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Examining the impact of Omani primary school climate and teacher self-efficacy on innovative teaching practices: a structural equation modeling approach

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Purpose: The main objective of this research is to examine the influence of Omani school organizational climate and teachers' self-efficacy on their innovative teaching practices. Moreover, the current study aimed to test the mediating role of teachers' self-efficacy in the relationship between the two constructs.

Research method: This study employed the cross-sectional survey method to collect data from 368 primary school teachers in Muscat employing the simple random sampling procedure. Structural equation modeling (SEM) through AMOS was utilized in two main steps: measurement model and structural model to analyze the study data.

Findings: The findings revealed a statistically significant influence of Omani school organizational climate and teachers' self-efficacy on their innovative behavior. Moreover, teachers' self-efficacy was found to mediate the relationship between the two variables.

Implications: These outcomes provide valuable insights for policymakers, urging them to consider the dimensions of school climate and teachers' self-efficacy. Such considerations can yield positive effects on the enhancement of teachers' innovative behavior, thereby improving the overall learning process.

Originality: In light of these findings, the study suggests that fostering the development of school climate and teachers' self-efficacy should be encouraged to promote innovative behavior within Omani primary schools.

KEYWORDS

innovative behavior, self-efficacy, school climate, teachers, structural equation modeling, Oman

Introduction

In recent years, the educational landscape has witnessed a transformative shift driven by innovation to enhance student engagement and learning outcomes. These modern pedagogical approaches, grounded in educational research, emphasize active learning, technology integration and personalized instruction (Li and Wang, 2024). To adequately cater to students' needs, schools must invest in advanced infrastructure and employ teachers who demonstrate both competence and a propensity for innovation (Al-refaei et al., 2024). According to Nguyen et al. (2021), it is essential for teachers to continually innovate in their pedagogical approaches, whether working individually or collaboratively. Schools should, therefore, foster an environment conducive to the development and assimilation of novel ideas, methods and strategies that teachers can readily understand and implement (Li and Wang, 2024; Chou et al., 2019; Alshuhumi et al., 2024).

The school climate and teachers' self-efficacy are pivotal elements in the educational ecosystem, significantly influencing various outcomes, including coping strategies (Samfira and Paloş, 2021), teachers' innovative behaviors (Bandura, 1997; Çimen et al., 2023). The school climate, encompassing the quality and character of school life, affects teachers' motivation, job satisfaction and overall performance (Thatok and Siti, 2023; Abigail De Arellano et al., 2023; Al-Refaei et al., 2024c; Bradshaw et al., 2014). Positive school climates are associated with collaborative environments, supportive leadership and professional growth opportunities, which can foster creativity and innovation among teachers (Afsar et al., 2019; Finch et al., 2023). Research indicates that high self-efficacy is linked to greater resilience, openness to new ideas and proactive behavior in the classroom (Bandura, 1997; Bandura, 1978).

Both educators and institutions must be willing to embrace novel viewpoints, cutting-edge curriculum designs, contemporary teaching techniques and educational technology if they hope to see appreciable gains in the quality of instruction (Hill and France, 2020; Nguyen et al., 2019; Nurjaman et al., 2019; Al-Refaei et al., 2024a). The ability of educators to innovate and their sense of self-efficacy are inextricably linked to improving the quality of instruction (Tobin et al., 2006; Gkontelos et al., 2023; Lambriex-Schmitz et al., 2020). According to Chand et al. (2020), innovative teaching requires motivating students to apply what they have learned in the classroom to real-world situations.

In education, innovative behavior includes activities directed toward conceiving and implementing novel ideas, products, technologies, or work processes to enhance the efficiency and effectiveness of an educational institution (Wahyuningtias and Nugroho, 2023; Bo, 2019; Widodo et al., 2020). Prioritizing and cultivating innovative behavior among teachers is imperative due to their substantial presence and central role in driving the educational system forward (Widiastuti and Kusmaryani, 2022; Izzati et al., 2023). Teachers with innovative behavior are better equipped to confront the challenges facing the education system, especially in an era of rapid technological advancements and global communication (Widiastuti and Kusmaryani, 2022; Izzati et al., 2023; Ibrahim et al., 2024; Ateeq et al., 2024a).

Innovative teaching encompasses applying novel and sophisticated methods and materials in teacher-student interactions, thereby nurturing students' creative thinking abilities (Hosseini and Shirazi, 2021). Teachers who possess a high degree of self-efficacy have confidence in their capacity to tackle and overcome obstacles in the classroom and beyond (Sánchez-Rosas et al., 2022; Zainal and Mohd Matore, 2021). Teachers who possess this self-efficacy are confident in their ability to solve pedagogical challenges and dedicated to lifelong learning from their experiences and environment to succeed as instructors (Musadad et al., 2022).

Unfortunately, there has been limited progress in the extent of innovative behavior exhibited by teachers in Oman over the years, which is a cause for concern (Al-Abdali and Al-Balushi, 2016). Research indicates that leadership and self-efficacy are the two most influential factors that affect teachers' innovative behavior in schools (Zainal and Matore, 2019). The creation of innovation in education relies heavily on teachers' inclination toward innovative behavior (Hasanefendic et al., 2017; George and Sabapathy, 2011; Choi and Kang, 2021). Therefore, it is crucial to prioritize efforts to nurture and empower teachers with innovative behavior.

