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Principal-shared instructional leadership in differentiated instruction classrooms: its effect on pedagogical practices

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ABSTRACT

This article examines the effect of principal-shared instructional leadership, learners' characteristics, and differentiated instruction strategies support on the quality of pedagogical practices mediated by classroom interventions. This instructional strategy is used along with the implementation of the independent curriculum, and teachers have to pay attention deeply to students' learning needs. This study was conducted as explanatory research on mover teachers throughout Indonesia, and 890 teachers participated voluntarily. Path analysis is utilized to estimate variables relationships. The study revealed that principal-shared instructional leadership and differentiated strategies positively and directly affect the quality of pedagogical practices, and learners' characteristics only contribute to an indirect effect. The findings suggest that school principals have significant roles in mobilizing stakeholders and facilitating learning resources for providing classroom interventions appropriately for students to learn. As an implication, accomplishing the quality of pedagogical practices will be able to achieve students' learning performances

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Introduction

Issues in the field of education in Indonesia are currently related to mover teachers and independent learning, and the main feature of the learning process applied by teachers in the classroom is differentiated instruction strategies. The design of this learning strategy emphasizes the learning process based on differences in students' learning profiles, accordingly, teachers have to pay attention to the innate potential of each student (Ginja & Chen, 2020; Malacapay, 2019). Identifying learning styles and different students' characteristics is the task and responsibility of teachers that is useful for designing lesson plans. Knowing profiles of various learning styles and students' characteristics will benefit teachers, especially in obtaining a comprehensive perspective when the teacher applies teaching strategies and conducts classroom interventions (Kahmann et al., 2022; Ismajli & Imami-Morina, 2018).

Teachers' voices identified from the field that there are various problems regarding differentiated instruction implementation. These problems start from the absence of recorded observations, several different findings exist in students' interests, and the need for sufficient time to profile students' learning needs. In addition, there are differences in understanding and perception among students regarding statements or questions made to identify their learning profile, and some of them are likely to follow their classmates so the results do not reflect actual conditions. Furthermore, to apply differences in learning styles, sufficient time is needed to analyze the diagnostic test results, with students' problems being less open when filling out the diagnostic test so that their

learning needs cannot be mapped properly. Moreover, students do not recognize themselves and follow their classmates, so it is necessary to re-map using different techniques. Another problem is that not all basic competencies can be implemented through a differentiated instructional process. It is often that learning materials cannot be delivered entirely (Djatmika & Astutik, 2023). Designing differentiated instruction that meets the needs of students' learning diversities requires adequate reliable instruments. There are often differences in information regarding the profile of students' learning needs. These problems come from insufficient data, a lack of standardized instruments, resource constraints, socio-cultural factors, and stakeholder collaboration (Chaw & Tang, 2023; Mahartika et al., 2023).

Practically, the consequences of implementing differentiated instruction within the schooling framework require a comprehensive view of the involvement of stakeholders and their respective activities in the learning process bay taking into account the interest of students. From the perspective of school organizational management, the implementation of this learning strategy requires at least the involvement of the principal as a leader in supporting collaborative processes among teachers in achieving learning goals. Stakeholder involvement in an integrated manner related to the implementation of differentiated instruction in the learning process is manifested in the quality of learning practices carried out by teachers in the classroom. According to these teaching principles (Tomlinson & Imbeau, 2010; Tomlinson, 2014; Ziernwald et al., 2022), the teacher's activity initially begins with identifying the characteristics of each student as a basis for designing empathetic and student-centered learning. Furthermore, to realize quality learning practices, the teacher also determines various relevant intervention activities and different learning strategies to be applied in class which refer to student learning profiles. This study examines the quality of pedagogical practices as an impact of the implementation of differentiated instruction in schools which sees principals with a shared instructional leadership perspective, and the activities of teachers involved in identifying students' learning profiles, classroom intervention programs, and differentiated learning designs.

The Quality of Pedagogical Practices

Every student is a social being. All forms of thoughts that are uttered in the form of words are the result of a process of interaction with the social environment that surrounds them. This also occurs in the interactions experienced by students in the learning process together with teachers and peers. In the learning interaction process, the main philosophical basis appropriately relevant to the instruction is the thought of Vygotsky "The relation between thought and word is a living process; thought is born through words. A word devoid of thought is a dead thing. … The connection between thought and word, however, is never pre-formed nor constant. It emerges in the course of development, and itself evolves." (Vygotsky, 1986:255). Through their social interactions, students build connections between developing thinking skills and all forms of expression including words articulated representing their thoughts. Learning practices that emphasize quality provide opportunities for each student to be involved in developing thinking process skills through learning interactions designed by the teacher. Student involvement in the learning process is prepared through active learning strategies based on the characteristics of student learning profiles (Malacapay, 2019; Tomlinson et al., 2003).

Teaching is a professional job and therefore each teacher has professional competence to support the success of the work done. The professional concept applies to work life, especially in professional fields that are very complex and require mastery of situations that are highly determined and depend on the interaction of knowledge, skills, attitudes, and motivation (Kunter et al., 2013). Professional competence contained in the teaching profession has multidimensional characteristics that require the integration of several characteristics at once from the capabilities of knowledge, expertise, personality, and social-interpersonal relations skills needed by teachers when carrying out their profession. All of that is related to a higher quality of teaching which impacts the achievement of student learning outcomes. Student interaction with more mature people and peers through a learning environment that is created through classroom dynamics with attachments between psychological, social, and intellectual factors including the scaffolding process influences self-development and student learning outcomes (Spivak & Farran, 2016; McNally & Slutsky, 2018).

