

The Effect of Self-Efficacy on Teachers' Willingness to Innovate: The Mediating Role of Burnout

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ABSTRACT

Based on Self-efficacy Theory (SET), this study aims to explore the mechanism of self-efficacy on teachers' willingness to innovate and to verify the mediating role of burnout in it. Data were collected through a questionnaire survey, with 258 valid responses obtained from primary and secondary school teachers currently in service. SPSS mediation analysis was used for data analysis. The results of the study showed that self-efficacy had a significant positive effect on teachers' willingness to innovate, while burnout played a partial mediating role between self-efficacy and willingness to innovate. Specifically, the higher the teachers' self-efficacy, the lower their burnout level, which in turn enhanced their willingness to innovate. The findings provide theoretical support and practical basis for the intervention of teacher burnout and the enhancement of innovative behaviours, as well as new perspectives for future related research.

KEYWORDS

Self-efficacy; Burnout; Teachers' willingness to innovate; Primary and secondary school teachers

1 Introduction

1.1 Background of the study

Innovation is the first driving force to lead development and the inexhaustible source of national prosperity and national progress. 2022, the Ministry of Education issued the "Stronger Teachers Plan for Basic Education in the New Era", which puts forward the ideas and initiatives to build the foundation and improve the quality of the basic education teaching force in the new era, and helps to build a high-quality primary and middle school teaching force. Teachers are the foundation and source of education, and the high-quality development of education at all levels and in all categories requires the construction of a high-quality, professional and innovative teaching force. In educational practice, teachers are the important main body of teaching innovation, teacher teaching innovation behaviour for the improvement of students' academic performance, the improvement of the quality of teaching in schools and even the improvement of the overall quality of education plays a crucial role. Therefore, on the journey of promoting the construction of a strong educational country in the new era, exploring the influencing factors and internal mechanisms of primary and secondary school teachers' innovative behaviours is of great significance to the construction of an innovative teaching force. Therefore, this study will start from the willingness to innovate and explore the relationship between teachers' willingness to innovate and self-efficacy as well as the mediating role of burnout.

1.2 Research overview

Self-efficacy refers to an individual's belief in their ability to perform a behaviour and their belief that this behaviour will produce the expected results.

Teacher burnout is an imbalance in teachers' enthusiasm, attitudes, and self-development as a result of the constant and intense pressure of teaching. The four factors associated with teacher burnout include occupational stress, social support, self-efficacy, and job satisfaction.

Willingness to innovate is the embodiment of behavioural willingness in the field of innovation, which reflects the strength of an individual's willingness to implement innovative behaviours. Ajzen's (1991) Theory of Planned Behaviour (TPB) suggests that willingness to behave is affected by individual attitudes, the social environment, and the difficulty of the behaviour, and that it is the most direct influencing factor on the implementation of the behaviour. Some domestic scholars have defined the willingness to innovate more specifically based on the TPB theory. For example, Yi Hua (2018) regarded the willingness to innovate as the degree of an individual's acceptance of new things and new behaviours, emphasizing the individual's attitude towards innovative behaviours. Xingrui (2015) defined willingness to innovate as an individual's bias and attitude in the process of innovative activities, focusing on the role of willingness to innovate in influencing behaviour. Hu Wanli (2013), on the other hand, through the relationship between willingness and behaviour, proposed that innovation willingness is the attitude, confidence and subjective implementation probability of employees towards innovative behaviour.

Hu Weiping et al. used 1,689 primary and secondary school students as subjects and found that teachers' creative

