkoech, 2023; Stollman et al., 2021; Tahiri et al., 2017; Taş & Minaz, 2024; Wibowo et al., 2025). Differentiated learning is a learning approach that takes into account the differences and diversity of individual student characteristics (Kalinowski et al., 2024; Magableh & Abdullah, 2022; Smale-Jacobse et al., 2019; Smit & Humpert, 2012; Tomlinson, 2018). This method recognizes that students have varying backgrounds, readiness levels, interests, and learning profiles, and seeks to address these differences (Inman & Roberts, 2022; Wibowo et al., 2025). Differentiated learning allows teachers to adapt learning activities to the diversity of student characteristics to ensure that each student gets optimal learning opportunities. Differentiation includes differentiation in terms of content, process, product, and learning environment (Tomlinson, 2017). Various learning practices, such as small group teaching, project-based learning, and variations in teaching materials and a variety of assignment choices can be carried out by teachers to realize differentiated learning objectives (Corsino & Fuller, 2021; Inman & Roberts, 2022; Ortega et al., 2018; Pozas et al., 2020; Supriyoko et al., 2022; Tomlinson & Imbeau, 2023).

The implementation of IDL is related to three main aspects: the use of different strategies, addressing student diversity, and student learning progress. The six main categories that are challenges in implementing DL are time, resources, knowledge, class size, support, and workload (Shareefa et al.,

2019). DL implementation is a form of constructive response to the needs of students based on their profile or characteristics (Aikaterini & Makrina, 2022; Hasanah et al., 2022; Ismajli & Imami-Morina, 2018; Leppan et al., 2018). In this context, constructive response means matching the learning approach with the pedagogy, curriculum objectives, and the most appropriate opportunities for students to learn according to their learning needs to achieve optimal learning outcomes. Based on student characteristics, learning needs can be grouped into three categories: a) student readiness, the student's zone of proximal development is the most suitable approach to guide them; b) student interest, the individual interests of students can be utilized to stimulate and increase their involvement in learning; and c) student learning profile, the learning mode is adjusted to their learning profile (Tomlinson et al., 2003). In this case, teachers must focus on adapting their instructions to the various differences of these students.

The success of DL implementation is determined by the readiness of teachers as the spearhead in facilitating student learning. Teacher readiness refers to the competence, willingness, and self-efficacy to implement differentiated learning (Cahyono et al., 2021; Fariduddin & Siau, 2022; Julia et al., 2020; Nguyen et al., 2022). Teacher readiness is one of the main keys in implementing DL (Cahyono et al., 2021; Paliwal & Singh, 2021). Therefore, research related to teacher readiness to implement DL and the factors that influence it is very urgent to be carried out. Teachers with a deeper understanding of the DL concept are more confident in implementing this strategy (Porta et al., 2022). Positive attitudes towards DL, increasing teachers' willingness to accept and adopt DL (Porta et al., 2022; Pozas et al., 2022). Continuous professional development is essential to improve teacher self-efficacy in implementing DL (Kahmann et al., 2022). Teachers benefit from ongoing professional development that includes reflective dialogue and collective accountability, which indirectly enhances teacher self-efficacy and DL practices (Neve et al., 2015). Teacher collaboration, especially in professional learning communities (PLCs), has a positive influence on teacher self-efficacy and acceptance of DL (Hammad et al., 2024; Pozas & Letzel-Alt, 2023). Support from school leaders, especially transformational leadership, indirectly increases teachers' acceptance and self-efficacy towards DL (Hammad et al., 2024; Ninković et al., 2022). Teachers with higher self-efficacy are better at managing diverse classes and utilizing available resources (Ramli & Nurahimah, 2020; Suprayogi et al., 2017). Time constraints and DL complexity can negatively impact teacher self-efficacy. Addressing these barriers through structured support and realistic expectations is important. (Hayden et al., 2024; Porta et al., 2022).

Based on the results of the theoretical review and previous research, we developed a hypothetical structural model as presented in Figure 1, which will be tested and used as a guide in this research.

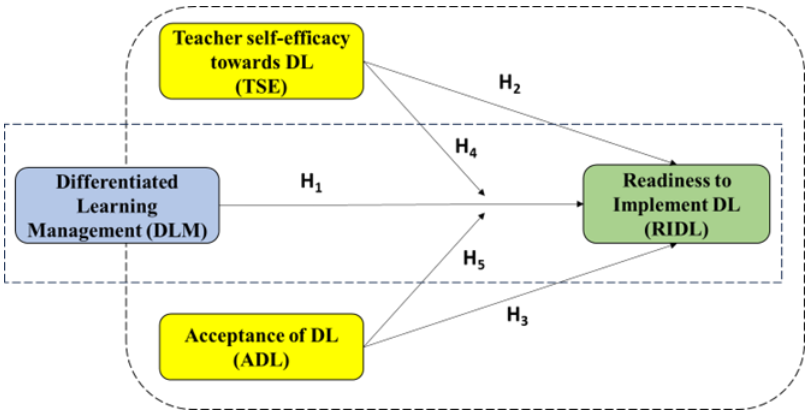



**Figure 1.** Hypothetical model tested in this study

Based on this model, we formulate five research questions as follows: 1) Does differentiated learning management (DLM) have a direct impact on teachers' readiness to implement differentiated learning (RIDL)? 2) Does teacher self-efficacy (TSE) towards DL have a direct impact on teachers' readiness to implement differentiated learning (RIDL)? 3) Does teachers' acceptance of differentiated learning (ADL) have a direct impact on teachers' readiness to implement differentiated learning (RIDL)? 4) Does teacher self-efficacy (TSE) moderate the effect of differentiated learning management (DLM) on teachers' readiness to implement differentiated learning (RIDL)? 5) Does teachers' acceptance of differentiated learning (ADL) moderate the effect of differentiated learning management (DLM) on teachers' readiness to implement differentiated learning (RIDL)?

### Gap Study and Objective

Teacher self-efficacy is a significant predictor of their ability to implement differentiated learning effectively (Porta et al., 2022; Scarparolo & Subban, 2021). This is supported by the results of Kalinowski et al. (2024) and Ramli and Nurahimah (2020) that high teacher self-efficacy influences better differentiated learning practices. The results of Samsudi et al. (2024) research shows that the potential readiness of teachers to implement differentiated learning is significantly influenced by accurate learning management. The results of other previous studies, such as research conducted by Godor (2021), Kenney et al. (2024), and Jager (2017) shows that learning management which includes planning and implementation in the process and effective learning assessment is an important component that influences the potential readiness of teachers in implementing differentiated learning. Teacher readiness to implement differentiated learning can be improved by focusing on learning management components that include accurate planning management, effective management of differentiated teaching processes, and implementation of differentiated learning assessments. Regarding differentiated learning management, Jager (2017) found that teachers face various challenges, including large class sizes, inadequate training, and lack of resources.

Winarto et al. (2025) claims that teacher acceptance of differentiated learning as indicated by a positive attitude and willingness to adopt integrated learning is very important for achieving success. Similar results were also found by Bi et al. (2024) that teachers' attitudes towards differentiated learning play an important role in supporting the success of its implementation. Other previous research also shows that teachers' acceptance of differentiated learning has a significant influence on their readiness to implement it (Hammad et al., 2024; Kalinowski et al., 2024; Ninković et al., 2022; Porta et al., 2022; Pozas et al., 2022; Ramli et al., 2021; Suprayogi et al., 2017).

However, there are not many studies in Indonesia that specifically study elementary school teachers. In fact, many elementary school teachers experience obstacles in understanding and implementing of differentiated learning. Elementary school teachers are generally class teachers, so they have to prepare learning for all subjects. Even in a number of elementary schools due to a shortage of teachers, many teachers are given the task of teaching more than one class. This has an impact on the availability of time that teachers have to study and deepen their knowledge about differentiated learning. In addition, not many researchers have studied in more depth the role of self-efficacy variables and teacher acceptance of differentiated learning as moderators of the causal relationship between learning management and teacher readiness in implementing differentiated learning, especially at the elementary school level. Learning management in this study includes design, implementation, and implementation of reflection and evaluation for continuous improvement of differentiated learning.

This study explicitly aimed to: 1) Examine the direct influence of DLM on RIDL; 2) Investigate the roles of TSE as predictors of RIDL; 3) Investigate the roles of ADL as predictors of RIDL; 4) Test whether TSE moderate the relationship between DLM and RIDL; and 5) Test whether ADL moderate the relationship between DLM and RIDL. Thus, this research is expected to contribute to practical insights for professional development and school leadership in guiding teachers to implement differentiated learning.