Principal-Shared Instructional Leadership

Schools that are showing success at this time are a result of the implementation of joint decision-making that is developed collectively, including the implementation of learning practices. Instructional leadership takes place between the principal and the teachers, which is reflected in the form of implementing group studies, mutual coaching, collegiality in joint exploration, and reflection on matters that show uncertainty and problem-solving. Implementation of joint discussions regarding the selection of alternatives, not as criticism that is not directive is the focus, and the principal together with the teachers constitutes a learning community involved in providing professional services to students. There are tasks of instructional leadership as a community together with teachers, namely group development, staff development, learning curriculum development, and implementation of action research for improvement. All of these have had an impact on the teacher's time for assignments,

expectations of student learning outcomes, focus on the quality of learning and problem-solving orientation. This allows for a link between the principal's leadership by considering teachers and tolerance towards students, through planning, creativity, and monitoring programs for student learning outcomes (Blase & Blase, 1999; Hallinger & Heck, 2010).

Effective school leadership can respond to the constraints and opportunities that exist in the school environment and the surrounding environment. Personal values, beliefs, knowledge, and experiences possessed by school principals are the source of the diversity of leadership practices. The principal figure does not have a direct impact on student learning outcomes but is mediated by school-level processes and conditions. The principal's leadership explicitly aims to increase the success of the student learning process. Leadership shows values apart from being the aspirations of leaders as well as a means for school members including teachers to achieve their best results (Hallinger, 2011; Zhan et al., 2023a). Principal instructional leadership emphasizes the importance of setting educational goals, planning curriculum implementation and learning in schools, and conducting evaluations of teachers. The main focus of the school principal is the responsibility for improving the achievement of measurable learning outcomes and emphasizes the importance of improving the quality of teaching and learning in schools carried out by teachers (Day et al., 2016; Faizah et al., 2024). As explicitly stated by Zhan et al. (2023), this includes key shared instructional leadership components which are shared vision, focus on instruction, monitoring of progress, and extensive collaboration.

Distributed leadership as a similar term to shared leadership refers to the form of collaboration carried out by school principals, teachers, and stakeholders who have an interest in carrying out school development that is based on sustainable change making it possible to build a sustainable high-performance learning climate. The effect of distributed leadership is to foster academic and social-curricular achievements, and accordingly, the school principal must make changes followed by the teacher who is responsible for their implementation in the classroom. Its effects are determined by the academic and social conditions that exist in schools and are aimed at achieving learning outcomes. Improving academic conditions relates to the creation of effective teaching and learning, and can increase the professionalism of the staff. Changes in distributed leadership will have a direct impact on academic capacity, and social-curricular linkages, and indirectly impact student learning growth (Heck & Hallinger, 2009). High instructional leaders reflect high-performance values by managing instructional programs, allocating resources to support educational goals, and developing school-based teacher-learning communities using students' learning needs to achieve instructional purposes (Louis & Robinson, 2012).

Classroom Interventions

Research findings suggest that differentiated feedback has a greater impact on directing student learning in the future than numerical scores which may mean nothing. Additionally, it is a fact that systems are generally more effective at doing the things they were designed for than the things they were not designed for (Wiliam, 2011). Information in the form of feedback generated from a previously designed system will be able to influence system performance in the next period. Feedback in the field of teaching and learning is very useful to show that there is a gap between the expected level of learning performance and what is currently achieved. In the field of learning, the most common intervention strategy as a designed system is in the form of class-based interventions. This intervention can be carried out by the teacher in the form of designing a curriculum and implementing a set of instructional strategies that seek to develop various student skills (Durlak et al., 2011).

The instructional design applied to the learning process in the classroom by the teacher strongly supports the creation of a positive climate. This is related to the effectiveness of the implementation of learning time and the emphasis on academic competencies that encourage cognitive development as well as students' literacy skills and build an academic classroom atmosphere. In addition, it also resulted in an unexpected decrease in conflict. The existence of a positive relationship between teachers and students is also very supportive of the learning process and positive emotional involvement. The learning atmosphere is characterized by higher learning productivity, mastery of concepts, quality of feedback, and student involvement, which contributes to improving the quality of the learning atmosphere in the classroom. Conversely, applying too strict or excessive controls in the classroom can hinder the creation of an atmosphere that supports the learning climate (Khalfaoui et al., 2021).

The implementation of a diverse learning process is fascinating because it addresses equal opportunities for diverse students, in a class with mixed ability conditions students tend to fail to fulfill promises unless the teacher can overcome student differences as happened in that context. Equal opportunity becomes a reality only when students receive learning processes that suit their different levels of learning readiness, interests, and preferences, thereby enabling them to maximize their development opportunities. The teacher's goal is to ensure that each student learns effectively and with satisfaction, this diversity of students presents a complex and difficult pedagogical dilemma for the teacher. Nonetheless, it seems unavoidable that today's schools reflect the fact that it is necessary to respond appropriately to what has to happen that the classroom must be a place that meets the

requirements of the process of intellectual development by the characteristics of the curriculum. The characteristics of the learning process ensure that every student is known and taught in the right way and that every student learns well and pays attention to the differences between each individual and society (Tomlinson et al., 1997; Tomlinson et al., 2003).