Additionally, several researchers have provided empirical evidence of the strong and positive correlation between teachers' innovative teaching practices and the organizational (school) climate (Thatok and Siti, 2023; Medina Nilasari et al., 2023; Xiaofeng et al., 2022; Dewantara et al., 2023; Al-Refaei et al., 2024b). However, there have also been instances where the impact of school climate on innovative teaching practices was found to be insignificant. For instance, Newman et al. (2020) and Zee et al. (2024) discovered that school climate did not have a significant positive relationship with innovative teaching practices. To break this impasse, further studies are needed to investigate the effect of school climate on innovative practices among teachers.

Another gap in the literature is that earlier research (Bartlett et al., 2022; Li and Wang, 2024; Anurupa and Debdulal, 2023; Gkontelos et al., 2023) tended to look at the relationship piecemeal and independently between teachers' creative teaching approaches, school climate and self-efficacy. Even if teachers' self-efficacy is influenced by the school climate it also influences teachers' creative teaching methods (Bartlett et al., 2022; Li and Wang, 2024). Additionally, a number of empirical studies have found that instructors' innovative teaching techniques are significantly predicted by their self-efficacy (Anurupa and Debdulal, 2023; Gkontelos et al., 2023). Previous studies have not examined the precise relationship between school climate and innovative teaching practices across diverse cultural contexts, nor have they explored how teacher self-efficacy mediates these variables specifically within primary school settings. Addressing these gaps could enhance our understanding of key factors that foster culturally diverse innovative teaching practices (Ialuna et al., 2024), particularly in primary school settings. Given these shortcomings, the present study aims to scrutinize the relationships between school climate, teachers' self-efficacy and innovative teaching practices, particularly examining the role of teachers' self-efficacy in mediating the link between school climate and teachers' innovative teaching practices in the Omani school context.

Conceptual framework

The conceptual framework outlines the relationships between the three major constructs in the study. The concept emphasizes how two of these constructs—school environment and teachers'

self-efficacy—are multidimensional. Three sub-constructs of instructors' self-efficacy are found: effectiveness in managing the classroom, effectiveness in engaging students and effectiveness in teaching practices (Tschannen-Moran and Hoy, 2001). It acts as a mediator between instructors' creative teaching methods and the school climate. The links between teachers' self-efficacy, creative teaching methods and school atmosphere are illustrated by the conceptual framework (Figure 1).

Literature review and hypotheses development

School climate and teachers' innovative behavior

Organizational climate significantly influences innovative behavior, as evidenced by various studies. Organizational innovative climate triggers psychological safety perceptions, impacting improvisational behavior and creative self-efficacy moderates this relationship, highlighting the importance of organizational characteristics in fostering innovative behaviors (Xiaofeng et al., 2022; Lecic et al., 2023). Furthermore, it has been observed that an innovative work environment positively influences both organizational learning behavior and innovative work behavior. The latter serves as a mediator in the relationship between the two former constructs, highlighting the significance of an environment that fosters innovation in organizations (Dewantara et al., 2023; You et al., 2022). Additionally, there is a positive correlation between the climate of innovation within an organization and innovative behavior. This relationship is fully mediated by psychological ownership and it is moderated by task interdependence (You et al., 2022). These findings highlight the intricate interactions between various factors that impact innovation in organizations (You et al., 2022; Xu et al., 2022). According to Ionica et al. (2019), instructors in schools that have a positive organizational climate tend to be more inventive. Considering these findings, the following hypothesis is put forth:

> *Hypothesis 1 (H1): Omani primary school climate directly and significantly impacts teachers' innovative teaching practices.*

School climate and teachers' self-efficacy

School climate plays a pivotal role in nurturing teachers' self-efficacy beliefs, which are critical determinants of their professional effectiveness and ability to impact student outcomes positively (Kutsyuruba et al., 2015). As Bartlett et al. (2022) highlight in their work entitled, "Sustainability," a supportive school climate that fosters environmental justice pedagogies can enhance teachers' self-efficacy for climate action. Similarly, Li and Wang's (2024) underscores how innovative teaching practices and a sustainable learning environment contribute to bolstering academic motivation and mental well-being among students, indirectly influenced by teachers' self-efficacy. The quality of the school climate, encompassing factors. Such as collegial relationships, administrative support and opportunities for professional growth, has been consistently linked to higher levels of teacher self-efficacy across multiple studies. Kutsyuruba et al. (2015), in their comprehensive review, synthesized evidence indicating that a positive school climate is associated with improved teacher self-efficacy, which in turn positively impacts student achievement and well-being. Furthermore, specific aspects of the school climate, such as a cooperative environment and classroom autonomy, have been shown to enhance teacher efficacy and job satisfaction. Lee et al. (1991) in their seminal work, indicated that these factors play a crucial role in shaping teachers' self-efficacy beliefs. Similarly, Chester and Beaudin (1996) found that school practices like collaboration significantly influence teacher self-efficacy, which can vary based on

