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How Instructional Leadership Influences Teachers' Innovative Work Behavior: Understanding the Mediating Role of Teacher Commitment and Professional Collaboration

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Abstract

This study investigates how principals' instructional leadership influences teachers' innovative work behavior, with teacher commitment and teacher professional collaboration as mediating mechanisms. Drawing on a cross-sectional survey of 812 teachers working in public schools in Türkiye, structural equation modelling with bootstrapping was employed to examine the direct and indirect effects of instructional leadership. The results indicate that instructional leadership has significant positive effects on both teacher commitment and teacher professional collaboration, which in turn enhance teachers' innovative work behavior. Furthermore, the findings show that the mediating effects of teacher commitment and teacher professional collaboration are stronger than the direct effect of instructional leadership, underscoring their central role in linking school leadership practices with teachers' innovative

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work behavior. By providing empirical evidence from a centralized education system, this study extends the international literature on instructional leadership and teacher innovation. The findings contribute theoretically by clarifying the mechanisms through which principals foster teachers' innovative work behavior, and practically by offering insights for school leaders and policymakers seeking to cultivate teacher collaboration, strengthen commitment, and stimulate innovative work behavior in schools.

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Introduction

Research on student achievement and instructional quality consistently identifies teachers as central actors in shaping students' learning outcomes (Darling-Hammond, 2000; Hattie, 2003; Heck & Hallinger, 2014). Building on this consensus, recent research has increasingly examined the specific behaviors through which teachers influence learning processes and outcomes. In this line of inquiry, teachers' innovative work behavior (TIWB) has emerged as a key outcome associated with instructional improvement, referring to teachers' generation, implementation, and sustained use of novel instructional practices (Hattie, 2008; Moolenaar et al., 2010). Empirical evidence suggests that teachers who adopt innovative classroom practices contribute to improved teaching quality and more positive

student outcomes (Darling-Hammond, 2000; Paletta et al., 2021). Accordingly, TIWB is increasingly viewed as a central outcome reflecting teachers' capacity to respond to contemporary educational demands (Kundu & Roy, 2016; Zainal & Matore, 2019).

One key reason for this growing interest in teachers' innovative work behavior relates to the changing expectations placed on schools in contemporary societies. In contexts shaped by rapid developments in information and communication technologies, schools are increasingly expected to support students' creativity and problem-solving skills, which places new demands on teachers' instructional practices (Klaeijsen et al., 2017). These demands became particularly visible during the COVID-19 pandemic, when teachers were required to adapt quickly to new teaching methods and digital tools (Zainal & Matore, 2019). In this sense, TIWB extends beyond the renewal of teaching methods and involves teachers' efforts to create learning environments that foster students' creativity and original thinking (Andiliou & Murphy, 2010). Accordingly, TIWB plays an important role in adapting to technological change, enriching students' learning processes, and supporting creative instructional practices (Kundu & Roy, 2016).

Given the growing emphasis on TIWB, increasing attention has been directed toward the school-level conditions that support or constrain such behaviors. Among these conditions, school principals' instructional leadership (IL) has been identified as particularly influential, as it directly shapes teachers' instructional practices and professional learning opportunities. Instructional leadership refers to principals' efforts to guide, support, and monitor teaching and learning processes within the school (Hallinger & Murphy, 1985). Research suggests that principals who enact IL foster a school climate

that encourages instructional improvement, supports teacher development, and indirectly contributes to student learning outcomes (Leithwood, 1994; Marks & Printy, 2003). Beyond coordinating instructional activities, IL also involves cultivating a school culture that values experimentation, learning, and instructional improvement, thereby creating conditions conducive to teachers' innovative work behavior (Bada et al., 2020; Robinson et al., 2009). Therefore, IL is widely viewed as a key organizational influence on TIWB, as it encourages teachers to adopt new approaches and engage with emerging instructional tools and technologies (Arslan et al., 2025; Hsieh et al., 2024).

School leadership research suggests that principals' influence on TIWB extends beyond formal leadership actions and is reflected in how collaboration and commitment are supported within schools (Kılınç et al., 2022; Thurlings et al., 2015). Research further indicates that opportunities for professional collaboration allow teachers to share ideas, reflect on their practice, and experiment with new instructional approaches, which can facilitate engagement in innovative work behavior (Almessabi & Alhosani 2024; Messmann & Mulder, 2011). Similarly, teacher commitment to the school has been associated with a greater willingness to invest effort in instructional improvement and to sustain innovative practices over time (Almessabi & Alhosani, 2024; Goddard et al., 2015). Thus, this body of work highlights collaboration and commitment as pathways linking school leadership and TIWB.