One of the intervention strategies implemented by teachers in differentiated instruction classrooms is learning assessment (Santangelo & Tomlinson, 2012). Teachers are responsible for conducting students' assessments, and they need to be prepared with competence related to accomplishing assessments for learning, of learning, and as learning (Yamtim & Wongwanich, 2014). According to The American Federation of Teachers, the National Council on Measurement in Education, and the National Education Association (1990), there are seven standards including (1) choosing an assessment method, (2) developing assessment methods, (3) administering, assigning, and interpreting learning outcomes, (4) using assessment outcomes in decision-making, (5) using assessment to determine levels of learning outcomes, (6) communicating assessment outcomes, and (7) knowing unethical practices. Moreover, Yamtim & Wongwanich (2014) suggest that the approach to developing teachers' knowledge and skills in the area of classroom assessment should be collaborative and teamwork to enable them to exchange knowledge, and information, and help each other consider and solve student problems. In addition, it is necessary to continue to emphasize the practice of carrying out assessments by teachers in real situations and contexts, and if necessary, assistance can be provided by more experienced people who act as mentors for the teacher.

Learners' Characteristics

Teachers can choose and apply learning techniques that are relevant to student characteristics. These characteristics include differences in age, prior knowledge, working memory capacity, verbal skills, interests, level of intelligence, motivation, and various other characteristics found in students. Designing learning that involves and is student-centered by taking into account its characteristics and creating a relevant learning environment by paying attention to the context and student factors will be able to improve student achievement in various aspects (Baeten et al., 2010; Dunlosky et al., 2013). Increasing student learning success is strongly supported by close relationships between students to build learning community formations in the classroom for the continuity of the learning process, both for collaborative and discussion activities (Martin & Bolliger, 2018).

When implementing differentiated instruction, teachers regard student profiles as important elements such as readiness and interest. Different students generate different ideas and strategies to solve problems of student discussion and reflection. A learner profile is the things about a student that make him unique which are identified by a person's gender, culture, learning style, and intelligence preferences. This refers to the preferred mode of learning in which students will best process what they need to learn (Ginja & Chen, 2020; Hamka et al., 2021), and accordingly, teachers need to be equipped with knowledge and skills related to teaching strategies and techniques that are relevant to differentiated instruction (Dewi et al., 2023; Shareefa, 2023).

Differentiated Instruction Strategies Support

Differentiated instruction focuses on student diversity to increase the effectiveness of the learning process (Ismajli & Imami-Morina, 2018). In different classroom situations, to achieve learning effectiveness, a teacher needs to follow general rules for facilitating classes where attention is paid to each individual. The approach is applied in the classroom to maximize the capacity of each individual, teachers are encouraged to proactively respond to the needs and differences of students in a flexible way by making full use of their capabilities. The main goal of differentiated learning is to create a classroom where the needs of each individual are considered. Differentiated classes based on student characteristics are more successful in the long term (Zolyomi, 2022). As a pedagogical practice, differentiated instruction is deliberated to respond to and respect the diversity of student learning profiles (Kahmann et al., 2022; Tomlinson, 2000), and the aim is to ensure that all students are equally capable of learning and developing. Based on readiness, interest, and student learning profiles, teachers can manage the learning process by modifying the learning environment, the content of learning materials, learning processes, learning outcomes, and learning assessments (Brigandi et al., 2019; Tomlinson, 2014).

Research findings suggest that current classroom practice issues in various settings should be calibrated with norms relevant to the situation. It is often seen that teachers are reluctant to change teaching practices by giving broad attention to students according to their learning needs. It is unclear whether most teachers believe teaching responsive to student differences is desirable. In some cases, teachers indicated that it was important to address differences in students' conditions and achievements in their classes. Teachers who support responsive learning programs are likely to discover and adapt to be aware of the diversity of learners to obtain learning that is more relevant and desirable. Therefore, teachers must design learning processes that pay attention to the various needs of students (Tomlinson, 2004). In implementing differentiated learning, teachers can differentiate based on content, process, and product by paying attention to student's readiness, interests, and learning profiles.

Furthermore, the distinction can also be based on the ability, goals, speed, and special needs of students, all of which fall under the umbrella of the level of student readiness (Malacapay, 2019; Zolyomi, 2022).

Hypothesis Development

The strategic role of instructional leadership in improving and maintaining academic standards and expectations through five things (Day et al., 2016; Afandi et al., 2021), namely: improving assessment procedures, encouraging the use of data and research, teaching policies and programs, strategic resource allocation, and changes in student target setting. Their research findings found that distributed leadership had an indirect effect on improvement in school conditions and consequently also impacted indirectly on improving students' behavior and attendance. Teacher collaborative culture directly had an impact on academic standard achievement and learning culture among students.

Research findings (Louis et al., 2010) revealed that instructional leadership had both direct and indirect effects on instruction. The shared leadership between the principal and teachers had a direct effect on instruction and improved teacher professionalism. Moreover, the study of Wiliam (2011) provided evidence that instruction carried out by teachers in terms of assessment for learning in several ways, including classroom strategies and practical techniques was able to improve the quality of student engagement and learning outcomes. Shared instructional leadership emphasizes the need to maintain a focus on classroom practices as a key to improving student achievement and demonstrates the important role of the school principal as a model. The establishment of shared instructional leadership between the principal and teachers shows how important it is to create learning organizations to improve learning performance.