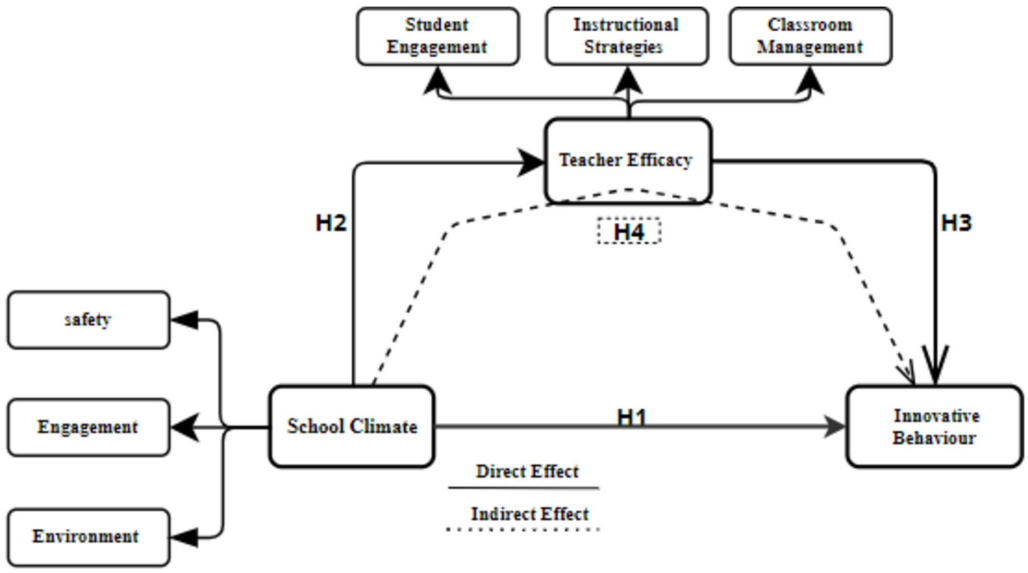

FIGURE 1
Study conceptual framework.

factors such as age and experience. Based on these findings, the following hypothesis is proposed:

> *Hypothesis 2 (H2): The school climate directly and significantly impacts teachers' self-efficacy.*

Teachers' self-efficacy and their innovative teaching practices

Teachers' self-efficacy is a key factor in encouraging innovative work behavior (IWB) among educators. Teachers' self-efficacy, defined as their belief in their capability to execute necessary actions to achieve desired outcomes, is crucial in determining their willingness to adopt and implement innovative teaching practices (Tschannen-Moran and Hoy, 2001). Research has demonstrated a positive correlation between instructors' IWB and innovative self-efficacy (ISE), suggesting that greater levels of self-belief in one's capacity for innovation translate into more inventive behaviors (Anurupa and Debdulal, 2023; Gkontelos et al., 2023). Furthermore, there is evidence connecting teacher self-efficacy (TSE) to work-related stress, motivation and job satisfaction. TSE levels in different areas of teaching are influenced by cross-curriculum skills preparation and innovative campus cultures (Sodergren et al., 2023). Furthermore, it has been observed that teachers' self-innovativeness has a major impact on their self-efficacy in distance learning and their teaching practices during difficult times like the COVID-19 pandemic. This highlights the significance of encouraging teachers to adopt an innovative mindset through professional development programs in order to improve their overall effectiveness in adjusting to new teaching methods (Frank and Nudque, 2022).

> *Hypothesis 3 (H3): Omani primary school teachers' self-efficacy directly and significantly impacts their innovative teaching practices.*

The mediating role of teachers' self-efficacy

Organizational (school) climate influences teachers' self-efficacy (Bartlett et al., 2022; Shah et al., 2022; Abigail De Arellano et al., 2023). In this context, teachers who experience good level of school climate, such as supportive leadership, collegial relationships, and professional development opportunities are likely to develop a strong sense of innovative teaching practices (Kwon, 2018; Rodríguez and Segovia, 2021). In turn, teachers' self-efficacy significantly influences their innovative teaching practices (Anurupa and Debdulal, 2023; Gkontelos et al., 2023; Sodergren et al., 2023). Teachers with a robust sense of self-efficacy are more likely to exhibit innovative work behavior (Çimen et al., 2023).

Therefore, creating an environment in schools where instructors feel confident in their abilities is crucial to promoting innovation in learning environments, which benefits professional growth and instructional quality. The relationships between teachers' innovative behavior and school climate (H1), teachers' innovative behavior and self-efficacy (H2) and teachers' self-efficacy and school climate (H3) have all been supported by empirical evidence in the previous discussions. Three main research hypotheses are developed because of these findings and will be investigated in this study. There is enough evidence based on the relationships between these constructs to speculate that instructors' self-efficacy has a mediation role (Baron and Kenny, 1986). As a result, this research anticipates that:

> *Hypothesis 4 (H4): Teachers' self-efficacy plays a mediating role in the relationship between Omani primary school climate and teachers' innovative teaching practices.*

Research methodology

Instrument

The present investigation employed a quantitative research methodology, utilizing a cross-sectional research design to gather data. Three of the 38 items on the structured questionnaire were devoted to gathering demographic data from the respondents. The pertinent metrics utilized in prior research were the basis for these questionnaire items, which were modified somewhat to suit the domain setting of the study.