teaching behaviours positively predicted students' creative self-efficacy. Using 453 secondary school teachers as subjects, and Wu Tianqin and Wang Health Care as subjects, Li Mingjun found that creative self-efficacy had a significant positive effect on both teachers' creative behaviours in teaching creative work and students' creative abilities. In addition, Nan Wang, Mingjun Li, and Yuandong Gu found that innovation self-efficacy mediates the relationship between work motivation, emotion, organisational innovation climate and innovation behaviour. In a similar study, Bifang Lin and Konermann found that innovation self-efficacy promotes teachers' creative teaching behaviours. Innovative self-efficacy is the construct closest to innovative behaviour and is a powerful dominant in motivating teachers to make innovative work behaviours, which directly affects their activeness in the process of innovative activities. Teachers with high innovative self-efficacy are confident in their innovative ability, and are more willing to think and explore when they encounter obstacles in their work, and are eager to solve problems in different ways, which is precisely one of the important factors for showing the need for innovative work behaviours. Teachers with low innovation self-efficacy tend to be timid and withdrawn in the process of innovation activities because of their past failure experience, and only expect to solve the problem quickly when they encounter difficult problems in their daily work, but seldom think about trying to innovate in a different way ^[1]. The results of the above study show that innovation self-efficacy has a direct positive influence effect on teachers' teaching innovation behaviours. This result is consistent with the findings of Tierney & Farmer's study on innovation self-efficacy and employees' innovative behaviours in business enterprise scenarios, and also with the findings of Jin Namchoi & Beghetto's study on college students' innovation self-efficacy contributing to their creative research and practice in the field of education. It can be seen that the direct positive effect of innovation self-efficacy on teachers' teaching innovation behaviour is very strong. This suggests that teachers' beliefs about their creativity in solving problems and achieving innovative results in the teaching process is one of the very key factors influencing their innovative teaching behaviour ^[2].

In terms of the impact of teachers' self-efficacy on burnout, previous studies have shown that individuals with high self-efficacy can effectively regulate the adverse effects of work stress on burnout, and they are more likely to view work stress and negative emotions as challenges rather than threats ^[3], and for primary and secondary school teachers, high levels of self-efficacy are conducive to greater confidence in dealing with personal distress in their lives and potential difficulties in teaching ^[4]. For primary and secondary school teachers, a high level of self-efficacy is conducive to their confidence in dealing with personal problems in their lives and potential difficulties in teaching ^[4], but when primary and secondary school teachers are not able to relieve their work stress in a timely manner, and when they are repeatedly disturbed by their work stress, it is likely that they will doubt their own teaching ability and proficiency, which will result in a low sense of self-efficacy, a loss of confidence in their teaching work, and then burnout ^[5], and studies on private college teachers have shown that there was a significant, negative correlation between the sense of self-efficacy of private college teachers and burnout of private college teachers. The correlation between self-efficacy of private college teachers and burnout of private college teachers is significant and negative. Focusing on the dimensions, there is also a significant negative correlation between self-efficacy of private college teachers and the three dimensions of burnout of private college teachers. It indicates that the higher the self-efficacy of private college teachers, the lower the degree of burnout ^[6].

Similarly, teacher burnout has a significant effect on innovation ability. If a teacher lacks the consciousness of educational research, does not want to reflect, challenge and innovate the old things, cannot experience the joy of success in self-innovation, and always "responds to changes with no changes" in the mechanical repetition of work, then the longer he teaches, the more likely he will have a sense of burnout, a sense of achievement and a sense of happiness. The longer he works, the more likely he is to develop burnout, and the more likely he is to have a sense of achievement and happiness, and the more likely he is to have a low sense of teaching efficacy, and the less likely he is to be able to further improve his own teaching ability and professional development ^[7]. Burnout reduces the degree of employees' commitment to their work, leading to a lack of enthusiasm for their work and an unwillingness to make changes at work ^[8]. Burnout and other pressure reactions, this pressure reaction makes them more inclined to adhere to the rules and regulations, according to the original rules and regulations to do things, but not willing to, do not dare to put forward innovative ideas, innovative activities. Because innovative behaviour is essentially a kind of resource investment behaviour, although this behaviour can help individuals to obtain a rapid return on resources, but it has a certain risk, not all innovative ideas can be achieved. Therefore, when the job satisfaction of grassroots civil servants decreases, burnout also occurs, which inhibits the emergence of their innovative behaviours. Focusing on a group of civil servants, this finding explores the path of influence between job satisfaction and innovative behaviours, provides new ideas for the discussion of the path of formation of innovative behaviours in civil servants, and sheds light on how burnout plays a role in the process of subjective feelings influencing proactive behaviours ^[9].

In summary, although there have been studies exploring the relationship between teachers' self-efficacy, burnout and willingness to innovate, these studies still have some limitations. For example, the research object of willingness to innovate mostly focuses on employees, and there are few related studies that refine into primary and secondary school

teachers. Although there have been studies that have explored the relationship between teacher burnout and innovativeness, these studies still have certain limitations. For example, Landeche's (2009) study had a small sample size and came from only two schools, and the sample was predominantly female and white, which may affect the generalisability of the findings. In addition, many of the studies focused primarily on definitions, causes, and consequences, with less attention paid to factors that mitigate burnout. Therefore, future research needs to further expand the sample size, conduct a longitudinal study, and include more variables (e.g., job satisfaction, self-efficacy, etc.) to more fully explore the relationship between teacher burnout and innovativeness.