Research findings revealed that the application of relevant instructional program interventions in learning activities (Hulleman et al., 2010) can trigger students' situational interest. Moreover, the intervention maintains students' interest for a longer time. The immediate effect was strongest for students who had lower performance expectations. The study of Miyake et al. (2010) found that classroom intervention programs with interactive techniques such as peer instruction, where students discuss various answers to contextual questions in small groups during the learning process, and curricular materials, such as tutorials and context-rich problems, can reduce gender disparities. Further efforts on a larger scale need to be made to reduce gender bias including restructuring the entire learning program or introducing women-focused mentoring programs. The results of this study indicate that value affirmation is one of the most promising instructional interventions delivered in class that can help reduce tension between the sexes. Even though the intervention was brief and did not directly involve learning materials, it provided significant encouragement for women, especially women who tended to support gender stereotypes.

Active learning strategies in learning activities are an effective way to engage students and improve their academic achievement. There are three forms of involvement (Martin & Bolliger, 2018), namely: (1) student-to-content, (2) student-to-student, and (3) student-to-teacher interactions. Student-to-content engagement is a process of intellectual interaction between students and content, which can change students' understanding and perspective. Student-to-content interactions can occur when watching instructional videos, interacting with multimedia, and searching for information related to learning content. Student-to-student interaction is invaluable for learning leads to student engagement, and provides opportunities for increased engagement through social interaction. Student-to-teacher relationships and collaboration in an interactive and cohesive environment, including group work and instructive feedback, are important for increasing student engagement and thus having an impact on learning success. The use of multiple student-to-teacher communication channels may be strongly associated with student engagement. Thorough and timely feedback from instructors on their work is invaluable so they can make improvements in their learning process.

Designing classroom interventions in terms of creating a learning environment enables students to gain access to the use of learning devices concerning investigating and obtaining information and other learning materials, collaborating with peers, and constructing their ideas into new knowledge and concepts based on explored information. Providing adaptive instructional design interventions such as the use of differentiated instructions that are relevant to different students' characteristics (Ismajli & Imami-Morina, 2018; Kahmann et al., 2022) affects their engagement which in turn enhances learning effectiveness and achievement both improving academic and socio-emotional skills (Yang & Wu, 2012). While the study of (Bradshaw et al., 2010) shows that designing positive behavior interventions affects both students' behavioral and academic outcomes. The increased accountability given to students enables them to become respectful, responsible, and ready to learn. Facilitating factors as forms of interventions for creating students' engagement and improving their performance include designing classroom instructions that make it possible for group processes, effective scaffolding, students centered learning, and well-arrangement assessment (Kokotsaki et al., 2016), and the engagement can be in the forms of behavioral, emotional, and cognitive (Fredricks & McColskey, 2012). Conducting teaching practices that focus on student achievement and improvement such as the use of differentiated instruction strategies

support makes it possible to encourage academic achievement (Roy et al., 2015; Ziernwald et al., 2022) that accommodate students' different learning profiles and varying needs (Kahmann et al., 2022).

Table 1. Research Hypothesis

Hypothesis
There is a positive and significant direct effect of principal-shared instructional leadership on classroom interventions.
There is a positive and significant direct effect of principal-shared instructional leadership on the quality of pedagogical practices.
There is a positive and significant direct effect of learners' characteristics on classroom interventions.
There is a positive and significant direct effect of learners' characteristics on the quality of pedagogical practices.
There is a positive and significant direct effect of differentiated instruction strategies support on classroom interventions.
There is a positive and significant direct effect of differentiated instruction strategies support on the quality of pedagogical practices.
There is a positive and significant direct effect of classroom interventions on the quality of pedagogical practices.
There is a positive and significant indirect effect of principal-shared instructional leadership on the quality of pedagogical practices mediated by classroom interventions.
There is a positive and significant indirect effect of learners' characteristics on the quality of pedagogical practices mediated by classroom interventions.
There is a positive and significant indirect effect of differentiated instruction strategies support on the quality of pedagogical practices mediated by classroom interventions.

Method

This study was conducted with an explanatory research design intended to explain the relationship among variables as shown in Figure 1.