Although a growing body of research has examined TIWB in relation to various leadership approaches, including transformational leadership (Kılınç et al., 2022), empowering leadership (Gkorezis, 2015; Zhu et al., 2019), and distributed or shared leadership (Hsieh et al., 2024; Özkan & Akman, 2024), comparatively less attention has been

given to IL in this line of inquiry. By contrast, far fewer studies have explored how a leadership approach explicitly centered on teaching and learning, such as IL, relates to TIWB. As a result, it remains unclear how and through which processes an education-focused leadership approach supports teachers' engagement in innovative instructional practices.

A second gap concerns the focus and scope of existing research conducted in different educational contexts. The importance of examining these relationships in the Turkish context is further underscored by ongoing educational reforms and policy initiatives aimed at improving teaching quality, innovation, and student learning outcomes. As a highly centralized education system, Türkiye places considerable responsibility on school leaders for implementing national educational priorities and supporting instructional improvement at the school level. In this context, school principals serve as key intermediaries between national educational policies and classroom practices. Beyond their administrative responsibilities, principals are expected to guide instructional improvement, facilitate teacher collaboration, support professional learning, and ensure the effective implementation of reform initiatives within schools. As a result, principals play a crucial role in shaping the organizational conditions that enable teachers to adopt and sustain innovative instructional practices.

At the same time, teachers are increasingly expected to adopt innovative teaching practices and effectively integrate new pedagogical and technological approaches into their classrooms. Understanding whether and how IL fosters TIWB is therefore not only a theoretical concern but also a policy-relevant issue with implications for school improvement and the successful implementation of

educational reforms. While the literature on school leadership and teaching has traditionally been dominated by studies from Western education systems (e.g., Geijsel et al., 2009; Neumerski, 2013), recent years have also seen a growing number of studies examining IL in non-Western and reform-oriented contexts, including Türkiye (Bellibaş et al., 2020). However, much of this research has concentrated on general instructional outcomes or leadership practices, rather than explicitly examining TIWB as a distinct outcome. Moreover, there remains limited empirical evidence from centralized education systems that holistically examines how IL relates to TIWB through specific organizational processes, such as professional collaboration and teacher commitment.

Taken together, these gaps highlight the need for a more comprehensive examination of the relationship between IL and TIWB. The present study extends existing knowledge in three important ways. First, it focuses on IL, a leadership approach that has received comparatively less attention in the TIWB literature than transformational, empowering, and distributed leadership. Second, it advances understanding of the mechanisms linking leadership to innovation by simultaneously examining teacher commitment and teacher professional collaboration as mediating processes. Third, by investigating these relationships within the Turkish education system, the study provides evidence from a centralized and non-Western educational context, thereby broadening the contextual scope of research on IL and TIWB.

Accordingly, the present study tested a mediation framework to examine the influence of IL on TIWB through teacher commitment and teacher professional collaboration. By doing so, the study seeks to provide a more nuanced understanding of how IL contributes to

teachers' engagement in innovative instructional practices. The study addressed the following research questions:

1. What are the direct associations of IL, TC, and TPC with TIWB?

2. What is the indirect association of IL with TIWB, with the mediation of TC and TPC?

Contextual Background

This study is situated in Türkiye, where education is governed through a highly centralized and hierarchical system under the Ministry of National Education (MoNE). As the central authority, MoNE oversees core functions such as teacher recruitment, curriculum development, and textbook provision, serving nearly 19 million students with a workforce of over one million teachers (MoNE, 2024a). Within this large-scale system, school principals play a crucial role in translating national policies into effective school-level practices.

Over the past two decades, educational reforms have increasingly emphasized strengthening principals' leadership capacities, particularly in fostering effective teaching and learning environments. Principals are responsible for implementing centrally defined policies while adapting them to the specific contexts and needs of their schools. Recent policy initiatives highlight IL as a key mechanism for improving teacher development and student outcomes. For example, the delegation of teacher performance evaluations to principals in 2014 expanded their role in supervising instructional practices and supporting professional growth. Similarly, the School Development Model introduced under MoNE's education reform agenda promotes context-sensitive improvement strategies aimed at enhancing instructional capacity (MoNE, 2018). More recently, the Century of Türkiye Education Model underscores holistic student development,

innovation, and 21st-century skills, positioning principals as central agents of change (MoNE, 2024c). Collectively, these policies reflect a sustained commitment to leadership practices that support teacher innovation and instructional improvement, providing the policy context for examining IL and teachers' innovative work behavior.

Conceptual Framework

The conceptual framework of this study is grounded in the Educational Leadership and Management (EDLM) literature, which has extensively examined the relationships among school leadership, teachers' beliefs, behaviors, and instructional practices, as well as their effects on student learning (Darling-Hammond, 2000; Hallinger & Heck, 1996; Leithwood et al., 2010). A consistent finding in this literature is that the influence of leadership on instruction is predominantly indirect rather than direct (Hallinger, 2003; Hallinger & Heck, 1996), prompting increased attention to mediating mechanisms (Goddard et al., 2019; Leithwood et al., 2019).