## METHOD

### Type and Design

This research was conducted in three sub-districts: Tapos (Depok City), Cimanggis (Bogor Regency), and Kelapa Dua Wetan (East Jakarta City). A cross-sectional survey design with a quantitative approach was employed. Prior to data collection, ethical clearance was obtained from the Institutional Review Board (IRB) of Pakuan University. Informed consent was obtained from all participants, who were assured of confidentiality, anonymity, and voluntary participation. No personal identifiers were collected, and participants were free to withdraw at any stage of the research. The research was conducted in the 2023/2024 academic year with 49 schools involved with the composition as presented in Table 1.

The structural model was specified as follows:

1. Direct effects: RIDL = β1(DLM) + β2(TSE) + β3(ADL) + ε
2. Moderation effects: RIDL = β4(DLM × TSE) + β5(DLM × ADL) + ε

In this specification, DLM, TSE, and ADL are modeled as exogenous constructs predicting RIDL, while interaction terms (DLM × TSE and DLM × ADL) capture potential moderating effects. All constructs were modeled as reflective latent variables. This explicit specification ensures that the hypothesized relationships can be empirically tested and interpreted within a coherent structural framework.

**Table 1**. Composition of schools and research participants

| School Categories | School Status | | Number of Participants | |
|---|---|---|---|---|
| | Government | Private | Government | Private |
| Elementary School (ES) | 37 | 4 | 140 | 15 |
| Madrasah Ibtidaiyah (MI) | - | 8 | - | 7 |
| Total | 37 | 12 | 140 | 22 |

## Data and Data Sources

Sampling employed a two-stage random cluster method with proportional probability. In the first stage, 37 ES and 12 MI were selected proportionally across the three districts. In the second stage, teachers were sampled proportionally according to the size of each school's teaching staff. A total of 162 teachers participated. The response rate was 81% (162 of 200 invited teachers), with non-response primarily due to scheduling conflicts. Potential non-response bias was assessed by comparing early vs. late respondents; no significant differences were found in demographic characteristics. Demographic information such as gender, age, qualifications, and teaching experience was collected (see Table 2).

**Table 2**. Socio-demographic characteristics of the participants

| Socio-Demographic Characteristics | | Participants (n = 162) | |
|---|---|---|---|
| | | Total | % |
| Gender | Male | 34 | 20.98 |
| | Female | 128 | 79.01 |
| Age | 25-35 years | 33 | 20.37 |
| | 36-45 years | 58 | 35.80 |
| | 46-55 years | 46 | 28.40 |
| | >55 years | 25 | 15.43 |
| Educational qualifications | Sarjana (S1) | 150 | 92.59 |
| | Magister (S2) | 12 | 7.41 |
| Experience as a teacher | < 5 years | 23 | 14.20 |
| | 5-10 years | 27 | 16.67 |
| | 10-20 years | 77 | 47.53 |
| | 20 years | 35 | 21.60 |

## Data Collection Technique

Data were collected using instruments arranged in a standard questionnaire. The data collection instruments consisted of four instruments arranged by the researcher himself, namely instruments to measure RIDL, TSE, ADL, and DLM. The measurement scale adopted a five-point Likert-type scale with a score of 1 = very poor, 2 = poor, 3 = sufficient, 4 = good, and 5 = very good. The four instruments were developed with reference to the indicators as presented in Table 3.

**Table 3**. Research instruments indicators

| Instruments | Indicators |
|---|---|
| RIDL | Understanding the concept of differentiated learning |
| | Ability to design differentiated learning |
| | Skills in implementing learning strategies |
| | Commitment and Attitudes towards Differentiated Learning |

| Instruments | Indicators |
|---|---|
| TSE | Confidence in designing differentiated learning |
| | Confidence in implementing differentiation strategies in the classroom |
| | Confidence in managing the challenges of differentiated learning |
| | Confidence in using differentiated assessment |
| | Confidence in collaboration and professional development |
| ADL | Perceived usefulness |
| | Perceived ease of implementation |
| | Attitude toward differentiated learning |
| | Behavioral intention |
| DLM | Planning and organizing differentiated learning |
| | Implementation and management of differentiated learning activities |
| | Monitoring, evaluation, and reflection of differentiated learning |

The validity test of the instrument items used the point biserial correlation technique, while the reliability was tested based on internal consistency using the alpha-Cronbach correlation technique. The instrument to measure RIDL consists of 23 items that meet valid criteria. The instrument to measure ADL consists of 19 items that meet valid criteria. The instrument to measure TSE consists of 21 items that meet valid criteria. The instrument to measure DLM consists of 18 items that meet valid criteria. Item validity was tested using point-biserial correlation, while reliability was tested using Cronbach's alpha. All instruments demonstrated acceptable internal consistency ($\alpha > 0.70$) (Bonett & Wright, 2015; Field, 2009). The full instrument items are provided in a supplementary appendix for transparency and potential replication. Raw (de-identified) data are also available upon reasonable request. The test result data is presented in Table 4.

## Data Analysis

Based on the hypothetical structural model as presented in Figure 1 and the formulation of the research problem, the following hypotheses are proposed to be tested in this study.

Hypothesis 1: Differentiated learning management DLM has a direct impact on teachers' readiness to implement differentiated learning (RIDL).

Hypothesis 2: Teacher self-efficacy (TSE) towards DL has a direct effect on teachers' readiness to implement differentiated learning (RIDL).

Hypothesis 3: Teachers' acceptance of differentiated learning (ADL) has a direct impact on teachers' readiness to implement differentiated learning (RIDL).

Hypothesis 4: Teacher self-efficacy (TSE) moderates the effect of differentiated learning management (DLM) on teachers' readiness to implement differentiated learning (RIDL).

Hypothesis 5: Teachers' acceptance of differentiated learning (ADL) moderates the effect of differentiated learning management (DLM) on teachers' readiness to implement differentiated learning (RIDL).

The hypothetical structural model was tested using Partial Least Squares Structural Equation Modeling (PLS-SEM) with SmartPLS 3.3. The analysis followed standard procedures to ensure reliable estimation. The algorithm was run with a maximum of 300 iterations and a stop criterion of $1 \times 10^{-7}$, which means the computer repeated the calculations until the solution became stable. To test the significance of the relationships, we used bootstrapping with 5,000 subsamples. Bootstrapping is a resampling technique that repeatedly draws random samples from the data to estimate how stable the results are, similar to checking whether the findings would hold across many hypothetical samples. These settings are widely recommended in the SEM literature (Hair et al., 2021) and help ensure that the results are statistically robust and replicable.

The reflective measurement model was used to examine convergent validity, internal consistency reliability, and discriminant validity. Convergent validity was measured from item loadings and average-variance extracted (AVE). AVE is a measure of how much variance in the survey items is explained by their construct. An AVE above 0.50 suggests that the items really represent the construct they are supposed to measure (Hair et al., 2021). Internal consistency reliability was assessed based on the intercorrelation of item scores observed in the construct, composite reliability, and Cronbach's

alpha correlation coefficient. Hair et al. (2021) explained that the criteria indicating convergent validity and internal consistency reliability of the measurement model must be greater than 0.70, while AVE must be greater than 0.5. Discriminative discrimination validity is assessed from the value of the heterotrait-monotrait (HTMT) ratio correlation criteria between constructs. HTMT is a simple check to make sure that each construct in the model is truly different from the others, not overlapping too much. An HTMT value below 0.90 indicates good separation between constructs (Hair et al., 2021; Henseler et al., 2015). We use these criteria as a reference to assess the quality of measurement and structural models in this study. If all validity and reliability tests meet the criteria, then continue with hypothesis testing, using t-statistics and confidence intervals in the lower 2.5% and upper 97.5% ranges.

## RESULTS

The measurement model demonstrated good psychometric properties across all constructs (see Table 4). The descriptive statistics showed acceptable mean values, with standard deviations indicating reasonable variation across respondents. All indicator loadings exceeded the recommended threshold of 0.70 (ranging from .812 to .961), which means each survey item was strongly related to the construct it was supposed to measure. Internal consistency reliability was also confirmed, with Cronbach's α values ranging from .878 to .959 and composite reliability (CR) values between .902 and .971—well above the .70 benchmark, indicating that the items worked together consistently.