1 The present study used four main scales: (1) sociodemographic details; (2) the Innovative Teaching Practices Scale developed by De Jong and Den Hartog (2008), which includes 10 items such as 'I regularly introduce new teaching methods'; (3) the Teacher Efficacy Scale, developed by Tschannen-Moran and Hoy (2001), containing 15 items across three subscales; for example "I can get through to the most difficult students" and "I can use instructional strategies that help students learn," and (4) the School Climate Scale, adapted from Bradshaw et al. (2014). Which includes 18 items such as "Teachers and students get along well in this school" and "the school's physical environment is clean and well-maintained." The reliability of each scale was confirmed with Cronbach's alpha values ranging from 0.941 to 0.976.

Respondents were asked to score statements based on how much they agreed with each statement on a five-point Likert scale. Five leaders and educators from different colleges evaluated the measuring items to determine their face validity. They offered comments on the items' length and clarity. The questionnaire's elements were then combined into a validation template and given to subject-matter experts for additional validation. These experts evaluated how well the items aligned with operational construct definitions and offered clarification feedback. Furthermore, the internal reliability of the study model for each of the three constructs, namely: teacher efficacy, innovative behavior and school climate was assessed using Cronbach's alpha.

Research context and participants

This research was carried out at primary schools in Muscat with a total of 7,303 teachers. The study provides a detailed analysis of the characteristics of the survey respondents, focusing on three key variables, namely: gender, qualification and years of experience. The data, which includes 368 respondents, was carefully examined to uncover valuable insights. The sample showed a roughly equal distribution of gender representation with 49% female respondents

and 51% male. Qualification-wise, most respondents (73%) had a bachelor's degree, a postgraduate degree was held by a lesser percentage (20%) and only a minority (7%) claimed having a diploma. In terms of job experience, the most common group reported by participants (53%) is those having 16 years or more of experience. In contrast, just 9% reported having 5–10 years of experience, while 26.1% reported having 11–15 years and 12% had fewer than 5 years. This data offers insightful information about the demography of the surveyed group, laying the groundwork for additional research and interpretation of the study's findings (Table 1).

The sampling technique employed in this study was simple random sampling. Researchers generated a comprehensive list of primary schools in the Muscat databases, which served as the sampling frame. The requisite sample size was achieved by randomly selecting staff numbers from this frame. A sample size of 368 participants was determined to be sufficient for the research objectives and the application of Structural Equation Modeling (SEM), as suggested by Hair et al. (2019) and Kline (2023). The questionnaire was administered to each teacher whose number was selected, thereby ensuring equal representation among participants.

Data analysis procedure

After screening the study data, testing the main assumptions and conducting descriptive analysis of the demographic variables using SPSS (version 26), the covariance-based SEM was employed. The model-fitting programs used for analysis was AMOS 26.0. This was done to analyze the conceptual framework of this research. It was conducted in two main steps, i.e., measurement model which is meant to ensure the data composite reliability and construct validity in terms of its convergent and discriminant validity.

Results

Measurement validation

The initial step in conducting covariance-based SEM involves establishing the measurement model to ensure composite reliability and construct validity, including both convergent and divergent validity aspects. As depicted in Figures 2, a Confirmatory Factor Analysis (CFA) was executed for the three constructs under scrutiny in this study: teachers' efficacy, school climate and innovative teaching practices. The primary aim of the CFA was to validate each dimension within the present sample.

TABLE 1 Sample breakdown.

Variable	Category	%	*N*
Gender	Male	189 51	51
	Female	179	49
Qualification	Diploma	27	7
	Bachelor	267	73
	Postgraduate	74	20
Years of experience	Less than 5 years	42	12
	5 to 10 years	34	9
	11 to 15 years	96	26
	16 years and more	196	53
Total		368	100%

The measurement model was iterated multiple times, using modification indices to identify low-loading components. Nevertheless, no items deemed objectionable were found. Results from the final measuring model that did not include the flagged items were satisfactory. Degrees of freedom (df) = 685, a p-value of 0.000 and a chi-square (X^2) value of 1910.772 all indicate a strong overall model fit. In addition, Hair et al. (2020) reported that the Root Mean Square Error of Approximation (RMSEA) was 0.070, much below the 0.08 criterion. Furthermore, the Tucker-Lewis Index (TLI) was 0.905 and the Comparative Fit Index (CFI) was 0.913 both surpassed the suggested threshold of 0.90 (Kline, 2023; Zumrah et al., 2021). According to Figure 1, these overall goodness-of-fit indices show that the measurement model fits the data quite well.