1.3 Research hypothesis

Therefore, this study aims to explore how primary and secondary school teachers' self-efficacy indirectly affects their willingness to innovate through burnout, to provide theoretical support for educational practice, and to provide strategic suggestions for enhancing teachers' willingness to innovate and alleviating burnout.

This study proposes the following hypotheses and constructs a mediation model (as shown in Figure 1)

H1: Self-efficacy has a significant positive effect on teachers' willingness to innovate

H2: Burnout mediates the relationship between self-efficacy and teachers' willingness to innovate

H3: Burnout has a significant negative effect on teachers' willingness to innovate

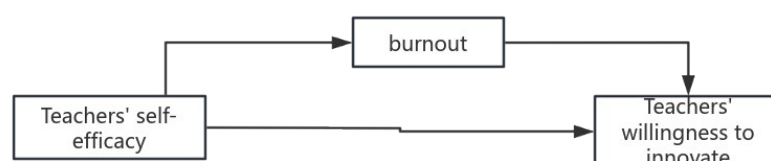


Figure 1: Hypothesised model path diagram

1.4 Purpose of the study

The purpose of this study is to test the mechanism of teacher self-efficacy on teachers' willingness to innovate, to clarify the relationship between teachers' self-efficacy and innovative behaviours, to explore the mediating role of burnout in this relationship, and to provide theoretical support and practical suggestions for enhancing teachers' innovative ability and alleviating burnout, and building an innovative teaching force.

2 Research methods

2.1 Research subjects and sample size

Convenience sampling method was used to select 300 in-service teachers in primary and secondary schools.

2.2 Measurement tools

2.2.1 MBI burnout questionnaire

The questionnaire consists of two parts: ① personal profile; ② burnout multiple-choice section with 22 entries in 3 subscales, evaluating the three dimensions of teacher burnout: emotional exhaustion, dehumanisation, and low achievement, respectively. Among them, there are 9 items for emotional exhaustion dimension, 5 items for dehumanisation, and 8 items for low achievement. The questionnaire adopts a 5-point scoring method, with emotional exhaustion and dehumanisation dimensions adopting a positive scoring method, i.e., the higher the score, the higher the degree of burnout, and low achievement adopting a negative scoring method, i.e., the lower the score the higher the degree of burnout, and the teachers have 5 answers to choose from, i.e., from "never" to "always".

2.2.2 Innovation self-efficacy scale

The Innovation Self-Efficacy Scale developed by Carmeli and Schaubroeck, which consists of eight items, was selected. The scale is based on a five-point Likert scale ranging from 1 = "not at all" to 5 = "completely". Representative items include "I am able to get results that are important to me in creative ways". The internal consistency coefficient of the scale in this study was 0.944, indicating that the scale has good reliability.

2.2.3 Questionnaire on teachers' willingness to teach creatively

Teachers' teaching innovation questionnaire developed by Wang Zhenhong et al. was used. The questionnaire has 18 questions, the internal consistency reliability of the questionnaire is 0.89, the retest reliability is 0.91, and the validity of the scale correlation is 0.61. The questionnaire adopts the Likert point scale, the higher the score, the higher the willingness of teachers to teach innovation.

2.3 Data collection method

The data were distributed through questionnaire star; the questionnaires were recovered, initially screened, and invalid questionnaires were excluded; spss was used for data entry, data cleaning, and data analysis.

2.4 Data analysis methods

2.4.1 Data cleaning and pre-processing

Firstly, check whether there are missing values in the data. For a small amount of missing data, multiple interpolation will be used for processing; if there are more missing values, the sample will be considered to be deleted. Continuous variables were standardised to standardise the data. Descriptive statistical analyses are performed to calculate the mean, standard deviation, skewness and kurtosis of each variable to understand the underlying distribution of the data. Finally, a test of variance was conducted to calculate the difference between the variables in terms of gender, and age.