**Table 4**. Descriptive statistics and construct model criteria

| Latent Variable | Mean | STD | Criteria | | | | |
|---|---|---|---|---|---|---|---|
| | | | Convergent validity | | Internal consistency reliability | | |
| | | | Indicator reliability | Cronbach's α | Composite reliability | AVE | HTMT |
| | | | Loading > .7 | > .7 | > .7 | > .5 | < .9 |
| RIDL | 20.985 | 1.894 | .812 – .924 | .878 | .917 | .734 | .843 |
| ADL | 19.387 | .461 | .910 – .961 | .959 | .971 | .892 | 806 |
| TSE | 16,481 | .729 | .882 – .930 | .959 | .957 | .817 | .862 |
| DLM | 22.109 | 1.220 | .839 – .88 | .944 | .902 | .754 | .852 |

Convergent validity was confirmed with AVE values between .734 and .892, all higher than the recommended .50 level. In simple terms, this shows that the items captured enough of the variance in each construct, so they truly represent what they are intended to measure. Furthermore, discriminant validity was established using the HTMT, with all values below the conservative cutoff of 0.90 (ranging from .806 to .862). This indicates that each construct of DLM, TSE, ADL, and RIDL are empirically distinct and does not overlap excessively with the others. These results indicate that the constructs are internally consistent, capture sufficient variance from their indicators, and remain empirically distinct from one another, thereby justifying their use in the structural model.

In this study, the teachers' readiness to implement DL (RIDL) had a mean score of 20.98 (SD = 1.89), indicating low-to-moderate readiness overall. The distribution (Figure 2) was slightly skewed to the right, showing that more teachers scored below the mean.

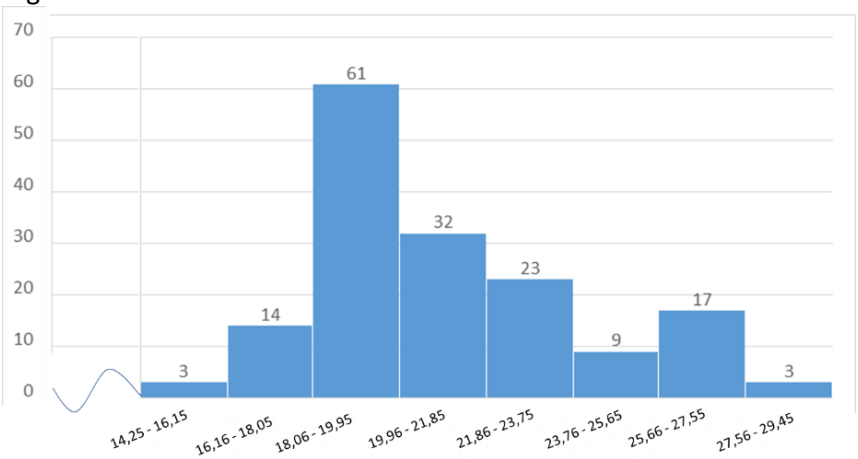



**Figure 2.** Frequency distribution of RIDL data

## Hypothesis Testing

The results of the research hypothesis test are presented in Table 5. From the table, it can be seen that the test results support the three hypotheses of model 1.

**Table 5.** Hypothesis test results

| Hypotheses | β | t | p | $f^2$ | Confidence intervals | | Decision |
|---|---|---|---|---|---|---|---|
| | | | | | Lower 2.5% | Upper 97.5% | |
| Model 1: Direct effects | | | | | | | |
| DLM -> RIDL | .212 | 3.241 | .001 | .070 | .092 | .350 | Supported |
| TSE -> RIDL | .443 | 4.959 | .000 | .142 | .261 | .603 | Supported |
| ADL -> RIDL | .279 | 3.442 | .001 | .072 | .126 | .425 | Supported |
| Model 2: Moderation effect | | | | | | | |
| Moderating Effect TSE -> RIDL | -.083 | .976 | .330 | .004 | -.260 | .058 | Not supported |
| Moderating Effect ADL -> RIDL | .160 | .971 | .049 | .016 | .010 | .319 | Supported |

DLM had a positive and significant effect on teachers' RIDL. The effect size was small to medium, suggesting that stronger DLM is associated with higher teachers' RIDL. TSE exerted the strongest positive influence among the predictors. The effect size was close to medium, highlighting that teachers' confidence in their own competence is a key determinant of RIDL. Teachers' ADL also showed a significant positive effect, with a small-to-medium effect size. This means that greater ADL corresponds to greater readiness to implement it.

Meanwhile, for hypothetical model 2 (the moderation effect) shows the following results. The moderating effect of TSE was not significant, indicating that TSE did not strengthen or weaken the relationship between DLM and RIDL. The moderating effect of ADL was significant, although the effect size was very small. This suggests that teachers' ADL enhances the positive influence of DLM on readiness: the higher the acceptance, the stronger the impact of management on readiness.

Model fit was tested using Standardized Root Mean Square Residual (SRMR), Normed Fit Index (NFI), and Root Mean Square Theta (rms Theta). SRMR is an index that measures the average standardized difference between the model's predicted covariance and the actual covariance of the data. The smaller the SRMR value, the better the model fits the data. Common thresholds: <0.08 = good fit (Henseler et al., 2016). The NFI is a comparative index that measures the extent to which a proposed model is better than the baseline model (null model). Values range from 0–1, with ≥ 0.90 indicating an acceptable fit (Bentler & Bonett, 1980). RMS Theta is an index used to evaluate the quality of outer model residuals. Lower values indicate a better measurement model. A threshold of ≤ 0.12 is generally considered adequate (Henseler et al., 2014). R Square ($R^2$) is a measure of the coefficient of determination, which shows how much of the variance of a dependent (endogenous) variable can be explained by the independent (exogenous) variables in the model. Model fit and explained variance are presented in Table 6.

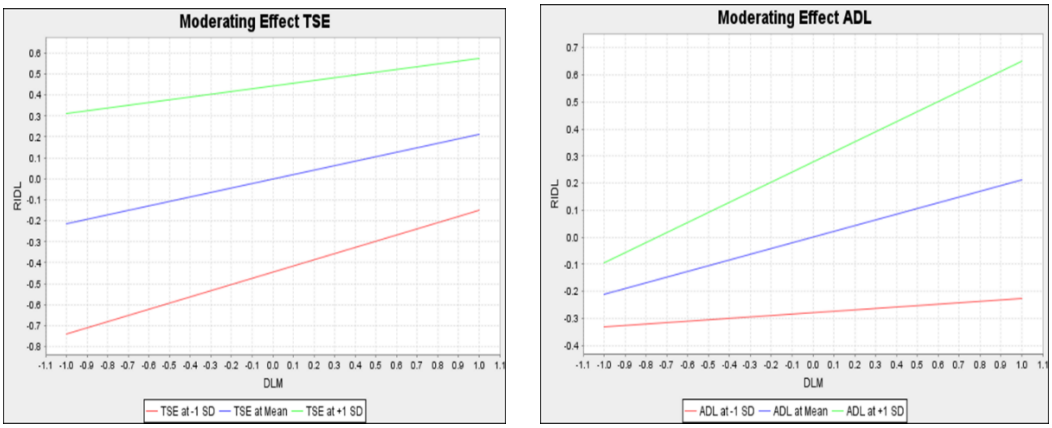
**Table 6**. Model fit and explained variance

| Model fit and explained variance | Values |
|---|---|
| SRMR | 0.053 |
| NFI | 0,909 |
| RMS Theta | 0.106 |
| $R^2$ (RIDL) | 0.841 |

The model demonstrated an acceptable overall fit, as indicated by the fit indices (see Table 6). The SRMR value of 0.053, which is below the recommended threshold of 0.08, suggests that the model reproduced the observed covariance matrix with a good level of accuracy. The NFI value of 0.909 exceeds the cutoff of 0.90, indicating that the proposed model fits the data substantially better than the null model. In addition, the RMS Theta value of 0.106 is below the threshold of 0.12, confirming

adequate quality of the measurement model and consistency of the indicators. Regarding explained variance, the $R^2$ value for RIDL was 0.841, meaning that DLM, TSE, teachers' ADL, and their interactions explained 84.1% of the variance in teachers' RIDL. This value is considered substantial, reflecting the strong predictive power of the structural model.

The moderating effect of TSE and ADL on the relationship between DLM and RIDL is visually presented in Figure 3. Figure 3(a) shows the moderating effect of TSE in the relationship between DLM and RIDL. The slopes for high and low levels of TSE appear relatively parallel, suggesting no significant interaction effect. This finding implies that while TSE plays an important direct role in predicting teachers' RIDL, it does not alter the strength of the relationship between DLM and RIDL. By contrast, Figure 3(b) illustrates the moderating role of ADL on the same relationship. The slope of the relationship is steeper under conditions of high ADL compared to low ADL, indicating that teachers' ADL significantly strengthens the impact of DLM on RIDL. In other words, when teachers hold higher levels of ADL, improvements in DLM are more effectively translated into increased RIDL.