The study thoroughly evaluated the three main requirements to ensure the psychometric properties of the model: composite reliability, discriminant validity and convergent validity. Item loadings were considered acceptable because they exceeded the recommended level of 0.50 as shown in Figure 1 and Table 2 (Hair et al., 2019). Considering that the items showed significant loadings above 0.50 and that the average variance extracted (AVE) was also greater than 0.50, this suggests an appropriate convergent validity criterion (Hair et al., 2017). In addition, the composite reliability (CR) value was examined and found to be higher than the recommended standard of 0.70. This is strong evidence supporting the validity of the model (Hair et al., 2017; Ateeq et al., 2024b). Assessment of composite reliability (CR) is vital since it aids in the internal consistency and reliability of the measurement model. Table 2 below shows the convergent validity and reliability of items.

To prove divergent validity, Table 3 shows the AVE variables in a diagonal representation. Inter-factor correlations are found below the diagonal, whereas squared inter-factor correlation values, which represent shared variance, are shown above it. The discriminant validity of each inter-factor correlation is supported because it is less than 0.8. Importantly, the fact that each AVE factor has a higher value than its squared intercorrelations with all other factors clearly suggests the existence of divergent validity. Specifically, this indicates that each component of the study is distinct and does not significantly overlap, indicating that the study measures all the desired constructs.

Assessment of the structural model and testing of hypotheses

Following a thorough psychometric examination to confirm the measurement model's validity and reliability, the model underwent additional transformation into a structural model based on conjectured causal pathways in place of correlations between dimensions. By accepted best practices, only the exogenous constructs were permitted to stay correlated to account for any covariance between dimensions (Hair et al., 2017).

The hypothesized structural model was estimated using maximum likelihood estimation (MLE) and the Analysis of Structures (AMOS

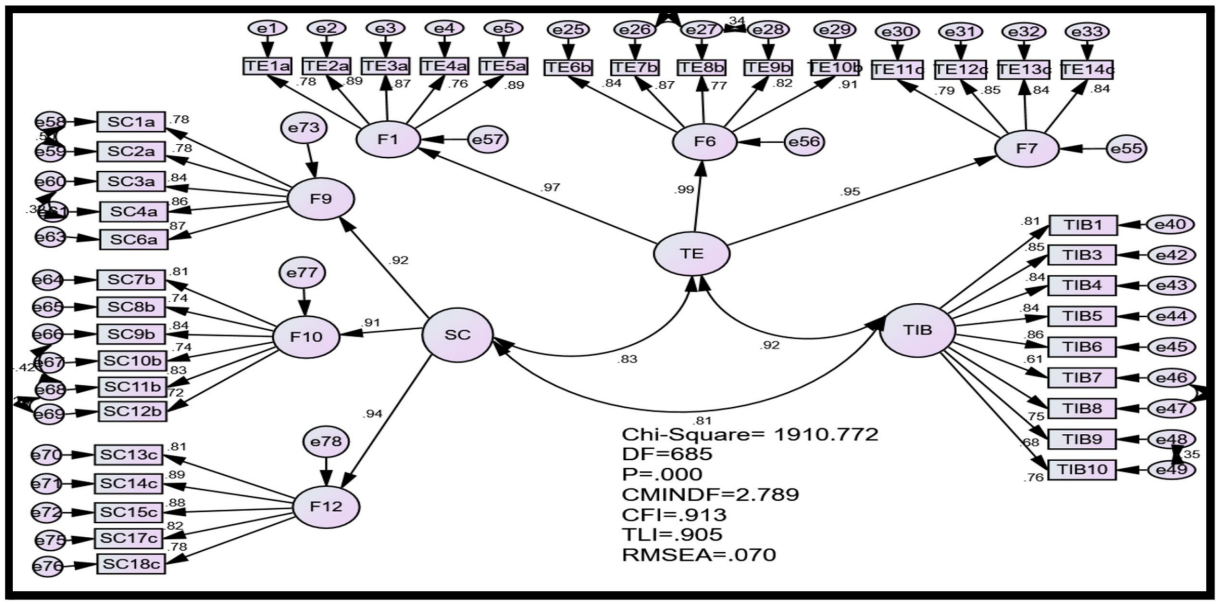

FIGURE 2
Measurement model.

version 26.0) on the collected data. The model's outcomes were evaluated using goodness of fit indices and rationality of parameter estimations. Additionally, the squared multiple correlation (SMC) between the indicators was examined. Figure 3 shows results with a chi-square (X^2) value of 1910.772, a p-value of 0.000 and degrees of freedom (df) = 685. Furthermore, the Root Mean Square Error of Approximation (RMSEA) was found to be 0.070, a substantial decrease from the recommended threshold value of 0.08 (Kline, 2023). Additionally, both the CFI at 0.913 and the Tucker-Lewis Index (TLI) at 0.905 exceeded the recommended threshold of 0.90 (Kline, 2023; Nasser et al., 2024). Hence, these findings demonstrate that the data is in line with the suggested model, proving that the structural model could adequately explain the data.

The final structural model's results are shown in Figure 2, which also shows the standardized path coefficients. According to the results, 85% of the variation in the innovative teaching practices of Omani primary school teachers can be explained by the model. Figure 2 and Table 4 show that school climate has a statistically significant direct impact on innovative teaching practices (β =0.148, $p < 0.05$) and teachers' self-efficacy ($\beta = 0.826$, $p < 0.05$) of primary school teachers in Oman.