Empirical studies identify teacher-related variables such as collaboration, motivation, and commitment as key mediators linking leadership to instructional improvement (Goddard et al., 2015; Kılınç et al., 2022; Thoonen et al., 2011). From this perspective, principals shape teaching and learning by influencing teachers' professional beliefs and practices rather than through direct classroom involvement (Goddard et al., 2019; Ross & Gray, 2006).

Building on this body of research, the present study examines the relationship between IL and TIWB, with TC and TPC as mediators. These constructs are theoretically anchored in the four-paths framework proposed by Leithwood et al. (2019), which explains how leadership indirectly affects instructional quality. Within this

framework, TC aligns with the emotional pathway and TPC with the rational pathway. The proposed model assumes that IL fosters a collaborative school culture and strengthens TC, thereby creating conditions that support innovative work behavior (see Figure 1).

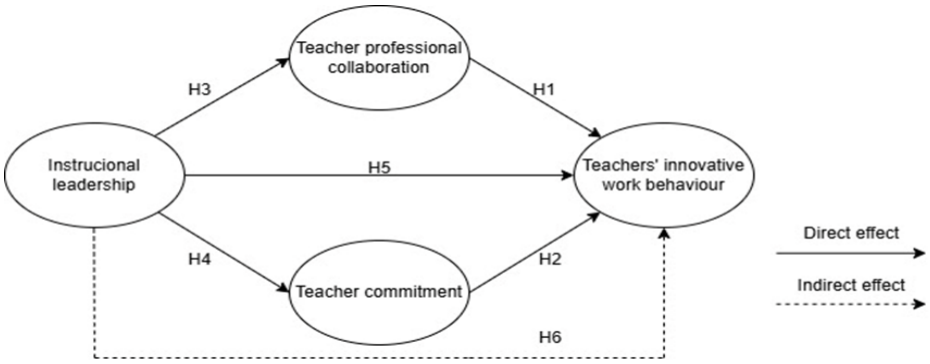

Figure 1. Conceptual model

Hypotheses development

Teacher commitment and teachers' innovative work behaviour

A review of the literature indicates that job commitment is a strong predictor of innovative work behavior (Awang-Hashim et al., 2017; Dhar, 2016). However, the majority of these studies on innovative work behavior have focused on the service, manufacturing, and industrial sectors (Bawuro, 2018). Nevertheless, some studies suggest that commitment contributes positively to innovative practices that support job performance across various sectors, including education (Dörner, 2012; Serdyukov, 2017). In the context of teaching, commitment has been found to positively influence teacher innovative practices (Kılınç et al., 2022). While the current literature provides limited empirical evidence regarding the direct relationship between TC and TIWB, existing findings point toward a positive association.

On this basis, we propose that TC is positively related to TIWB (Hypothesis 1).

Teacher professional collaboration and teachers' innovative work behaviour

Empirical research consistently shows that collaborative school cultures support TPC and strengthen collective capacity for innovation (Geijsel et al., 2009; Nguyen et al., 2021). Collegial networks, in particular, create organizational conditions that facilitate innovative practices (Moolenaar et al., 2011). Studies focusing on TIWB further demonstrate a positive relationship between professional collaboration and innovative work behavior (Thurlings et al., 2015; Zainal & Matore, 2019). Accordingly, drawing on the existing literature, this study proposes a positive association between TPC and teachers' innovative work behavior (Hypothesis 2).

The mediating role of teacher commitment and teacher professional collaboration

Previous research has increasingly highlighted that IL plays a critical role in fostering TPC by creating a school culture focused on shared goals, instructional coherence, and collective responsibility. Research shows that principals who engage in IL such as providing feedback, coordinating curriculum, and supporting teacher learning-significantly enhance collaborative practices among teachers (Liu et al., 2020; Sebastian et al., 2016). Through supporting professional learning communities and promoting joint problem-solving, instructional leaders help build a collaborative environment that strengthens teaching quality and improves student outcomes. Accordingly, we propose that principals who practice IL are more likely to enhance the

degree of professional collaboration among teachers in their schools (Hypothesis 3).

Evidence from diverse contexts suggests that principals who practice IL significantly influence teachers' commitment by influencing collaboration among teachers (Cansoy et al., 2018). Skelton (2019) reported that principals' instructional leadership plays a significant role in strengthening teachers' organizational commitment, particularly through practices related to framing and conveying the school's mission and goals. On this empirical foundation, we theorise that IL is positively and directly related to TC (Hypothesis 4).