(a) (b)

**Figure 3.** Moderating effect of TSE and ADL

The complete visualization of the test results is presented in Figure 4. The figure clearly shows the T statistics outer loadings values for the four latent variables, the direct influence of the independent variables on the dependent variables, and the moderating effect. Except for the moderating effect TSE, the other T statistics values are tested significant, thus supporting the hypothesis.

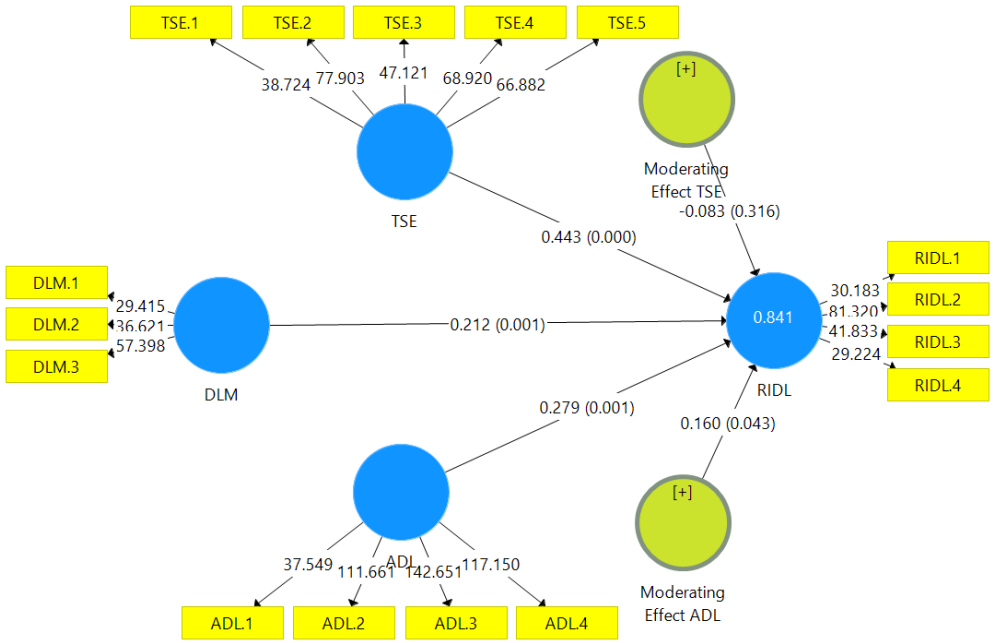



**Figure 4.** Empirical structural model

## DISCUSSIONS

The present study sought to examine the essential roles of DLM, TSE, and teachers' ADL in shaping teachers' RIDL. Using PLS-SEM, the findings provide both theoretical insights and practical implications for strengthening differentiated learning in the Indonesian context. The result of the analysis confirmed that all three main predictors: DLM, TSE, and ADL had significant positive effects on RIDL. Among these, TSE emerged as the strongest determinant, underscoring the central role of teachers' confidence in their instructional abilities. This aligns with prior literature emphasizing self-efficacy as a critical driver of instructional innovation and adaptive teaching practices (Arias-Pastor et al., 2024; Meschede & Hardy, 2020; Sarfraz et al., 2022; Teig et al., 2019). In contrast, while DLM and ADL exhibited smaller effect sizes, their significance highlights the importance of both structural support in managing DL and teachers' attitudinal acceptance in fostering readiness. Previous research has also suggested that school management practices influence teachers' willingness and ability to adopt differentiated strategies (Goddard et al., 2019; Sebastian et al., 2019). Collectively, these results suggest that readiness for DL implementation is multidimensional, requiring both the psychological assurance of teachers and the organizational conditions that support differentiated practices.

The study sheds light on the moderating effects within the model. Teacher ADL significantly moderated the relationship between DLM and RIDL, albeit with a small effect size. This finding suggests that the effectiveness of DLM is magnified when teachers embrace the philosophy and practice of differentiation. Similar findings were reported by Tomlinson (2021), who argued that teacher attitudes toward differentiation critically determine its classroom enactment. In other words, even strong management systems may have a limited impact unless teachers themselves are receptive to differentiated approaches. Conversely, TSE did not demonstrate a significant moderating role, indicating that while self-efficacy directly boosts readiness, it does not alter how management practices translate into readiness. This divergence underscores the nuanced roles of psychological versus attitudinal factors: self-efficacy is a powerful direct driver (Maddux & Kleiman, 2021; Maheshwari, 2022; Nykänen et al., 2019), whereas acceptance functions as a contextual amplifier of management effectiveness.

Interestingly, teacher self-efficacy (TSE) did not emerge as a significant moderator in the relationship between DLM and RIDL ($\beta = -0.083$, $p = 0.330$). One possible explanation lies in the operational definition of TSE used in this study, which primarily captured teachers' beliefs in their general instructional capabilities. While such beliefs strongly and directly predicted readiness, they may not necessarily alter how external management practices translate into readiness. This finding echoes earlier studies suggesting that self-efficacy functions more as a direct driver of teacher behavior rather than as a contextual amplifier of school-level factors (Klassen & Tze, 2014; Zee & Koomen, 2016).

Cultural and systemic factors in the Indonesian context may also contribute to this pattern. Teachers in both ES and MI operate under relatively centralized regulations and curriculum frameworks. As a result, self-efficacy, while important for individual motivation, may not substantially modify the impact of managerial or organizational arrangements. In such contexts, collective attitudes such as acceptance (ADL) may play a more decisive moderating role, as they directly influence the alignment between policy-driven practices and teachers' willingness to implement them (Suprayogi et al., 2017). Future studies could refine the operationalization of TSE to distinguish between task-specific and general efficacy, and test whether such distinctions produce different moderating effects.

The model fit indices and explained variance support the robustness of the model. With an SRMR of 0.053, NFI above 0.90, and RMS Theta below 0.12, the measurement and structural models demonstrate acceptable fit (Hair et al., 2021; Henseler et al., 2016). Furthermore, the $R^2$ value of 0.841 for RIDL is substantial, indicating that the predictors together explain over 80% of the variance in teacher readiness. This level of explanatory power surpasses many previous studies in similar contexts, suggesting that the integrated model adopted here captures the complexity of factors shaping readiness for DL.

Although this study did not explicitly examine differences in teachers' readiness to implement differentiated learning (RIDL) across school types (public elementary schools versus Islamic elementary schools/MI) or demographic subgroups (e.g., age, teaching experience, or educational background), the composition of the sample ensured representation from both categories. Thus, the findings can be

considered reflective of teachers' readiness across diverse school settings. Previous research in Indonesia suggests that contextual differences such as school type or teacher demographics may influence the way differentiated learning is understood and enacted (Gasser et al., 2018; Suprayogi et al., 2017). However, the strong explanatory power of the present model ($R^2 = 0.841$) indicates that the combination of DLM, TSE, and ADL plays a central role regardless of background characteristics. Future studies may therefore build upon these results by systematically comparing groups, in order to explore whether contextual or demographic variables amplify or attenuate the relationships observed here.

From a theoretical standpoint, these findings extend the body of knowledge by bridging structural, psychological, and attitudinal perspectives on teacher readiness. Prior studies on DL in Indonesia and other developing contexts often relied on qualitative approaches, emphasizing challenges and teacher perceptions (Farisia et al., 2025; Padauleng et al., 2025; Santoso et al., 2022; Yunaini et al., 2024). By applying PLS-SEM, this study quantitatively validates those earlier insights, offering stronger empirical evidence of how DLM, TSE, and ADL jointly contribute to readiness. The inclusion of moderation analysis further advances the literature, revealing that acceptance—not self-efficacy—is the key moderator enhancing the management–readiness link.

Practically, the results underscore the need for a dual strategy in policy and professional development. Strengthening teachers' self-efficacy through continuous professional learning, mentoring, and recognition is critical, as confidence directly drives readiness (Burger, 2024; Kalinowski et al., 2024; Karaiskos et al., 2024; Koul et al., 2023). At the same time, school leaders and policymakers must invest in systems that not only improve DL management but also cultivate teacher acceptance of differentiation. Professional development programs should therefore go beyond technical training, embedding reflective practices and peer collaboration that nurture positive attitudes toward differentiation (Hidayat et al., 2024; Kwok et al., 2025; Richard et al., 2018; Tomlinson, 2021).