Furthermore, teachers' self-efficacy has a direct and significant impact on the innovative teaching practices of primary school teachers ($\beta = 0.798$, $p < 0.05$). Consequently, the model offers empirical support for all three of the study's direct hypotheses, emphasizing the important connections among school climate, teachers' self-efficacy and the innovative teaching practices of Oman's primary school teachers.

Analysis of the mediating effect

The significance test for the mediating role of teachers' self-efficacy in the relationship between school climate and the innovative teaching practices of primary school teachers in Oman was conducted using a bootstrapping method, following methodological recommendations. Specifically, 1,000 bootstrap samples and 95% confidence intervals were used in a bias-corrected bootstrap approach. Table 5 shows the results of the bootstrapping procedure.

The bootstrapping analysis's findings illustrate that teachers' self-efficacy has a statistically significant mediating effect on the impact of school climate on innovative teaching practices at a level of less than 0.01. This result shows that school climate indirectly impacts the innovative teaching practices of Omani teachers at primary schools through their self-efficacy.

Discussion

This study investigated how Oman's school climate affected the innovative teaching practices that primary teachers taught their subjects, with an emphasis on the role that teachers' self-efficacy played as a mediator. The results offer strong support for the theories that teachers' innovative teaching techniques and self-efficacy are highly influenced by school climate and that self-efficacy plays a crucial role as a mediator in this relationship.

The findings supported H1 by showing that school climate significantly influences the creative teaching strategies used by Omani primary school teachers. The results align with previous research suggesting that school climate plays a significant role (Xiaofeng et al., 2022; Lecic et al., 2023; Zhou et al., 2024; Kouhsari et al., 2024). According to Dewantara et al. (2022), a creative work environment and organizational learning behavior are positively correlated with organizational climate. In a similar vein, Ionica et al. (2019) and Zee et al. (2024) discovered that instructors in schools tend to be more inventive when there is a positive organizational climate. These findings collectively underscore the

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TABLE 2 Convergent validity and reliability.

Variable	Dimension	Item	loadings	S.E.	C.R.	*P*	CR	AVE
School climate	Safety	SC4a	0.862				0.990	0.952
		SC6a	0.866	0.048	21.424	***		
		SC1a	0.783	0.054	18.138	***		
		SC2a	0.783	0.056	18.131	***		
		SC3a	0.842	0.038	25.295	***		
	Engagement	SC7b	0.807					
		SC8b	0.743	0.064	15.901	***		
		SC9b	0.836	0.053	18.370	***		
		SC10b	0.741	0.069	15.838	***		
		SC11b	0.831	0.064	18.070	***		
		SC12b	0.723	0.069	15.131	***		
	Environment	SC13c	0.810					
		SC14c	0.889	0.054	20.652	***		
		SC15c	0.876	0.056	20.218	***		
		SC17c	0.824	0.052	18.469	***		
		SC18c	0.781	0.059	17.120	***		
Teacher efficacy	Efficacy in student engagement:	TE1a	0.777				0.976	0.931
		TE2a	0.892	0.055	19.494	***		
		TE3a	0.870	0.055	18.860	***		
		TE4a	0.765	0.065	15.988	***		
		TE5a	0.888	0.053	19.397	***		
	Efficacy in instructional strategies:	TE6b	0.846					
		TE7b	0.883	0.048	22.610	***		
		TE8b	0.792	0.050	18.740	***		
		TE9b	0.818	0.052	19.763	***		
		TE10b	0.912	0.042	24.017	***		
	Efficacy in classroom management	TE11c	0.795					
		TE12c	0.841	0.056	18.369	***		
		TE13c	0.845	0.053	18.502	***		
		TE14c	0.858	0.054	18.884	***		
		TE15c	0.669	0.067	13.686	***		
Teacher innovation behavior	N.A	TIB1	0.810				0.941	0.617
		TIB2	0.790	0.048	20.935	***		
		TIB3	0.850	0.052	19.536	***		
		TIB4	0.840	0.053	19.196	***		
		TIB5	0.835	0.052	19.003	***		
		TIB6	0.855	0.052	19.685	***		
		TIB7	0.633	0.071	13.129	***		
		TIB8	0.761	0.060	16.666	***		
		TIB9	0.686	0.059	14.526	***		
		TIB10	0.765	0.056	16.799	***		

substantial role that school plays in promoting innovative behaviors among teachers, particularly in the context of Omani primary schools.

The study also confirmed that school climate significantly impacts teachers' self-efficacy, thereby supporting H2. This aligns with previous research highlighting a strong positive correlation between school

climate and teacher self-efficacy (Bartlett et al., 2022; Li and Wang, 2024). Chester and Beaudin (1996) found that school practices like collaboration significantly influence teacher self-efficacy, which can vary based on factors such as age and experience. Moreover, Kutsyuruba et al. (2015) in their comprehensive review, synthesized evidence indicating that a positive school climate is associated with improved teacher self-efficacy, which positively impacts student achievement and well-being. These findings suggest that school climate is instrumental in enhancing teachers' confidence in their capabilities, which is essential for their professional growth and effectiveness.