Marks and Printy (2003) highlight that teachers tend to demonstrate greater commitment, increased professional engagement, and a readiness to implement innovative teaching methods when they perceive their principals to be practicing IL. IL is regarded as particularly significant in enhancing instructional quality due to its stronger association with teachers' innovative behaviors compared to other forms of leadership (Robinson et al., 2009). Consequently, it is posited that school principals' instructional leadership exerts a meaningful influence on fostering innovative behaviors among teachers (Hypothesis 5).

Drawing on the four-paths framework (Leithwood et al., 2019), instructional leadership is expected to influence teachers' innovative work behavior indirectly through both emotional and rational pathways. Teacher commitment represents the emotional pathway because committed teachers are more likely to invest effort in instructional improvement and sustain innovative practices over time. Teacher professional collaboration represents the rational pathway because collaborative interactions facilitate knowledge sharing, collective problem-solving, and the exchange of innovative ideas.

Therefore, instructional leadership may foster innovative work behavior not only directly but also indirectly by strengthening teacher commitment and professional collaboration. Considering the relationships posited in Hypotheses 1, 2, 3, 4 and 5 we propose our sixth hypothesis: IL is indirectly linked to TIWB through TPC and TC (Hypothesis 6).

Literature Review

Teachers' Innovative Work Behaviour

TIWB characterized by the exploration, generation, and implementation of new ideas supports not only pedagogical improvement but also contributes to addressing complex educational challenges (De Jong & Den Hartog, 2010; Scott & Bruce, 1994). TIWB is one of the key concepts discussed in the context of improving instructional practices and enhancing the quality of teaching (Kundu & Roy, 2016; Messmann & Mulder, 2014). TIWB refers to the proactive efforts of educators to introduce and apply novel ideas in their teaching practices (Thurlings et al., 2015). These behaviors align with the broader concept of workplace innovation, which involves recognizing opportunities for change, developing creative solutions, and successfully integrating them into daily practices (Kundu & Roy, 2016).

TIWB encompasses three main dimensions: idea generation, idea promotion, and idea implementation (Janssen, 2000). Idea generation involves developing new instructional strategies, teaching methods, or assessment techniques. Idea promotion refers to advocating for these ideas within the school community, while idea implementation involves integrating innovations into teaching practice. This study mainly adopts this perspective, describing the construct as teachers'

attempts to create, support, and implement ideas to improve the quality of instruction.

Teacher Commitment

TC is understood as teachers' psychological attachment to their profession and key stakeholders within the school context, such as their institution, parents, colleagues, and students (Firestone & Pennell, 1993; Park, 2005). As an intrinsic source of motivation, TC encourages teachers to broaden their professional roles, seek novel experiences, and engage with challenges, positioning it as a critical element in fostering school development and improving student learning outcomes (Firestone & Pennell, 1993; Nir, 2002).

The existing literature conceptualizes TC as a multidimensional construct encompassing commitment to the school, students, instructional practice, and the teaching profession (Razak et al., 2010; Thien et al., 2014). Synthesizing prior research, Thien et al. (2014) proposed a four-dimensional model of teacher commitment encompassing commitment to students, teaching, the school, and the profession. This study adopts this conceptualization of teacher commitment.

Teacher Professional Collaboration

TPC refers to teachers' exchange of knowledge, sharing of experiences, and intentional efforts to create learning opportunities through sustained mutual interaction (Geijsel et al., 2009). It is commonly understood as educators working collectively toward shared goals, such as improving instructional practices and enhancing student learning, through reflective dialogue and joint problem solving. Effective collaboration requires continuity over time and a focus on clearly articulated learning goals, as well as opportunities for teachers

to observe instructional practices and reflect on their effectiveness (Hiebert, 1999).

The literature characterizes TPC through several recurring features. It involves collective work toward shared objectives within the school context (Meyer et al., 2022; Nguyen & Ng, 2020) and is intentionally structured to foster interdependence among teachers (Huber, 2008; Truijen et al., 2013). Although collaborative practices are often encouraged by school leadership, meaningful collaboration depends on teachers' voluntary and equitable participation (Hallinger & Kulophas, 2020) and on sustained, long-term professional interaction (Levine & Marcus, 2010).

Instructional Leadership

IL has gained global popularity and has been adopted by many countries as a new paradigm of school leadership (Bush et al., 2018; Liu et al., 2020). Such a leadership style is characterized by direct engagement with teachers, attention to curriculum and staff development, and a range of direct and indirect strategies that contribute to student learning outcomes (Glickman et al., 2018; Heck, 1993). One of the most frequently cited definitions of IL describes it as the capacity of school principals to lead their schools by engaging in roles related to curriculum development, enhancing teacher competencies, and fostering a positive learning climate for students (Hallinger & Wang, 2015).