This study also found that the readiness of ES and MI teachers in implementing differentiated learning tends to be low to moderate. In fact, the curriculum currently used in Indonesia recommends that teachers implement differentiated learning. However, research shows that in reality teachers do not do it properly on a regular basis. This finding is in line with previous research (Andarwulan et al., 2021; Hidayat & Patras, 2024; Nurtanto et al., 2019; Winarto et al., 2025). International research also shows a similar phenomenon (Kalinowski et al., 2024). In sum, this study highlights that building readiness for differentiated learning requires more than managerial systems or teacher competence in isolation. It demands the integration of effective management, psychological empowerment, and attitudinal alignment, ensuring that teachers are both capable and willing to enact differentiation in their classrooms.

These findings also resonate with the current educational reform agenda in Indonesia, particularly the implementation of the Merdeka Curriculum or the next curriculum and the School Transformation Program, which emphasize differentiated and student-centered learning. By demonstrating the central role of teacher self-efficacy, acceptance, and effective management, this study provides empirical support for policies that invest in teacher empowerment and systemic support. Ultimately, strengthening these dimensions is essential for ensuring that reform initiatives translate into meaningful and sustainable improvements in classroom practice.

## CONCLUSION

In conclusion, this study has found that: 1) Differentiated learning management has a significant direct effect on teacher readiness in implementing differentiated learning. 2) Self-efficacy has a direct and significant effect on teacher readiness in implementing differentiated learning. Teacher self-efficacy plays an important role in increasing their readiness to implement differentiated learning, where teachers with high self-efficacy tend to be more consistent in implementing differentiated learning. 3) Teacher acceptance of differentiated learning has a direct and significant effect on teacher readiness to implement differentiated learning. 4) Teacher self-efficacy does not show a role as a moderator in the causal relationship between learning management and teacher readiness to implement differentiated learning. 5) Teacher acceptance of differentiated learning is tested to significantly moderate the causal relationship between learning management and teacher readiness to implement differentiated learning. Teacher acceptance of differentiated learning is empirically proven to strengthen the influence of learning management on teacher readiness to implement

differentiated learning. This study has limitations that can affect the results achieved. These limitations are 1) data collection was carried out using cross-sectional surveys with limited samples, and 2) the instruments used were developed by the researchers themselves so that there is still a possibility of biased items even though they have been tested before being used in the study. Based on these research limitations, we recommend further studies as follows: 1) Research similar to this study but using different methods, samples, and data collection and analysis techniques. 2) Research on teacher readiness to implement differentiated learning by exploring other individual characteristics as independent variables. Based on the findings of this study, we recommend to related parties: 1) For Elementary School and Madrasah Ibtidaiyah teachers, it is recommended to be actively involved in professional learning communities and proactively and independently carry out continuous learning to improve their ability to manage differentiated learning, self-efficacy, and acceptance of differentiated learning. 2) For school-level professional learning community administrators, it is recommended to design and implement professional development programs in their schools, and to reflect and evaluate learning practices continuously.

## REFERENCES


Aikaterini, T. A., & Makrina, Z. (2022). Differentiated Instruction and Portfolio Assessment: Motivating Young Greek-Romani Students in the English Class. *World Journal of English Language*, 12(1), 258–274. https://doi.org/10.5430/wjel.v12n1p258

Akram, H., Abdelrady, A. H., Al-Adwan, A. S., & Ramzan, M. (2022). Teachers' Perceptions of Technology Integration in Teaching-Learning Practices: A Systematic Review. *Frontiers in Psychology*, 13(June), 1–9. https://doi.org/10.3389/fpsyg.2022.920317

Albanese, D., Yu, M., & Wu, J. (2021). Bricolage and the Evolution of Giftedness and Talent in Taiwan. In S. R. Smith (Ed.), Handbook of Giftedness and Talent Development in the Asia-Pacific. *Springer International Handbooks of Education.* https://doi.org/https://doi.org/10.1007/978-981-13-3041-4_48

Andarwulan, T., Al Fajri, T. A., & Damayanti, G. (2021). Elementary teachers' readiness toward the online learning policy in the new normal era during Covid-19. *International Journal of Instruction*, 14(3), 771–786. https://doi.org/10.29333/iji.2021.14345a

Arias-Pastor, M., Van Vaerenbergh, S., González-Bernal, J. J., & González-Santos, J. (2024). Analysis of teacher self-efficacy and its impact on sustainable well-being at work. *Behavioral Sciences*, 14(7), 563. https://doi.org/10.3390/bs14070563

Ballat, G. El. (2024). Understanding the Adoption of Additive Manufacturing in Construction: A Sociological Perspective through a Revised TAM Model. *Advances in Applied Sociology*, 14(10), 517–536. https://doi.org/10.4236/aasoci.2024.1410035

Bi, M., Letzel-Alt, V., Pozas, M., Zhu, C., & Struyven, K. (2024). Chinese version of the teachers' attitudes towards differentiated instruction scale: an adaptation study. *Cogent Education,* 11(1). https://doi.org/10.1080/2331186X.2024.2380166

Bi, M., Struyven, K., Zhu, C., & Zhong, C. (2024). From perception to practice: How Chinese teachers perceive and implement differentiated instruction in primary and secondary schools. *Education* 3-13, 1–16. https://doi.org/10.1080/03004279.2024.2344853

Bonett, D. G., & Wright, T. A. (2015). Cronbach's alpha reliability: Interval estimation, hypothesis testing, and sample size planning. *Journal of Organizational Behavior*, 36(1), 3–15. https://doi.org/10.1002/job.1960

Bourne, M. J., Smeltzer, S. C., & Kelly, M. M. (2021). *Clinical teacher self-efficacy: A concept analysis. In Nurse Education in Practice* (Vol. 52, p. 103029). Elsevier Ltd. https://doi.org/10.1016/j.nepr.2021.103029

Burger, J. (2024). Constructivist and Transmissive Mentoring: Effects on Teacher Self-Efficacy, Emotional Management, and the Role of Novices' Initial Beliefs. *Journal of Teacher Education*, 75(1), 107–121. https://doi.org/10.1177/00224871231185371

Cahyono, S. M., Kartawagiran, B., & Mahmudah, F. N. (2021). Construct Exploration of Teacher Readiness as an Assessor of Vocational High School Competency Test. *European Journal of Educational Research*, 10(3), 1471–1485. https://doi.org/10.12973/eu-jer.10.3.1471

Christina, R., & Panagiotidis, P. (2024). Teachers' Attitudes Towards AI Integration in Foreign Language Learning: Supporting Differentiated Instruction and Flipped Classroom. *European Journal of Education*, 7(2), 88–104. https://doi.org/10.26417/171oob60e

Cooper, K. W., Tran, E. H., McIntosh, B. O., Lam, T., Tat, C. man T., Gallegos, D. M., Dukes, A. J., & Chen, A. (2025). Challenges that novices face in applying core concepts to neuroscience contexts. *Frontiers in Education*, 10. https://doi.org/10.3389/feduc.2025.1488892

Corsino, L., & Fuller, A. T. (2021). Educating for diversity, equity, and inclusion: A review of commonly used educational approaches. *Journal of Clinical and Translational Science*, 5(1). https://doi.org/10.1017/cts.2021.834

Deunk, M. I., Smale-Jacobse, A. E., de Boer, H., Doolaard, S., & Bosker, R. J. (2018). Effective differentiation practices: A systematic review and meta-analysis of studies on the cognitive effects of differentiation practices in primary education. *Educational Research Review*, 24(June 2018), 31–54. https://doi.org/10.1016/j.edurev.2018.02.002

Fariduddin, M. N., & Siau, C. S. (2022). Readiness to teach and perform CPR: A survey amongst secondary school teachers in Malaysia. *Journal of Public Health and Development*, 20(1), 267–276. https://doi.org/10.55131/jphd/2022/200121

Farisia, H., Santoso, A., Suyono, & Kusumaningrum, S. R. (2025). A Multisite Case Study of Differentiated Instruction in Indonesia: A Cross Case Investigation of Rural and Urban Areas. *Journal of Curriculum and Teaching*, 14(2), 13–26. https://doi.org/10.5430/jct.v14n2p13

Field, A. (2009). *Discovering Statistics Using SPSS* (Third Ed.). SAGE Publications Inc. https://books.google.co.id/books/about/Discovering_Statistics_Using_SPSS.html?id=a6FLF1YOqtsC&redir_esc=y

Fletscher, L., Mendoza-Cardenas, C., Mercado, J., Montoya, L., Valderrama, A., & Ramirez, D. (2024). Enhancing Differentiated Learning in Virtual Courses Through AI-Driven Recommender Systems. *2024 IEEE Digital Education and MOOCS Conference (DEMOcon),* 1–6. https://doi.org/10.1109/DEMOcon63027.2024.10747954