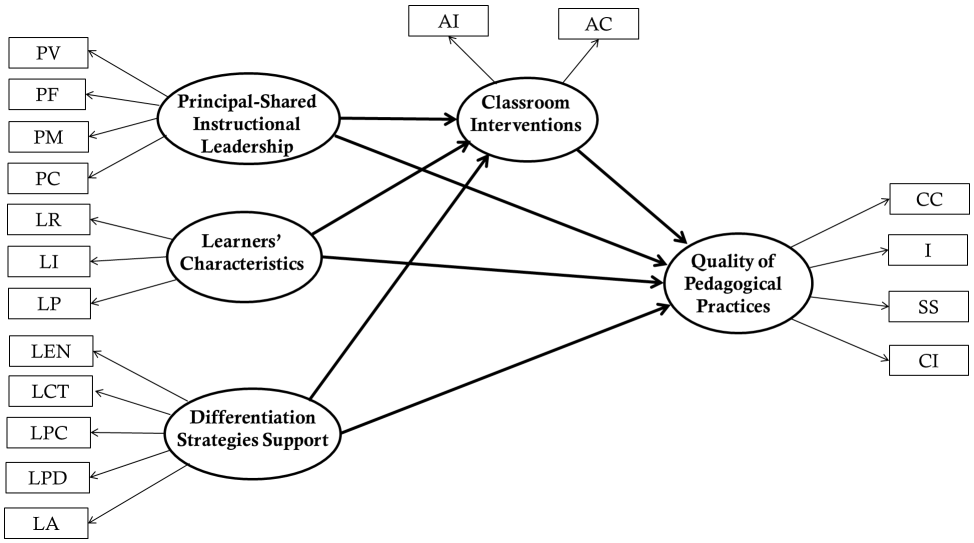

Figure 1. Relationships Among Variables

Variables in this study involve three parts. The first part is antecedent variables, including principal-shared instructional leadership, learners' characteristics, and differentiated instruction strategies support. The second part is the mediating variable which includes classroom interventions. Finally, the third part is the quality of pedagogical practices as a criterion variable. The measurement of the principal shared instructional leadership variable was carried out by modifying the work of Zhan et al., (2023). This variable has four indicators, namely principal shared vision, principal focus on instruction, principal monitoring of progress, and principal broad collaboration. The measurement of learners' characteristics was carried out by modifying the work of Santangelo & Tomlinson (2012). There are three indicators for this variable. These are student readiness, student interest, and student learning profile.

This study has five latent variables and is measured through its indicators as described in the following table.

Table 2. Research Variables and Measurement Indicators

Research Variables	Measurement Indicators
Principal-Shared Instructional Leadership	Principal Shared Vision (PV); Principal Focus on Instruction (PF); Principal Monitoring on Progress (PM); and Principal Broad Collaboration (PC).
Learners' Characteristics	Learners' Readiness (LR); Learners' Interest (LI); Learners' Learning Profile (LP).
Differentiated Instruction Strategies Support	Learning Environment (LEN); Learning Content (LCT); Learning Process (LPC); Learning Product (LPD); and Learning Assessment (LA).
Classroom Intervention	Area of Instruction (AI); and Area of Communication (AC).
Quality of Pedagogical Practices	Classroom Culture (CC); Instruction (I); Socioemotional Skills (SS); and Closeness Teacher-Student Interaction (CI).

The measurement of differentiated instruction strategies support variable was carried out by modifying it from Santangelo & Tomlinson (2012). It has five indicators, in terms of learning environment, content, process, product, and assessment. The classroom intervention variable was measured by modifying the work of Wertheim & Leyser (2022). This variable has two indicators: area of instruction and area of communication. The measurement of the quality of the pedagogical practices variable was carried out by modifying the work of Molina et al. (2020) and Pianta (2001). This variable has four indicators: classroom culture, instruction, socio-emotional skills, and the closeness of teacher-student interaction. Measurements of each item for all those variables were developed using a five-point Likert scale, ranging from strongly disagree (1) up to strongly agree (5). The measurement result analysis for each indicator is presented in the following table. All Cronbach's Alpha coefficients analyzed by using SPSS (version 25) for each indicator are above 0.7 (Taber, 2018) indicating that all of the indicators are reliable and acceptable in showing its consistency.

Table 3. Measurement Result of Item Analysis (N=890)

Variables	Indicators	Cronbach's Alpha	N of Items
Principal-Shared Instructional Leadership	Principal-Shared Vision (PV)	0.889	3
	Principal Focus on Instruction (PF)	0.878	3
	Principal Monitoring on Progress (PM)	0.892	3
	Principal Broad Collaboration (PC)	0.948	3
Learners' Characteristics	Learners' Readiness (LR)	0.922	5
	Learners' Interest (LI)	0.820	3
	Learners' Learning Profile (LP)	0.868	4
Differentiated Instruction Strategies Support	Learning Environment (LEN)	0.918	6
	Learning Content (LCT)	0.886	6
	Learning Process (LPC)	0.873	5
	Learning Product (LPD)	0.901	5
	Learning Assessment (LA)	0.882	4
Classroom Interventions	Area of Instruction (AI)	0.872	6
	Area of Communication (AC)	0.860	5
Quality of Pedagogical Practices	Classroom Culture (CC)	0.708	3
	Instruction (I)	0.847	6
	Socioemotional Skills (SS)	0.847	4
	Closeness Teacher-Student Interactions (CI)	0.828	4

Results and Discussions

Respondents of this study are mover teachers throughout Indonesia from Sumatra to Papua. Research instruments were compiled in a kind of Google Form and sent via social media through their community. The responses obtained and usable for analysis purposes came from 890 respondents. Respondents' demographics are characterized mainly as female (69.8%), coming from elementary school teachers (57.2%), coming from East Java Province as a region of origin (38.8%), most of them are undergraduate degree (77.6%), have already possessed status as certified professional teachers (81.2%), their age mainly between 31 up to 50 years old (90.6%), and dominantly owned between 11 up to 20 years of service as teachers. The detailed distribution of respondents' demographic characteristics is shown in the following table.