Hallinger and Murphy's (1985) framework is one of the most widely recognized models for understanding the sub-dimensions of instructional leadership. According to their framework, IL is organized around three central dimensions-school mission, instructional program management, and learning climate-each of which is

operationalized through a set of ten key functions. These dimensions include setting and communicating school goals, supervising instruction, coordinating curriculum, monitoring student progress, and cultivating an environment that supports effective teaching and learning. This comprehensive model serves as the foundation for the present study.

Method

Procedure and sample

Data for this study were collected from teachers working in public schools in Türkiye during the 2023–2024 academic year. A stratified random sampling approach was employed to ensure representation across school levels and regions. In the implementation of the stratified sampling method, the proportion of teachers working in schools within each district to the overall population was calculated by taking district size into account. Sample sizes for each district were determined by considering both the total number of teachers and their proportional representation within the districts. The teachers to be selected from each district for the sample were then identified through random selection. In total, 967 questionnaires were distributed, of which 812 were deemed valid and included in the analysis after screening for missing or inconsistent responses. Of the participants, 63% were female and 37% male. In terms of professional experience, 21% had between 1–5 years of teaching, 28% between 6–10 years, 32% between 11–20 years, and 19% more than 20 years. Regarding school type, 42% of the teachers worked in primary schools, 35% in lower secondary schools, and 23% in upper secondary schools. This heterogeneous sample, encompassing variations in gender, years of professional experience, and school type, provided a comprehensive

basis for examining the relationships among IL, TPC, TC, and TIWB. The overall distribution of the sample was also considered in relation to the official statistics published by the Ministry of National Education for the 2023–2024 academic year, and it appeared to be broadly consistent with the reported profile of teachers working in public schools in Türkiye (MoNE, 2024b).

Instruments

Innovative Work Behavior Scale: TIWB were measured using the "Innovative Work Behavior Scale," originally developed by Janssen (2000) and adapted into Turkish by Töre (2017). The scale consists of three sub-dimensions: idea generation, idea promotion, and idea realization, each comprising three items. It is a 5-point Likert-type scale (1 = Always, 5 = Never) designed to assess the frequency with which individuals exhibit innovative work behaviors. The reliability coefficient of the original scale was reported as .95 (Janssen, 2000). The reliability of the adapted version, as measured by Cronbach's alpha, was .87, with a total explained variance of 61.27% (Töre, 2017).

Instructional Leadership Scale: To evaluate teachers' views of principals' instructional leadership behaviors, this study employed the PIMRS, originally created by Hallinger and Murphy (1985) and subsequently adapted into Turkish by Bellibaş et al. (2016). The scale is a 5-point Likert-type instrument with response options ranging from 1 = Never to 5 = Always. The reliability of the scale was supported by Cronbach's alpha coefficients: .94 for the school mission dimension, .90 for instructional program management, .91 for school climate, and .94 for the overall scale. Additionally, the adapted short form demonstrated high internal consistency, with a Cronbach's alpha value of .98.

Teacher Professional Collaboration Scale: To measure teachers' perceptions regarding professional collaboration, the "Professional Collaboration" subscale of the Teacher Professional Learning Scale, originally developed by Liu et al. (2016) and adapted into Turkish by Gümüş et al. (2018), was employed. In the adaptation study, the Cronbach's alpha coefficient for the collaboration sub-dimension was reported as .82, indicating acceptable internal consistency.

Teacher Commitment Scale: We measured TC using the Teacher Commitment Scale developed by Thien et al. (2014) and adapted to Turkish language and culture by Dolapcı and Uluğ (2023). The scale consists of 13 items across four dimensions: commitment to students, commitment to teaching, commitment to the school, and commitment to the profession. The Cronbach's alpha coefficients calculated for the scale indicated acceptable internal consistency and were reported as follows: .89 for commitment to the school, .82 for commitment to students, .73 for commitment to teaching, and .71 for commitment to the profession.

In the present study, validity and reliability analyses of the scales employed were conducted using Confirmatory Factor Analysis (CFA), Cronbach's alpha reliability coefficients, item-total correlation analyses, and calculations of inter-factor correlation values. The goodness-of-fit indices obtained from the CFA and the reliability coefficients for all scales are presented in Table 1.

Table 1. Model fit indices of the scales

Scales	α	χ^2/df	RMSEA	SRMR	TLI	CFI
TIWB	0.85	1.85	0.05	0.02	0.97	0.98
TPC	0.92	1.99	0.05	0.01	0.98	0.99

TC	0.81	2.79	0.07	0.05	0.91	0.93
IL	0.96	2.52	0.07	0.03	0.96	0.96

Notes. IL: Instructional Leadership; TPC: Teacher Professional Collaboration; TC: Teacher Commitment; TIWB: Teachers' Innovative Work Behavior.