Gasser, L., Grütter, J., Buholzer, A., & Wettstein, A. (2018). Emotionally supportive classroom interactions and students' perceptions of their teachers as caring and just. *Learning and Instruction*, 54, 82–92. https://doi.org/10.1016/j.learninstruc.2017.08.003

Goddard, Y. L., Goddard, R. D., Bailes, L. P., & Nichols, R. (2019). From school leadership to differentiated instruction a pathway to student learning in schools. *Elementary School Journal,* 20(2), 198–219. https://doi.org/10.1086/705827

Godor, B. P. (2021). The Many Faces of Teacher Differentiation: Using Q Methodology to Explore Teachers Preferences for Differentiated Instruction. *Teacher Educator*, 56(1), 43–60. https://doi.org/10.1080/08878730.2020.1785068

Goyibova, N., Muslimov, N., Sabirova, G., Kadirova, N., & Samatova, B. (2025). Differentiation approach in education: Tailoring instruction for diverse learner needs. *MethodsX,* 14(December 2024), 103163. https://doi.org/10.1016/j.mex.2025.103163

Hair, J. F., Hult, G. T. M., Ringle, C. M., Sarstedt, M., Danks, N. P., & Ray, S. (2021). *Partial least squares structural equation modeling (PLS-SEM) using R: A workbook*. Springer. https://doi.org/10.1007/978-3-030-80519-7

Hammad, W., Hilal, Y. Y., & Bellibaş, M. Ş. (2024). Exploring the link between principal instructional leadership and differentiated instruction in an understudied context: The role of teacher collaboration and self-efficacy. *International Journal of Educational Management*, 38(4), 1184–1203. https://doi.org/10.1108/IJEM-09-2023-0441

Hartwig, S. J., & Schwabe, F. (2018). Teacher attitudes and motivation as mediators between teacher training, collaboration, and differentiated instruction. *Journal for Educational Research Online*,

10(1), 100–122. https://doi.org/10.25656/01:15415

Hasanah, E., Suyatno, S., Maryani, I., Badar, M. I. Al, Fitria, Y., & Patmasari, L. (2022). Conceptual Model of Differentiated-Instruction (DI) Based on Teachers' Experiences in Indonesia. *Education Sciences*, 12(10). https://doi.org/10.3390/educsci12100650

Hayden, S. M., Gubbins, E. J., Cody, R. A., & Boldt, G. T. (2024). Teachers' Perceptions of Differentiation Following a Math Curriculum Implementation Study. *Journal for the Education of the Gifted*, 47(1), 3–29. https://doi.org/10.1177/01623532231215092

Henseler, J., Hubona, G., & Ray, P. A. (2016). Using PLS path modeling in new technology research: Updated guidelines. *Industrial Management and Data Systems*, 116(1), 2–20. https://doi.org/10.1108/IMDS-09-2015-0382

Henseler, J., Ringle, C. M., & Sarstedt, M. (2015). A new criterion for assessing discriminant validity in variance-based structural equation modeling. *Journal of the Academy of Marketing Science*, 43(1), 115–135. https://doi.org/10.1007/s11747-014-0403-8

Hidayat, N., Suharyati, H., & Sanubari, R. (2024). Strategy to increase the effectiveness of differentiated learning. *Journal of Higher Education Theory and Practice*, 24(6), 44–60. https://doi.org/10.33423/jhetp.v24i6.7021

Hidayat, R., & Patras, Y. E. (2024). Education transformation in Indonesia requires the implementation of differentiated learning. *International Journal of Evaluation and Research in Education,* 13(3), 1526–1536. https://doi.org/10.11591/ijere.v13i3.27658

Inman, T. F., & Roberts, J. L. (2022). Effective differentiation for continuous progress. In J. L. Roberts, T. F. Inman, & J. H. Robins (Eds.), *Introduction to Gifted Education* (2nd Ed., pp. 243–265). Routledge Taylor & Francis Group. https://doi.org/10.4324/9781003235866

Ismajli, H., & Imami-Morina, I. (2018). Differentiated instruction: Understanding and applying interactive strategies to meet the needs of all the students. *International Journal of Instruction*, 11(3), 207–218. https://doi.org/10.12973/iji.2018.11315a

Jager, T. de. (2017). Perspectives of teachers on differentiated teaching in multi-cultural South African secondary schools. *Studies in Educational Evaluation*, 53, 115–121. https://doi.org/10.1016/j.stueduc.2016.08.004

Janahi, Y. M., AlDhaen, E., Hamdan, A., & Nureldeen, W. A. (2023). Emerging technologies for digitalized learning in higher education. *Development and Learning in Organizations: An International Journal,* 37(6), 29–31. https://doi.org/10.1108/DLO-09-2022-0183

Jepkoech, F. (2023). Differentiated Learning in a Typical Classroom. In F. Nyemba & R. Chitiyo (Eds.), Closing the Educational Achievement Gap for Students With Learning Disabilities (pp. 228–245). *IGI Global Scientific Publishing*. https://doi.org/10.4018/978-1-6684-8737-2.ch011

Julia, J., Subarjah, H., Maulana, M., Sujana, A., Isrokatun, I., Nugraha, D., & Rachmatin, D. (2020). Readiness and competence of new teachers for career as professional teachers in primary schools. *European Journal of Educational Research*, 9(2), 655–673. https://doi.org/10.12973/eu-jer.9.2.655

Kahmann, R., Droop, M., & Lazonder, A. W. (2022). Meta-analysis of professional development programs in differentiated instruction. *International Journal of Educational Research*, 116(February), 102072. https://doi.org/10.1016/j.ijer.2022.102072

Kalinowski, E., Westphal, A., Jurczok, A., & Vock, M. (2024). The essential role of teacher self-efficacy and enthusiasm for differentiated instruction. *Teaching and Teacher Education*, 148(August 2022), 104663. https://doi.org/10.1016/j.tate.2024.104663

Karaiskos, L., Sotiras, M. I. N., Antonopoulou, P., & Gdonteli, K. (2024). The impact of training and professional development on physical education teacher self-efficacy. *Journal of Physical Education and Sport,* 24(11), 2022–2033. https://doi.org/10.7752/jpes.2024.11300

Kenney, A. W., Dulong Langley, S., Hemmler, V., Callahan, C. M., Gubbins, E. J., & Siegle, D. (2024). Different or Differentiated? Recoupling Policy and Practice in an Era of Accountability.

*Educational Policy*, 38(1), 134–160. https://doi.org/10.1177/08959048231153612

Khairiah, Amin, A., Muassomah, Mareta, M., Sulistyorini, & Yusuf, M. (2024). Challenges to professional teacher development through workplace culture management. *International Journal of Evaluation and Research in Education* , 13(2), 714–722. https://doi.org/10.11591/ijere.v13i2.25666

Klassen, R. M., & Tze, V. M. C. (2014). Teachers' self-efficacy, personality, and teaching effectiveness: A meta-analysis. *Educational Research Review*, 12, 59–76. https://doi.org/10.1016/j.edurev.2014.06.001

Kotorov, I., Krasylnykova, Y., Mazzara, M., & Bobrov, E. (2025). Higher Education Institutions and the Imperative for Transformation in the 21st Century. In G. Jezic, Y. Chen-Burger, M. Kušek, R. Šperka, R. J. Howlett, & L. C. Jain (Eds.), Agents and Multi-agent Systems: Technologies and Applications 2024. KES-AMSTA 2024. *Smart Innovation, Systems and Technologies* (p. 406). Springer. https://doi.org/10.1007/978-981-97-6469-3_24

Koul, R., Musikul, K., Nishikawa, S., & Almutawa, H. (2023). Mentoring in the Development of Science Teaching Self-Efficacy Among Primary School Teachers in Thailand: A Mixed Methods Study. *Journal of Science Teacher Education*, 35(1), 44–62. https://doi.org/10.1080/1046560X.2023.2179384

Kwok, S., Yu, P., & Le Corre, J. Y. (2025). *Exploring Practice-Led Research for Professional Development*. IGI Global. https://doi.org/10.4018/979-8-3693-6376-8

Lai, C.-P., Zhang, W., & Chang, Y.-L. (2020). Differentiated instruction enhances sixth-grade students' mathematics self-efficacy, learning motives, and problem-solving skills. *Social Behavior and Personality: An International Journal,* 48(6), 1–13. https://doi.org/10.2224/sbp.9094