The research further revealed that teachers' self-efficacy significantly impacts their innovative behavior, supporting H3. This is in line with studies demonstrating a positive association between innovative self-efficacy and teachers' innovative work behavior (Anurupa and Debdulal, 2023; Gkontelos et al., 2023; Malinen et al., 2024). Sodergren et al. (2023) linked teacher self-efficacy to job satisfaction, motivation and work-related stress, noting that an innovative campus culture and cross-curriculum skills preparation can influence self-efficacy levels in various teaching aspects. During the COVID-19 pandemic, Frank and Nudque (2022) found that teachers' self-innovativeness significantly impacted their distance learning self-efficacy and teaching practices. These findings underscore the importance of promoting teachers' self-efficacy to enhance their innovative capabilities, particularly in adapting to new and challenging teaching environments.

The bootstrapping analysis indicated that the mediating paths of teachers' self-efficacy were statistically significant at a level lower than 0.01, thereby supporting H4. This finding highlights the critical role of self-efficacy in mediating the relationship between school climate and teachers' innovative teaching practices. This is in line with Hammad et al. (2024) which found that the influence of principal instructional leadership on differentiated instruction was indirectly facilitated through the mediation of teacher collaboration and teacher self-efficacy. Simbula et al. (2011) found that self-efficacy mediated the relationship between job resources (including a positive school climate) and work engagement among teachers, which can foster innovative behaviors. Similarly, Aldrup et al. (2018) reported that self-efficacy mediated the effects of school organizational climate on teachers' innovative teaching practices. Gu and Day (2013) highlighted the importance of self-efficacy beliefs in mediating the impact of school climate on teachers' motivation and commitment to innovate their instructional approaches. Similarly, Hosford and O'Sullivan (2016) revealed that a supportive school climate enhanced teachers' self-efficacy, which then promoted greater innovation in their pedagogical strategies.

TABLE 3 Divergent validity.

Construct	CR	AVE	TIB	SC	TE
TIB	0.934	0.613	**0.873**		
SC	0.945	0.850	0.807	**0.922**	
TE	0.980	0.942	0.920	0.826	**0.970**

A square root of AVE. Bold values is squared inter-factor correlation values.

Limitations and future research

The current study has two main limitations. Firstly, as its sample (368 respondents) was drawn from findings the Omani primary school teachers, it may not be fully representative of the entire education system in Oman. Hence, to obtain a more comprehensive understanding, future investigations should include

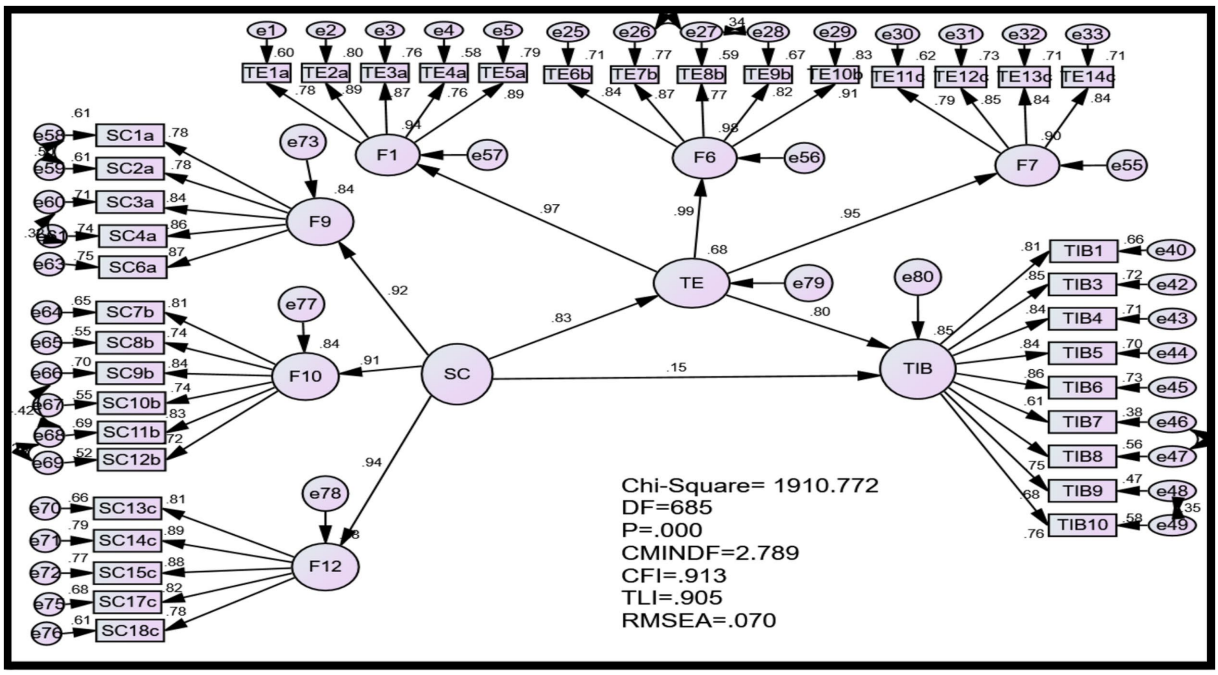

FIGURE 3
Structural model.