Table 4. Distribution of Respondents' Demographic Characteristics (N=890)

Respondents' Demographic Characteristics		Frequency	Percentage
Gender	Male	269	30.2%
	Female	621	69.8%
Institutions	Kindergarten	60	6.7%
	Elementary School	509	57.2%
	Junior High School	193	21.7%
	Senior/Vocational High School	128	14.4%
Region	Sumatra	168	18.9%
	Kalimantan	38	4.3%
	West Java, DKI Jakarta, and Banten	125	14.0%
	Central Java and DI Yogyakarta	114	12.8%
	East Java	345	38.8%
	Bali and Nusa Tenggara	43	4.8%
	Sulawesi	37	4.2%
	Maluku and Papua	20	2.2%
Education	Undergraduate	691	77.6%
	Graduate	199	22.4%
Certification	Not Yet Certified	167	18.8%
	Certified	723	81.2%
Age	Up to 30	28	3.1%
	31 up to 40	436	49.0%
	41 up to 50	370	41.6%
	51 and above	56	6.3%
Years of Service	Up to 5 years	38	4.3%
	6 up to 10 years	125	14.0%
	11 up to 20 years	606	68.1%
	More than 20 years	121	13.6%

The following describes descriptive statistics which is carried out by utilizing SPSS (version 25) for each variable and measurement indicators showing its mean ranging scale from 1 to 5, and its standard deviation as shown in the following table.

Table 5. Descriptive Statistics

Variables	Measurement Indicators	Mean	Std. Deviation
Principal-Shared Instructional Leadership	Principal-Shared Vision (PV)	4.6723	0.51435
	Principal Focus on Instruction (PF)	4.6599	0.49338
	Principal Monitoring on Progress (PM)	4.6375	0.52212
	Principal Broad Collaboration (PC)	4.6558	0.52319
Learners' Characteristics	Learners' Readiness (LR)	4.5506	0.50792
	Learners' Interest (LI)	4.5101	0.55446
	Learners' Learning Profile (LP)	4.5360	0.53014
Differentiated Instruction Strategies Support	Learning Environment (LEN)	4.7193	0.41501
	Learning Content (LCT)	4.5860	0.46514
	Learning Process (LPC)	4.6121	0.46312
	Learning Product (LPD)	4.5562	0.49775
	Learning Assessment (LA)	4.5461	0.52895
Classroom Interventions	Area of Instruction (AI)	4.6867	0.40029
	Area of Communication (AC)	4.5582	0.47749
Quality of Pedagogical Practices	Classroom Culture (CC)	4.8112	0.33363
	Instruction (I)	4.7363	0.35847
	Socioemotional Skills (SS)	4.7638	0.37613
	Closeness Interaction (CI)	4.8073	0.34092

The result of structural equation model statistics is shown in Figure 2 as follows.

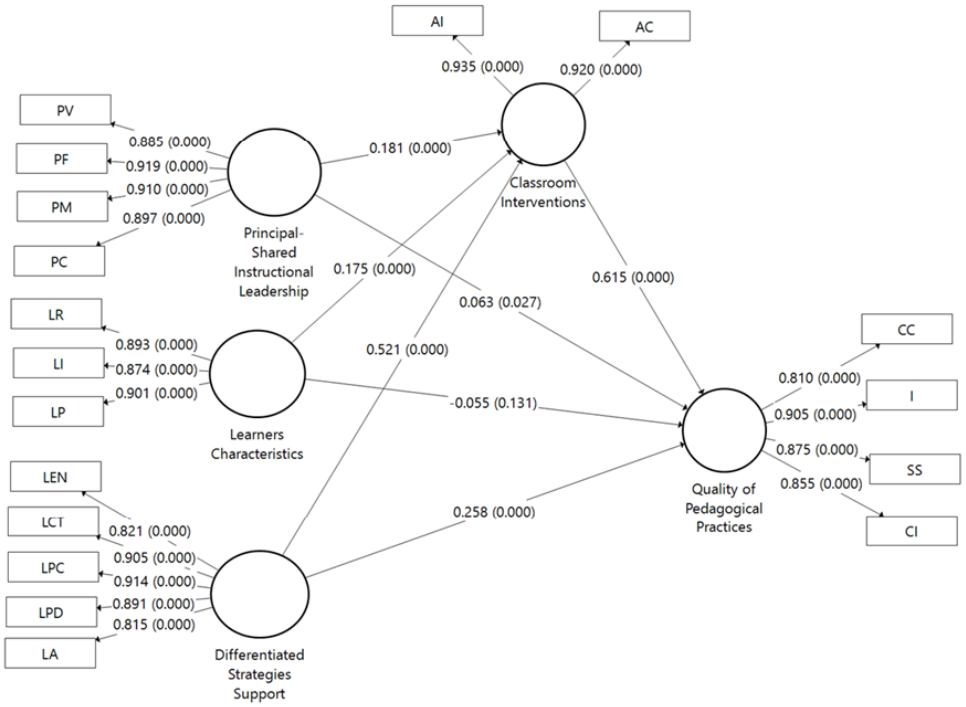

Figure 2. Results of Structural Equation Model Analysis (Coefficients and P-Values)

The detailed information for direct and indirect effect coefficients regarding variable relationships is presented in the following table.