Lai, C., Wang, Q., & Huang, X. (2022). The differential interplay of TPACK, teacher beliefs, school culture and professional development with the nature of in-service EFL teachers' technology adoption. *British Journal of Educational Technology*, 53(5), 1389–1411. https://doi.org/10.1111/bjet.13200

Leppan, R. G., van Niekerk, J. F., & Botha, R. A. (2018). Process model for differentiated instruction using learning analytics. *South African Computer Journal*, 30(2), 17–43. https://doi.org/10.18489/sacj.v30i2.481

Luk, C., Ng, K., & Lam, W. (2018). The Acceptance of Using Open-Source Learning Platform (Moodle) for Learning in Hong Kong's Higher Education. In S. Cheung, J. Lam, K. Li, O. Au, W. Ma, & W. Ho (Eds.), Technology in Education. *Innovative Solutions and Practices. ICTE 2018. Communications in Computer and Information Science* (p. 843). Springer. https://doi.org/10.1007/978-981-13-0008-0_23

Maddux, J. E., & Kleiman, E. M. (2021). *Self-Efficacy: The Power of Believing You Can*. In C. R. Snyder & Others (Eds.), The Oxford Handbook of Positive Psychology (3rd edn (2). https://doi.org/10.1093/oxfordhb/9780199396511.013.26

Magableh, I. S., & Abdullah, A. (2022). Differentiated instruction effectiveness on the secondary stage students' reading comprehension proficiency level in Jordan. *International Journal of Evaluation and Research in Education,* 11(1), 459–466. https://doi.org/10.11591/ijere.v11i1.21971

Maheshwari, G. (2022). Entrepreneurial intentions of university students in Vietnam: Integrated model of social learning, human motivation, and TPB. *The International Journal of Management Education*, 20(3). https://doi.org/10.1016/j.ijme.2022.100714

Mengistie, S. M. (2020). A Primary School Teachers' Knowledge, Attitude and Practice of Differentiated Instruction: The Case of In-Service Teacher-Trainees of Debre Markos College of Teacher Education, West Gojjam Zone, Amhara Region, Ethiopia. *International Journal of Curriculum and Instruction,* 12(1), 98–114. https://www.ijci.net/index.php/IJCI/article/view/258

Meschede, N., & Hardy, I. (2020). Preservice teachers' self-efficacy of adaptive teaching in heterogeneous classrooms. *Z Erziehungswiss*, 23, 565–589. https://doi.org/10.1007/s11618-020-00949-7

Neve, D. De, Devos, G., & Tuytens, M. (2015). The importance of job resources and self-efficacy for

beginning teachers' professional learning in differentiated instruction. *Teaching and Teacher Education,* 47(April 2015), 30–41. https://doi.org/10.1016/j.tate.2014.12.003

Nguyen, N. T. P., Chu, A. T. T., Tran, L. H., Pham, S. X., Nguyen, H. N., & Nguyen, V. T. (2022). Factors Influencing Elementary Teachers' Readiness in Delivering Sex Education amidst Covid-19 pandemic. *International Journal of Learning, Teaching and Educational Research*, 21(2), 320–341. https://doi.org/10.26803/ijlter.21.2.18

Ninković, S., Knežević-Florić, O., & Đorđić, D. (2022). Transformational leadership and teachers' use of differentiated instruction in Serbian schools: investigating the mediating effects of teacher collaboration and self-efficacy. *Educational Studies,* 50(6), 1353–1372. https://doi.org/10.1080/03055698.2022.2081787

Nurtanto, M., Kholifah, N., Masek, A., Sudira, P., & Samsudin, A. (2021). Crucial problems in arranged the lesson plan of vocational teacher. *International Journal of Evaluation and Research in Education*, 10(1), 345–354. https://doi.org/10.11591/ijere.v10i1.20604

Nurtanto, M., Sofyan, H., Fawaid, M., & Rabiman, R. (2019). Problem-based learning (PBL) in industry 4.0: Improving learning quality through character-based literacy learning and life career skill (LL-LCS). *Universal Journal of Educational Research*, 7(11), 2487–2494. https://doi.org/10.13189/ujer.2019.071128

Nusser, L., & Gehrer, K. (2020). Addressing heterogeneity in secondary education: who benefits from differentiated instruction in German classes? *International Journal of Inclusive Education*, 1–18. https://doi.org/10.1080/13603116.2020.1862407

Nykänen, M., Salmela-Aro, K., Tolvanen, A., & Vuori, J. (2019). Safety self-efficacy and internal locus of control as mediators of safety motivation – Randomized controlled trial (RCT) study. *Safety Science,* 117, 330–338. https://doi.org/10.1016/j.ssci.2019.04.037

Omotoy, J. F. (2023). Examining College Students' Self-Efficacy in the Online Learning Environment System During the Covid-19 Pandemic Implications for Higher Education Institutions. *RGSA – Revista de Gestão Social e Ambiental,* 17(5), 1–14. https://doi.org/10.24857/rgsa.v17n5-027

Organisation for Economic Co-operation and Development [OECD]. (2020). Oecd: Volume 5. Effective policies, successful schools: PISA 2018 results. *OECD Publishing*. https://doi.org/10.1787/ca768d40-en

Ortega, D. P., Cabrera, J. M., & Benalcázar, J. V. (2018). Differentiating instruction in the language learning classroom: Theoretical considerations and practical applications. *Journal of Language Teaching and Research*, 9(6), 1220–1228. https://doi.org/10.17507/jltr.0906.11

Padauleng, A., Abduh, A., Samtidar, Muslim, A., Mujizatullah, Massoweang, A. K., Ridwan, M., Darmawati, B., & Rosidi, A. (2025). Differentiated Instruction in a Public Junior High School: EFL Teachers' Perception and Practices. *World Journal of English Language*, 15(3), 277–289. https://doi.org/10.5430/wjel.v15n3p277

Paliwal, M., & Singh, A. (2021). Teacher readiness for online teaching-learning during COVID −19 outbreak: a study of Indian institutions of higher education. *Interactive Technology and Smart Education,* 18(3), 403–421. https://doi.org/10.1108/ITSE-07-2020-0118

Porta, T., Todd, N., & Gaunt, L. (2022). 'I do not think I actually do it well': A discourse analysis of Australian senior secondary teachers' self-efficacy and attitudes towards implementation of differentiated instruction. *Journal of Research in Special Educational Needs,* 22(3), 297–305. https://doi.org/10.1111/1471-3802.12568

Pozas, M., & Letzel-Alt, V. (2023). Teacher collaboration, inclusive education and differentiated instruction: A matter of exchange, co-construction, or synchronization? *Cogent Education*, 10(2). https://doi.org/10.1080/2331186X.2023.2240941

Pozas, M., Letzel, V., Bost, N., & Reichertz, J. (2022). Confident, positive, but interested? Exploring the role of teachers' interest in their practice of differentiated instruction. *Frontiers in Education*, 7(August), 1–11. https://doi.org/10.3389/feduc.2022.964341

Pozas, M., Letzel, V., & Schneider, C. (2020). Teachers and differentiated instruction: exploring differentiation practices to address student diversity. *Journal of Research in Special Educational Needs,* 20(3), 217–230. https://doi.org/10.1111/1471-3802.12481

Rahmadani, A., & Kurniawati, F. (2021). Teacher Engagement Mediates Self-Efficacy and Classroom Management: Focus on Indonesian Primary Schools. *Electronic Journal of Research in Educational Psychology,* 19(53), 75–92. https://doi.org/10.25115/ejrep.v19i53.3444

Ramaila, S. (2025). Unveiling the Potential: A Systematic Review on Harnessing the Affordances of Differentiated Instruction. *Journal of Teaching and Learning*, 19(2), 41–56. https://doi.org/10.22329/jtl.v19i2.8561

Ramli, R., Awang, M. I., & Yusoff, N. M. (2021). Teacher readiness in applying ATL skills in the International Baccalaureate Middle Years Programme Schools. *International Journal of Evaluation and Research in Education,* 10(4), 1409–1416. https://doi.org/10.11591/IJERE.V10I4.21415

Ramli, R., & Nurahimah, M. Y. (2020). Self-efficacy and differentiated instruction: A study among Malaysian school teachers. *Universal Journal of Educational Research*, 8(4), 1252–1260. https://doi.org/10.13189/ujer.2020.080416

Richard, A., Gagnon, M., & Careau, E. (2018). Using reflective practice in interprofessional education and practice: a realist review of its characteristics and effectiveness. Journal of Interprofessional Care, 33(5), 424–436. https://doi.org/10.1080/13561820.2018.1551867