Analytical Strategy

We conducted a structural equation modeling (SEM) analysis to examine the hypothesized relationships among IL, TIWB, TC and TPC. IL was modeled as the independent variable, TIWB as the dependent variable, and TC and TPC as mediators. The data collection process was carried out via both paper-based and online surveys. A total of 700 printed forms were distributed, of which 528 were returned. After excluding 80 incomplete or incorrectly filled forms, 448 responses were entered into IBM SPSS 21. An additional 519 responses collected online were appended to the dataset, resulting in an initial sample of 967 observations.

Prior to main analyses, the dataset was screened for coding errors, missing values, and outliers. Since incomplete responses had already been excluded, no missing data remained. Univariate outliers were identified by converting raw scores to standardized z-scores, and observations exceeding the ±3.28 threshold (Field, 2013) were removed (n = 75). Subsequently, multivariate outliers were detected using Mahalanobis distance, and observations with values exceeding 25.21 (Barnett & Lewis, 1978), given the sample size and number of variables, were also excluded (n = 80). After outlier removal, the final dataset consisted of 812 valid cases.

Normality assumptions were evaluated at both univariate and multivariate levels. For univariate normality, skewness and kurtosis values of all variables fell within the acceptable ±1 range. These

findings were further supported by graphical assessments, including histograms and Q–Q plots, indicating normal distributions. To assess multivariate normality, scatterplot matrices were examined, which revealed elliptical distributions consistent with normality. Mardia's multivariate kurtosis coefficient was calculated as 2.68, well below the threshold of 5 (Byrne, 2010), confirming that the assumption of multivariate normality was met.

To address the first sub-question of the study, bivariate relationships among the independent, dependent, and mediating variables were examined using Pearson product-moment correlation coefficients. The seconda sub-question explored the mediating roles of teacher commitment and professional collaboration in the relationship between IL and TIWB. To test the full mediation model, we employed AMOS 24. The structural equation model included IL as the exogenous variable, TIWB as the endogenous variable, and TC and TPC as mediators. The bootstrapping method (Efron, 1982) was used to test the statistical significance of indirect effects, and specific indirect effects were also examined separately for each mediator (Hayes, 2018). This approach allowed us to estimate the direct and indirect effects within a single comprehensive model.

Findings

Preliminary Analysis

In the initial analysis stage, Pearson product-moment correlation coefficients were computed to examine pairwise relationships between variables. Additionally, descriptive statistics such as means and standard deviations were calculated to assess data characteristics. The results are summarized in Table 2.

Table 2 indicates that teachers' perceptions of TIWB (*M*=4.23, *SD*=0.48), TPC (*M*=4.27, *SD*=0.59), TC (*M*=4.23, *SD*=0.56), and IL (*M*=4.13, *SD*=0.62) were above average. The analysis of relationships among the study variables revealed positive and significant correlations ($p<0.01$).

Table 2. Descriptive statistics and correlations

Variable	1	2	3	4
1.TIWB	1	0.46**	0.25**	0.38**
2. TPC		1	0.38**	0.57**
3. TC			1	0.40**
4. IL				1
Mean or %	4.23	4.27	4.23	4.13
SD	0.48	0.59	0.56	0.62
Skewness	-0.21	-0.44	-0.21	-0.52
Kurtosis	-0.45	-0.56	-0.45	-0.17

Notes. ** $p < .01$; IL: Instructional Leadership; TPC: Teacher Professional Collaboration; TC: Teacher Commitment; TIWB: Teachers' Innovative Work Behavior.

Model testing

Figure 2 presents the multiple mediation model, in which the paths from each variable to teachers' innovative behaviors represent direct effects. Error covariances between the mediating variables were freely estimated in the model (Preacher & Hayes, 2008). The results indicate that principals' instructional leadership exerts an indirect effect on teachers' innovative behaviors through these mediators. Specifically, TPC and TC partially mediate the relationship between IL and TIWB.