2.4.2 Mediating effect analysis

Firstly, Pearson or Spearman correlation analysis was conducted to test the correlation between teachers' self-efficacy, willingness to innovate and burnout. The process plug-in of spss was used to test the mediating role of burnout between self-efficacy and willingness to innovate respectively. Confidence intervals for the mediating effects were estimated using Bootstrap method to enhance the robustness of the results.

3 Findings

3.1 Reliability and validity analysis of the questionnaire

3.1.1 Questionnaire Reliability Analysis

The 48-question Cronbach's coefficient used in this study is greater than 0.7, which has good reliability, and the test results are shown in Table 2

Table 2 Questionnaire reliability analysis

Reliability Statistics	
Cronbach Alpha	Number of terms
.818	48

3.1.2 Questionnaire validity analysis

The questionnaire was analysed for validity using KMO and Bartlett of spss and the results are shown in Table 2, the KMO value of this study is 0.697 close to 0.7 and the significance is 0.000, so it is possible to do the factor analysis with good validity.

Table 3 Analysis of validity of questionnaire

KMO and Bartlett's test		
KMO Number of Sampling Suitability Quantity.		.697
	Approximate chi-square	200.490
Bartlett's test of sphericity	Degrees of freedom	3
	Significance	.000

3.2 Analysis of differences

This section compares the differences in the dimensions of burnout, self-efficacy and willingness to innovate in teaching and learning and the overall differences between the research participants of different genders. Since the gender is divided into two types of men and women, the t-test of independence was used, and the results show that the significance is greater than 0.05, so it can be seen that there is no significant difference between genders on the

dimensions.

Table 4 Analytical test of gender differences between men and women

		Levene's variance equivalence test		Mean equivalence t-test					
		F	Significance	t	Degree of freedom	Significance (two-tailed)	Mean Difference	Standard Error Difference	Difference 95% confidence interval
									Lower limit Upper limit
Burnout	Assumed equal variance	2.352	.126	-.298	256	.766	-.048180996961487	.161869006743732	-.366945405486342 .270583411563369
	Not assuming equal variance			-.299	255.965	.765	-.048180996961487	.161253980800693	-.365734458779173 .269372464856199
Self-efficacy	Assuming equal variance	.004	.948	-.197	256	.844	-.022087	.112311	-.243258 .199085
	Not assuming equal variance			-.197	254.008	.844	-.022087	.112285	-.243215 .199042
Willingness to innovate in teaching	Assuming equal variance	.120	.729	-.108	256	.914	-.013008130081303	.120506692201203	-.250318812561850 .224302552399244
	Not assuming equal variance			-.108	255.233	.914	-.013008130081303	.120289380400286	-.249894245548559 .223877985385953

3.3 Correlation analysis

This study was operated using spss20 to verify the correlation between the variables, as shown in Table 5, above the significance level of 0.01, teacher self-efficacy has a significant positive effect on teacher's willingness to innovate, and burnout has a significant negative effect on teacher's willingness to innovate, so the hypotheses of this study, H1 and H3, are valid.

Table 5 Results of correlation analysis between self-efficacy, willingness to innovate, and burnout

Correlation		Burnout	Willingness to Teach Innovation	Self-efficacy
Burnout	Pearson correlation	1	-.493**	-.541**
	Significance (two-tailed)		.000	.000
	Number of cases	258	258	258
Willingness to Innovate in Teaching	Pearson Correlation	-.493**	1	.549**
	Significance (two-tailed)	.000		.000
	Number of cases	258	258	258
Self-efficacy	Pearson correlation	-.541**	.549**	1
	Significance (two-tailed)	.000	.000	
	Number of cases	258	258	258

**. At the 0.01 level (two-tailed), the correlation is significant.

3.4 Mediation effect analysis

3.5.1 Total effect c path analysis (teachers' self-efficacy on willingness to innovate in teaching)

From the table below, $c=0.549$, $p=0.000<0.05$, indicating that teachers' self-efficacy has a significant positive correlation effect on willingness to teach innovation.

Table 6 Analysis of total effects

Coefficient ^a		Unstandardised coefficient		Standardised coefficient	t	Significance
Model		B	Standard Error	Beta		
1	(Constant)	1.416	.209		6.778	.000
	Self-efficacy	.589	.056	.549	10.501	.000

a. Dependent variable: willingness to innovate in teaching

3.5.2 Effect of X on M (path a analysis)

From the table below, $a=-0.541$, $p=0.000<0.05$, indicating that teacher self-efficacy is significantly negatively related to burnout.