Samsudi, Supraptono, E., Utanto, Y., Rohman, S., & Djafar, T. (2024). Unraveling the Merdeka Curriculum: Exploring Differentiated Instruction'S Impact on Student Learning. *Jurnal Ilmiah Peuradeun*, 12(2), 517–538. https://doi.org/10.26811/peuradeun.v12i2.1131

Santoso, P. H., Istiyono, E., & Haryanto. (2022). Physics Teachers' Perceptions about Their Judgments within Differentiated Learning Environments: A Case for the Implementation of Technology. *Education Sciences*, 12(9). https://doi.org/10.3390/educsci12090582

Sarfraz, M., Vlăduţ, N.-V., Cioca, L.-I., & Ivascu, L. (2022). Teaching Strategies and Students' Academic Performance in Agriculture Studies: The Mediating Effect of Teachers' Self-Efficacy. *INMATEH - Agricultural Engineering,* 68(3), 767–780. https://doi.org/10.35633/inmateh-68-76

Scarparolo, G., & Subban, P. (2021). A systematic review of pre-service teachers' self-efficacy beliefs for differentiated instruction. *Teachers and Teaching*. 27(8), 753–766. https://doi.org/10.1080/13540602.2021.2007371

Schunk, D. H., & DiBenedetto, M. K. (2021). *Self-efficacy and human motivation.* In Andrew J. Elliot (Ed.), Advances in Motivation Science (8th ed., pp. 153–179). Elsevier. https://doi.org/10.1016/bs.adms.2020.10.001

Sebastian, J., Herman, K. C., & Reinke, W. M. (2019). Do organizational conditions influence teacher implementation of effective classroom management practices: Findings from a randomized trial. *Journal of School Psychology*, 72, 134–149. https://doi.org/10.1016/j.jsp.2018.12.008

Shareefa, M., Hj, R., Mat, A., Zaiham, N., Abdullah, M., & Jawawi, R. (2019). Differentiated Instruction: Definition and Challenging Factors Perceived by Teachers. *Advances in Social Science, Education and Humanities Research*, 388(December), 322–327. https://www.atlantis-press.com/proceedings/icse-19/126007888

Shruthi, H. L., Radhakrishnan, A., Veigas, A. D., Railis, D. J., & Dinesh, R. S. (2025). Analyzing pedagogy and education in English language teaching using information and communication technology. *Analyzing Pedagogy Education and Information Technologies*, 30, 16551–16573. https://doi.org/10.1007/s10639-025-13439-2

Smale-Jacobse, A. E., Meijer, A., Helms-Lorenz, M., & Maulana, R. (2019). Differentiated Instruction in Secondary Education: A Systematic Review of Research Evidence. *Frontiers in Psychology*, 10(November). https://doi.org/10.3389/fpsyg.2019.02366

Smit, R., & Humpert, W. (2012). Differentiated instruction in small schools. *Teaching and Teacher Education*, 28(8), 1152–1162. https://doi.org/10.1016/j.tate.2012.07.003

Sofiana, N., Andriyani, S., Shofiyuddin, M., Mubarok, H., & Candraloka, O. R. (2024). The implementation of differentiated learning in ELT: Indonesian teachers' readiness. *Forum for Linguistic Studies*, 6(2), 1–17. https://doi.org/10.59400/fls.v6i2.1178

Stollman, S., Meirink, J., Westenberg, M., & van Driel, J. (2021). Teachers' Interactive Cognitions of Differentiated Instruction: An Exploration in Regular and Talent Development Lessons. *Journal for the Education of the Gifted,* 44(2), 201–222. https://doi.org/10.1177/01623532211001440

Subban, P., Suprayogi, M. N., Preston, M., Liyani, A. N., & Ratri, A. P. P. (2025). "Differentiation is Sometimes a Hit and Miss". Educator Perceptions of Differentiated Instruction in the Higher Education Sector. *Asia-Pacific Education Researcher*, 34(3), 873–884. https://doi.org/10.1007/s40299-024-00904-8

Suprayogi, M. N., Valcke, M., & Godwin, R. (2017). Teachers and their implementation of differentiated instruction in the classroom. *Teaching and Teacher Education*, 67, 291–301. https://doi.org/10.1016/j.tate.2017.06.020

Supriyoko, Nisa, A. F., Uktolseja, N. F., & Prasetyo, Z. K. (2022). The nature-based school curriculum: A solution to learning-teaching that promotes students' freedom. *Cakrawala Pendidikan*, 41(3), 643–652. https://doi.org/10.21831/cp.v41i3.47903

Tahiri, J. S., Bennani, S., & Idrissi, M. K. (2017). diffMOOC: Differentiated learning paths through the use of differentiated instruction within MOOC*. International Journal of Emerging Technologies in Learning*, 12(3), 197–218. https://doi.org/10.3991/ijet.v12i03.6527

Taş, H., & Minaz, M. B. (2024). The Effects of Learning Style-Based Differentiated Instructional Activities on Academic Achievement and Learning Retention in the Social Studies Course. *SAGE Open*, 14(2), 1–14. https://doi.org/10.1177/21582440241249290

Teig, N., Scherer, R., & Nilsen, T. (2019). I know i can, but do i have the time? The role of teachers' self-efficacy and perceived time constraints in implementing cognitive-activation strategies in science. *Frontiers in Psychology*, 10(JULY), 1–17. https://doi.org/10.3389/fpsyg.2019.01697

Tomlinson, C. A. (2017). *How to Differentiate Instruction in Academically Diverse Classrooms* (3rd Ed.). Association for Supervision and Curriculum Development. https://books.google.co.id/books?id=zoh2DgAAQBAJ&printsec=frontcover&hl=id#v=onepage&q&f=false

Tomlinson, C. A. (2018). Differentiated instruction. In C. M. Callahan & H. L. Hertberg-Davis (Eds.), *Fundamentals of gifted education: Considering multiple perspectives* (pp. 279–292). Routledge Taylor & Francis Group. https://doi.org/10.4324/9781315639987

Tomlinson, C. A. (2021). *How to differentiate instruction in academically diverse classrooms* (3rd ed.). ASCD.

Tomlinson, C. A., Brighton, C., Hertberg, H., Callahan, C. M., Moon, T. R., Brimijoin, K., Conover, L. A., & Reynolds, T. (2003). Differentiating instruction in response to student readiness, interest, and learning profile in academically diverse classrooms: A review of literature. *Journal for the Education of the Gifted,* 27(2–3), 119–145. https://doi.org/10.1177/016235320302700203

Tomlinson, C. A., & Imbeau, M. B. (2023). *Leading and Managing a Differentiated Classroom* (2nd Ed.). Association for Supervision & Curriculum Development (ASCD).

Wan, S. W. Y. (2016). Differentiated instruction: are Hong Kong in-service teachers ready? *Teachers and Teaching*, 23(3), 284–311. https://doi.org/10.1080/13540602.2016.1204289

Wibowo, S., Wangid, M. N., & Firdaus, F. M. (2025). The relevance of Vygotsky's constructivism learning theory with the differentiated learning primary schools. *Journal of Education and Learning*, 19(1), 431–440. https://doi.org/10.11591/edulearn.v19i1.21197

Winarto, W., Kristyaningrum, D. H., Rahayu, R., Hayu, W. R. R., Jumini, S., & Dewi, N. D. L. (2025). Science teachers' perceptions of differentiated learning: A survey study. *Multidisciplinary Science Journal,* 7(2). https://doi.org/10.31893/multiscience.2025101

Yildiz, M. (2023). Self-Efficacy Perceptions of Religious Culture and Moral Knowledge Teachers on

Differentiated Instruction. *Cumhuriyet İlahiyat Dergisi,* 27(2), 661–683. https://doi.org/10.18505/cuid.1335789

Yunaini, N., Mustadi, A., Mumpuniarti, Ishartiwi, & Hidayat, R. (2024). Differentiated instruction science learning for intellectually disabilities pupils at an inclusive primary school: A case study. *Journal of Turkish Science Education*, 21(3), 467–483. https://doi.org/10.36681/tused.2024.025

Zee, M., & Koomen, H. M. Y. (2016). Teacher self-efficacy and its effects on classroom processes, student academic adjustment, and teacher well-being: A synthesis of 40 years of research. *Review of Educational Research*, 86(4), 981–1015. https://doi.org/10.3102/0034654315626801

Zhang, Y. (Lorraine). (2025). Predicting Teachers' Intentions for AIGC Integration in Preschool Education: A Hybrid SEM-ANN Approach. *Journal of Information Technology Education*, 24(16), 1–31. https://doi.org/10.28945/5502