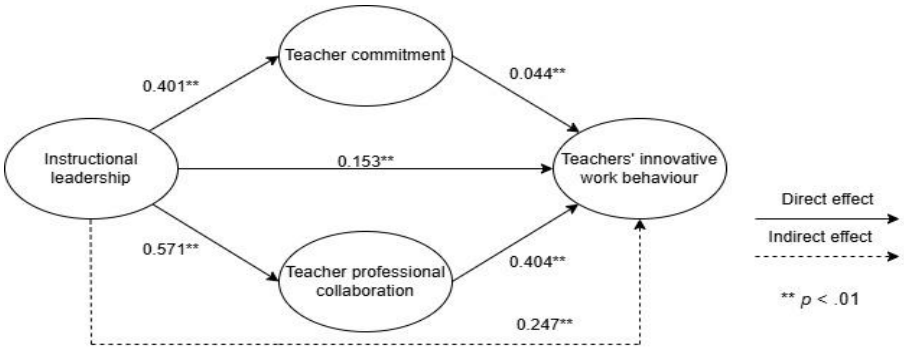

Figure 2. Structural equation model results

Path analysis conducted to examine the direct and indirect effects of IL yielded a chi-square value of $\chi^2(6) = 15.29$, resulting in a χ^2/df ratio of 2.55. The model demonstrated good fit, with RMSEA = .04 and RMR = .01 (Hu & Bentler, 1995; Kline, 2011). In addition, the goodness-of-fit indices - GFI = .99, AGFI = .98, CFI = .99, and TLI = .98 - indicated excellent fit (Schumacker & Lomax, 2004). Overall, these findings suggest that the proposed model fits the data well. The path coefficients of the model are presented in Figure 2.

The direct and indirect effects of IL on TIWB were estimated using AMOS 23. The standardized coefficients for the direct and indirect effects, along with the bootstrap-based confidence intervals and significance levels, are presented in Table 3. An examination of Table 3 indicates that the direct, indirect, and total effects of IL are statistically significant.

Among the variables directly affecting TIWB, TPC emerged as the strongest predictor (β = .404, SE = .043, $p < .01$). In contrast, TC exhibited the weakest direct effect (β = .044, SE = .039, $p < .01$). The independent variable, IL, also demonstrated a statistically significant direct effect on TIWB (β = .153, SE = .046, $p < .01$).

Table 3. Direct and indirect effects

Variables	β	SH	%95 Bootstrap Lower Bound	%95 Bootstrap Upper Bound	P
IL					
Direct effect	.153	.046	.064	.245	**
Indirect effect	.247	.027	.196	.303	**
Total Effect	.400	.037	.328	.470	**
TPC					
Direct effect	.404	.043	.317	.487	**
TC					
Direct effect	.044	.039	-.034	.118	**

Notes. *** $p < .001$, * $p < .05$; IL: Instructional Leadership; TPC: Teacher Professional Collaboration; TC: Teacher Commitment; TIWB: Teachers' Innovative Work Behavior; SD: Standard deviation; β: Standardised path coefficient; *SE*: Standard error.

Interpretation of Findings

The findings of this study highlight the pivotal role of IL in fostering TIWB. The results demonstrate that principals' instructional leadership behaviors are positively associated with teachers' engagement in innovative practices. This suggests that when teachers perceive their principals as strong instructional leaders setting clear goals, supporting teaching practices, and cultivating a conducive learning climate they are more inclined to generate new ideas, adopt novel instructional strategies, and integrate innovative methods into their classrooms. This finding is consistent with prior researches that underscore the influence of instructional leadership on teacher performance and classroom practices (Leithwood, 1994; Marks & Printy, 2003; Saboe et al., 2015; Sheppard, 1996).

Beyond its direct effects, the study further demonstrated that teacher collaboration and teacher commitment function as mediating mechanisms in the association between IL and TIWB. Teachers who perceived higher levels of IL also reported greater collaboration with colleagues and stronger commitment to their schools, which in turn enhanced their willingness to engage in innovative work behaviour. This finding resonates with existing research showing that collaborative cultures and professional trust are crucial enablers of innovation in schools (Almessabi & Alhosani 2024; Blase & Blase, 2000; Vangrieken et al., 2015). Particularly in the Turkish educational context, where principals operate under pressure to improve student performance in high-stakes examinations, the emphasis on teacher collaboration and commitment may serve as an organizational mechanism that reinforces innovation.

Importantly, the analysis indicated that collaboration exerted the strongest direct effect on TIWB, surpassing both IL and commitment. This underscores the centrality of TPC in shaping teachers' innovative actions, echoing prior studies which emphasize the role of shared learning, peer networks, and collegial exchange in fostering innovation (Borasi & Finnigan, 2010; Thurlings et al., 2015; Widmann & Mulder, 2018). Teacher commitment was likewise identified as a significant determinant of innovative outcomes, supporting earlier work that links commitment to greater openness to pedagogical change and experimentation (Almessabi & Alhosani 2024; Thien et al., 2014; Werleman, 2016).

Furthermore, the results demonstrate that the indirect effects of IL on TIWB operating through collaboration and commitment were stronger than its direct effects. This finding mirrors the broader leadership literature, which highlights that principals influence teaching and

learning not only through direct supervision but also by shaping organizational conditions such as culture, trust, and collective efficacy (Hallinger & Heck, 1996; Leithwood et al., 2010; Thoonen et al., 2011). Within the Turkish educational system, where schools operate under a centralized governance structure and principals are expected to implement national educational priorities while maintaining instructional quality, these organizational processes may be particularly important. Because opportunities for school-level autonomy are relatively constrained, principals may have limited capacity to promote innovation through structural changes alone. Instead, fostering collaborative professional relationships and strengthening teachers' commitment may represent key mechanisms through which instructional leadership encourages innovative teaching practices.