Table 6. Direct and Indirect Effects

Direct Effects	Coefficients	P-Values	Decision
Principal-Shared Instructional Leadership → Classroom Interventions	0.181	0.000	Significant
Principal-Shared Instructional Leadership → Quality of Pedagogical Practices	0.063	0.027	Significant
Learners Characteristics → Classroom Interventions	0.175	0.000	Significant
Learners Characteristics → Quality of Pedagogical Practices	-0.055	0.131	Non-Significant
Differentiated Strategies Support → Classroom Interventions	0.521	0.000	Significant
Differentiated Strategies Support → Quality of Pedagogical Practices	0.258	0.000	Significant
Classroom Interventions → Quality of Pedagogical Practices	0.615	0.000	Significant

Specific Indirect Effects	Coefficients	P-Values	
Principal-Shared Instructional Leadership → Classroom Interventions -→ Quality of Pedagogical Practices	0.111	0.000	Significant
Learners Characteristics → Classroom Interventions → Quality of Pedagogical Practices	0.108	0.001	Significant
Differentiated Strategies Support → Classroom Interventions → Quality of Pedagogical Practices	0.321	0.000	Significant

The results of structural equation model analysis carried out by utilizing SmartPLS (version 3) fulfill the goodness of statistics. Model evaluation is based on several criteria, in terms of loading factor, construct reliability and validity, discriminant validity, outer and inner VIF values, and Fit Summary. The following table presents the model evaluation of those criteria.

Table 7. Model Evaluation

Latent Variables	Measurement Indicators	Outer Loading	Indicator Reliability	Composite Reliability	Cronbach's Alpha	Average Variance Extracted
Principal-Shared Instructional Leadership	PV	0.885	0.889	0.946	0.924	0.815
	PF	0.919	0.878			
	PM	0.910	0.892			
	PC	0.897	0.948			
Learners' Characteristics	LR	0.893	0.922	0.919	0.869	0.792
	LI	0.874	0.820			
	LP	0.901	0.868			
Differentiated Instruction Strategies Support	LEN	0.821	0.918	0.940	0.919	0.757
	LCT	0.905	0.886			
	LPC	0.914	0.873			
	LPD	0.891	0.901			
Classroom Interventions	LA	0.815	0.882	0.925	0.837	0.860
	AI	0.935	0.872			
	AC	0.920	0.860			
	CC	0.810	0.708			
Quality of Pedagogical Practices	I	0.905	0.847	0.920	0.885	0.743
	SS	0.875	0.847			
	CI	0.885	0.828			

The coefficients as mentioned in the above table show that all construct indicators are above 0.70 and the average variance extracted (AVE) is above 0.50. Furthermore, the maximum at 0.95 for Cronbach's alpha and Composite reliability shows its internal consistency and avoids indicator redundancy. It means that all coefficients fulfill the criteria (Al-Zwainy & Al-Marsomi, 2023; Tenenhaus et al., 2005; Wong, 2013; Hair et al., 2021).

Table 8. VIF Values Evaluation

Latent Variables	Indicators	Outer VIF Values	Inner VIF Values	
			Classroom Interventions	Quality of Pedagogical Practices
Principal-Shared Instructional Leadership	PV	2.867	1.820	1.912
	PF	3.592		
	PM	3.848		
	PC	3.464		
Learners Characteristics	LR	2.239	2.931	3.018
	LI	2.211		
	LP	2.405		
Differentiated Strategies Support	LEN	2.096	3.874	4.636
	LCT	3.484		
	LPC	3.904		
	LPD	3.364		
Classroom Interventions	LA	2.203	---	2.803
	AI	2.078		
	AC	2.078		
	CC	1.985		
Quality of Pedagogical Practices	I	2.921	---	---
	SS	2.498		
	CI	2.236		

All the VIF coefficients, both outer and inner, are below 5, which means there is no problem with multicollinearity (Wong, 2013; Hair et al., 2017).

Table 9. R Square, Q Square, and GoF Index

	R Square	R Square Adjusted	Q Square	GoF Index
Classroom Interventions	0.643	0.642	0.698	0.729
Quality of Pedagogical Practices	0.697	0.696		

The Table 9 shows that the contribution of antecedent variables on the mediation variable is 64.3% and on the dependent variable is 69.7%. The predictive relevance of the model is 69.8%, which is above the criteria of 35%, meaning there is a strong degree of predictive relevance (Hair et al., 2012; Henseler et al., 2009; Hair et al., 2017). Accordingly, the model is relevant to predict the antecedent variables in terms of principal-shared instructional leadership, learners' characteristics, and differentiated instruction strategies on the quality of pedagogical practice as the dependent variable, mediated by classroom interventions.

Table 10. Fit Summary

Fit Criteria	Saturated Model	Estimated Model
SRMR (standardized root mean squared residual)	0.046	0.046
d_ULS (unweighted least squares)	0.364	0.364
d_G (the geodesic distance)	0.284	0.284
Chi-Square	1504.310	1504.310
NFI (normed fit index)	0.892	0.892

All indices as mentioned in the above table meet the goodness of fit since the saturated model is matched with the estimated model, and the SRMR coefficient is below 0.10 (Hair et al., 2011; Hair et al., 2017; Dash & Paul, 2021; Wong, 2013). Confirming the research hypotheses as pointed out in Table 1 examined by using the results of statistical analysis, the results of hypothesis testing are shown in the following table. There is only one research hypothesis that is not supported there is no direct effect of learners' characteristics on the quality of pedagogical practices. The classroom intervention variable plays a role in mediating learners' characteristics and the quality of pedagogical practices. While the others show significant effects.