TABLE 4 The direct hypotheses.

Structural path		$\bar{\beta}$ (>0.2)	C.R (>0.196)	*P*-value	Decision
H1	SC → TIB	0.148	2.694	0.007	Supported
H2	SC → TE	0.826	13.696	0.000	Supported
H3	TE → TIB	0.798	11.358	0.000	Supported

TABLE 5 Bootstrap results: standardized indirect effect.

Path/effect		$\bar{\beta}$	SE	95% interval of confidence		*p*-value	Decision
				Lower	Upper		
H4	SC → TE → TIB	0.659**	0.089	0.516	0.802	0.001*	Supported

* Statistically significant. ** Practically important.

larger and more diverse samples of Omani teachers across all educational levels and from various governorates. Additionally, comparative studies between primary and secondary school teachers could offer valuable insights into potential variations in the impact of school climate and self-efficacy on innovative teaching practices.

Secondly, the study's reliance on cross-sectional data gathered through questionnaires limits the establishment of causal relationships between variables. While the quantitative data reveals associations, it does not provide in-depth explanations for why these relationships exist. Employing qualitative data could provide valuable context-specific information to elucidate the underlying mechanisms that connect school climate, teachers' self-efficacy and teaching innovative practices. Mixed-method research, which combines qualitative and quantitative methods, may provide a more thorough and all-encompassing understanding of the interactions among the study's variables.

Implications and recommendations

This study's examination of the impact of school climate and teachers' self-efficacy on innovative teaching practices in Omani primary schools offers several important implications for education. Firstly, the research indicates that fostering a positive school climate and enhancing teachers' self-efficacy can promote innovative teaching practices. Strategies to achieve this include creating a safe and supportive teaching and learning environment, encouraging teamwork among teachers, supporting the generation of original ideas and delivering high-quality educational services. Providing teachers with autonomy, nurturing trust and cohesion and offering necessary support are key actions that can help school administrations enhance innovative teaching practices.

Secondly, the study underscores the importance of psychological beliefs in influencing innovative teaching methods. Teachers with higher self-efficacy are more confident in overcoming obstacles and implementing innovative practices. Thus, interventions aimed at boosting teachers' self-efficacy, such as targeted professional development programs and supportive mentoring, should be prioritized.

The practical implications for educational policymakers and school administrators in Oman are significant. They should work to create a supportive environment that recognizes and rewards innovation. Allocating resources and incentives for teachers to experiment with new methodologies can further stimulate their willingness to innovate.

Moreover, continuous assessment and improvement are essential. Schools should systematically evaluate the impact of school climate and teachers' self-efficacy on innovative teaching practices. Implementing feedback mechanisms from teachers, students and other stakeholders can provide valuable insights, identify challenges and refine strategies to effectively foster innovation.

Finally, sharing successful examples of innovative teaching practices is crucial. Establishing platforms for knowledge exchange and celebrating innovative achievements can inspire other educators and create a collaborative atmosphere that supports a collective commitment to innovation in Omani primary schools.

Conclusion

This research highlights the crucial role of educators in fostering innovation to address educational challenges in an era of rapid advancements and global communication. The study investigated the relationship between school climate, teachers' self-efficacy and their innovative teaching practices in Omani primary schools. The findings indicated that both school climate and teachers' self-efficacy significantly influence innovative teaching practices. Additionally, school climate indirectly impacts these practices through teachers' self-efficacy.

These results underscore the importance of understanding the drivers of innovative teaching to enhance the educational environment. Integrating school climate and teachers' self-efficacy into educational plans can enable the Ministry of Education to promote innovative teaching, improving learning outcomes in Omani primary schools. The study advocates for incorporating these factors into teacher training programs to foster a culture of innovation. It also emphasizes the need for the Ministry to prioritize training in these areas to sustain innovative teaching practices in the evolving educational landscape. Overall, this study provides valuable insights for developing policies and programs to enhance innovative teaching in Omani schools.

Data availability statement

The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

Ethics statement

Ethical review and approval was not required for the study on human participants in accordance with the local legislation and institutional requirements. Written informed consent from the participants was not required to participate in this study in accordance with the national legislation and the institutional requirements.

Author contributions

SA: Writing – original draft, Writing – review & editing. DA-H: Writing – original draft, Investigation, Supervision, Writing – review & editing. AMA: Data curation, Writing – original draft, Writing – review & editing. AA: Writing – original draft, Conceptualization, Funding acquisition, Validation, Writing – review & editing. NA: Validation, Resources, Software, Writing – original draft, Writing – review & editing. SI: Validation, Formal analysis, Writing – original draft, Writing – review & editing. A-Ar: Investigation, Project administration, Writing – original draft, Writing – review & editing.

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Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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