Taken together, these findings contribute to the growing body of research emphasizing the interconnectedness of leadership, collaboration, and commitment in promoting teacher innovation. The findings are particularly relevant for the Turkish educational context, where policymakers have increasingly emphasized instructional improvement, innovation, and the effective integration of new pedagogical approaches in schools. The results suggest that sustainable innovation is unlikely to emerge solely through centrally designed reforms or top-down policy initiatives. Rather, innovation appears to depend on school-level professional environments that encourage collaboration, shared learning, and organizational commitment among teachers. Accordingly, efforts to improve teaching quality in Türkiye may benefit not only from strengthening principals' instructional leadership capacities but also from creating

organizational structures and professional learning opportunities that support collaborative and committed teacher communities.

Implications for Policy and Practice

The findings of this study have important implications for educational policy and practice. First, the positive association between instructional leadership and teachers' innovative work behavior highlights the importance of strengthening principals' capacity to support teaching and learning. Professional development programs for school leaders should therefore place greater emphasis on instructional leadership practices, including providing instructional feedback, supporting teacher learning, and creating conditions that encourage experimentation and innovation.

Second, teacher professional collaboration emerged as the strongest predictor of innovative work behavior. This finding suggests that schools should move beyond viewing innovation as an individual teacher responsibility and instead create structures that facilitate collective learning. Regular collaborative planning meetings, professional learning communities, peer observation opportunities, and cross-disciplinary teamwork may help teachers exchange ideas and implement innovative practices more effectively.

Third, the mediating role of teacher commitment indicates that innovation is more likely to occur when teachers feel connected to and invested in their schools. School leaders may therefore benefit from adopting practices that strengthen organizational commitment, such as involving teachers in decision-making processes, recognizing professional contributions, and fostering supportive working environments.

Finally, because the indirect effects of instructional leadership through collaboration and commitment were stronger than its direct effects, policymakers should consider school improvement efforts that simultaneously target leadership development and the organizational conditions that support collaboration and commitment. The findings suggest that sustainable innovation is unlikely to result solely from top-down initiatives; rather, it depends on creating professional environments in which teachers are supported, connected, and actively engaged in collective improvement efforts.

From a research perspective, future studies could build on the present findings by examining more specific dimensions of teacher professional collaboration, such as peer observation, co-teaching, and professional learning communities, in order to better understand which forms of collaboration most strongly foster teachers' innovative work behavior. In addition, given the mediating role of teacher commitment identified in this study, future research could investigate how different types of commitment (e.g., affective, normative, continuance) relate to innovation processes in schools. Future studies could also employ longitudinal or multilevel designs to explore how instructional leadership practices influence the development of teacher innovation over time and across different organizational levels. Finally, comparative studies across different educational systems and governance structures would help clarify how contextual factors shape the effectiveness of instructional leadership in promoting teachers' innovative work behavior.

Limitations and Future Research

The findings of this study should be interpreted in light of several limitations. First, the cross-sectional design restricts the ability to draw causal inferences regarding the relationships among IL, TC, TPC, and

TIWB. Although the proposed model reveals meaningful direct and indirect associations, the lack of longitudinal data limits conclusions about directionality. Future research employing longitudinal or experimental designs would allow for examination of reciprocal and dynamic relationships over time.

Second, data were collected exclusively through teachers' self-reported questionnaires, which may be subject to response biases such as social desirability or acquiescence. While teachers' perceptions are central to understanding leadership and collaboration processes, reliance on a single data source constrains objectivity. Subsequent studies should triangulate data by incorporating multiple perspectives, including those of school leaders, peers, or objective indicators of instructional or student outcomes.

Third, the study was conducted within Türkiye's highly centralized and hierarchical education system, which may limit the generalizability of the findings to other national or organizational contexts. Cultural and structural characteristics specific to this setting may shape how leadership, collaboration, and commitment influence innovative behavior. Replication across more decentralized and culturally diverse systems would enhance external validity.

Fourth, the present study focused on the relationships among the core variables of the proposed model. Therefore, demographic and professional variables such as gender, school type, and professional seniority were not included as control variables in the analyses. Although these variables were beyond the main analytical focus of the study, they may influence teachers' innovative work behavior. Future research could extend the current model by incorporating such variables to provide a more comprehensive understanding of the factors associated with teachers' innovative work behavior.

Finally, although TC and TPC were examined as mediators, other relevant variables such as school climate, organizational trust, or teacher motivation were not included. Future research could extend the model through multi-level analyses incorporating school-level factors to further elucidate the mechanisms linking leadership and innovation.

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