Table 7 Path a effects analysis

Coefficient ^a		Unstandardised coefficient		Standardised coefficient	t	Significance
Model		B	Standard Error	Beta		
1	(Constant)	6.816	.282		24.139	.000
	Self-efficacy	-.780	.076	-.541	-10.295	.000

a. Dependent variable: burnout

3.5.3 Direct effect and effect of M on Y (path b analysis)

From the table below, $c' = 0.399, p = 0.000 < 0.005$ (significant); $b = -0.277, p = 0.000 < 0.005$ (significant); where the absolute value of c' is smaller than c , which indicates that there is a mediating effect of M. Therefore, H2 is established in this study.

Table 8 Plot of direct effect and M on Y effect analysis

Coefficient ^a		Unstandardised coefficient		Standardised coefficient	t	Significance
Model		B	Standard Error	Beta		
1	(Constant)	2.824	.364		7.760	.000
	Burnout	-.207	.044	-.277	-4.641	.000
	Self-efficacy	.428	.064	.399	6.667	.000

a. Dependent variable: willingness to innovate in teaching

4 Discussion

This study explored the mediating role of self-efficacy between teachers' willingness to innovate and burnout. Through empirical analysis, we found that self-efficacy not only directly affects teachers' willingness to innovate, but also indirectly affects teachers' innovative behaviours through the mediating variable burnout. This finding is consistent with existing such studies on civil servants, and expanding the sample size to focus on the teacher population further confirms the indication that self-efficacy has an important moderating and mediating role in teachers' career development.

Specifically, teachers with higher self-efficacy were more inclined to adopt positive teaching strategies, thus enhancing their willingness to innovate. However, such positive innovative behaviours may be inhibited when teachers face higher levels of burnout. This suggests that burnout plays a partial mediating role between self-efficacy and willingness to innovate, i.e., teachers' self-efficacy affects their willingness to innovate by influencing their burnout levels. The discovery of this mechanism provides a new perspective for understanding the underlying mechanisms of teachers' innovative behaviours.

In addition, significant correlations were found between the three dimensions of burnout (emotional exhaustion, depersonalisation and self-achievement) and teachers' willingness to innovate. This suggests that whether teachers feel emotionally exhausted, whether they maintain emotional distance from their students, and whether they feel a sense of accomplishment affect their innovative behaviour. Therefore, interventions for teacher burnout should focus not only on their psychological state, but also on their professional identity and sense of achievement.

5 Summary and Conclusion

This study revealed the mediating role of self-efficacy between teachers' willingness to innovate and burnout through empirical analyses. The findings show that self-efficacy not only directly affects teachers' willingness to innovate, but also indirectly affects teachers' innovative behaviour through the mediating variable burnout. This finding provides important theoretical support and practical guidance for teacher education and management.

From the theoretical level, this study further enriches the application of self-efficacy theory in the field of education, especially on the relationship between teacher burnout and innovative behaviour. The study shows that self-efficacy, as an important psychological resource, can effectively alleviate burnout and thus promote teachers' innovative behaviours. This finding fits with Bandura's theory of self-efficacy, which states that an individual's self-efficacy not only influences his or her behavioural choices, but also affects his or her emotions and motivation.

On a practical level, this study provides new ideas for teacher burnout intervention. By enhancing teachers' self-efficacy, the level of burnout can be effectively reduced, thus enhancing their willingness to innovate. Therefore, schools and educational administrations should pay attention to the development of teachers' self-efficacy, and help teachers establish positive career beliefs and coping strategies by providing professional development opportunities, strengthening social support, and optimising the working environment.

In addition, this study found a significant correlation between the three dimensions of burnout (emotional exhaustion, depersonalisation and self-achievement) and teachers' willingness to innovate. This suggests that whether teachers feel

emotionally exhausted, whether they maintain emotional distance from their students, and whether they feel a sense of accomplishment affect their innovative behaviour. Therefore, interventions for teacher burnout should focus not only on their psychological state, but also on their professional identity and sense of achievement.

In summary, this study provides new perspectives for understanding the internal mechanisms of teachers' innovative behaviours and offers practical guidance for teacher burnout intervention. Future studies can further explore the interaction between self-efficacy and other mediating variables (e.g., psychological resilience, social support, etc.) to reveal the complex mechanisms of teachers' innovative behaviours more comprehensively.

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