Table 11. Hypotheses Testing

Research Hypothesis	Coefficients	P-Values	Decision
There is a positive and significant direct effect of principal-shared instructional leadership on classroom interventions.	0.181	0.000	Supported
There is a positive and significant direct effect of principal-shared instructional leadership on the quality of pedagogical practices.	0.063	0.027	Supported
There is a positive and significant direct effect of learners' characteristics on classroom interventions.	0.175	0.000	Supported
There is a positive and significant direct effect of learners' characteristics on the quality of pedagogical practices.	-0.055	0.131	Not Supported
There is a positive and significant direct effect of differentiated instruction strategies support on classroom interventions.	0.521	0.000	Supported
There is a positive and significant direct effect of differentiated instruction strategies support on the quality of pedagogical practices.	0.258	0.000	Supported
There is a positive and significant direct effect of classroom interventions on the quality of pedagogical practices.	0.615	0.000	Supported
There is a positive and significant indirect effect of principal-shared instructional leadership on the quality of pedagogical practices mediated by classroom interventions.	0.111	0.000	Supported
There is a positive and significant indirect effect of learners' characteristics on the quality of pedagogical practices mediated by classroom interventions.	0.108	0.001	Supported
There is a positive and significant indirect effect of differentiated instruction strategies support on the quality of pedagogical practices mediated by classroom interventions.	0.321	0.000	Supported

This research was conducted among mover teachers in Indonesia, the majority of which 81.2% are certified teachers. The results of this study reveal that the school principals of these mover teachers have contributed both directly and indirectly to achieving the quality of pedagogical practices in schools. The school principals with their instructional leadership have a direct contribution to the creation of learning intervention programs implemented in the classroom in the form of classroom intervention, as well as to the activities of creating

differentiation strategies support designs carried out by mover teachers. Furthermore, based on the characteristics of students that have been previously mapped by the teacher for the benefit of implementing differentiated learning, the results of this study reveal that the characteristics of students indirectly affect the quality of pedagogical practices. This shows that the teacher has a very important role in mediating the characteristics of students to achieve quality pedagogical practice. The mediating variables are classroom interventions and differentiation strategies support, which is practically fully the responsibility of the teacher for its implementation.

Empirically the implementation of shared instructional leadership from school principals based on the teacher's perspective as a whole has a high degree with an average score of 4.65 on a scale of one to five, with a standard deviation of 0.46. Essentially, this perspective suggests that principal-shared instructional leadership controls the collaborative process with teachers to deliver quality of pedagogical practice. The school principal has the authority to establish policies for enhancing learning achievement that is relevant to the availability and suitability of resources including qualified teachers and learning facilities, and classroom culture that supports the learning climate and students' learning outcomes both academic and socio-emotional skills (Yang & Wu, 2012; Day et al., 2016).

The results of this study revealed that the mapping of students' characteristics was carried out based on readiness, interests, and student profiles. Overall, teachers' perceptions of mapping student characteristics show an average score of 4.53 on a scale of one to five, with a standard deviation of 0.47. This shows that the teacher's mapping of student characteristics is very good, and is very closely related to designing, providing, and managing learning processes that facilitate and focus students which enables them to be actively involved (Wiliam, 2011; Martin & Bolliger, 2018; Kokotsaki et al., 2016; Fredricks & McColskey, 2012), which ultimately contributes to the achievement of student learning outcomes.

In this study, teachers have an important involvement role in building an academic climate by designing student-centered learning through three variables, namely classroom interventions, differentiation strategies support, and the embodiment of the quality of pedagogical practices. The principal who acts as shared instructional leader and also the results of mapping students' characteristics have contributed to how the three variables are realized by the teacher. The results showed that the teacher's perception of the classroom intervention as a whole had an average value of 4.22 and a standard deviation of 0.51. For the implementation of the differentiation strategy, support has an average value of 4.60 and a standard deviation of 0.41. Furthermore, for the embodiment of the quality of pedagogic practices, it has an average value of 4.77 and a standard deviation of 0.30. All of these variables range from one to five rating scales.

Based on hypothesis testing, it is revealed that all of the hypotheses were confirmed, and the only hypothesis (H_6) that was not confirmed is the direct effect of learners' characteristics on the quality of pedagogical practices. However, the indirect effect of learners' characteristics both mediated by classroom intervention and differentiation strategies support significantly affects the quality of pedagogical practices. It means that both classroom intervention and differentiation strategies support variables that take an important role as mediating variables (Ismajli & Imami-Morina, 2018; Kokotsaki et al., 2016; Roy et al., 2015; Ziernwald et al., 2022). The implementation of differentiated instruction needs to pay attention to awareness through various academic events, and meeting the required facilities and recommended educational inputs. Teachers recognize that it is important to use different teaching approaches in diverse classes. There is increased motivation, better student-teacher relationships, and closed gaps between student achievement and targeted achievement (Ginja & Chen, 2020).

Conclusions

In directing the learning process, as a whole, the principal plays an important role in realizing quality pedagogical practices in schools. In addition, related to the learning process carried out by teachers, the principal also plays a role in ensuring that there is a good classroom intervention process and the application of differentiated learning strategies. Forms of classroom intervention and implementation of differentiated instruction are an important part of the continuity of the learning process that takes into account the differences found in students. Learning can be organized according to the needs of each student. An important part of what is accomplished by teachers is to identify the characteristics of students which is the basis for teachers to determine the kind of classroom interventions and the implementation of differentiation learning strategies. In an integrated manner, the role of the school principal in implementing shared instructional leadership in school and the teachers' role in identifying students' characteristics is an important part related to the variety of classroom interventions and the implementation of differentiation learning strategies which as a whole contribute to the quality of pedagogical practices.

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