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The impact of personality traits on enhanced academic self-efficacy and teaching innovation behavior among vocational teachers in China

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ABSTRACT

This study aims to investigate how personality trait dimensions influence teachers' academic self-efficacy and teaching innovation behavior. A total of 635 teachers from vocational schools in China participated by filling out a comprehensive questionnaire designed to assess various personality traits and their impact on teaching practices. Structural equation modeling (SEM) was employed to examine the research hypotheses. The findings revealed that teachers' personality trait dimensions, such as agreeableness, extraversion, neuroticism, and openness, have a positive and significant effect on teachers' academic self-efficacy. In contrast, conscientiousness did not demonstrate a significant role in influencing teachers' self-efficacy, suggesting that not all personality traits contribute equally to teachers' confidence in enhancing academic abilities. The findings reveal that academic self-efficacy partially mediates the relationship between teachers' personality traits and their teaching innovation behavior. This indicates that while personality traits can directly influence teaching practices, the level of self-efficacy also plays a crucial role in this dynamic. Education stakeholders should foster attractive collaborations between teachers and students, particularly by addressing teachers' personal psychological needs during the learning process. However, this study was limited to vocational teachers in China, suggesting the need for future research to explore cross-regional cultures, various educational departments, and different religious contexts to gain a more comprehensive understanding of these relationships.

Contribution/ Originality: This study adds to the body of literature by providing actual data on how personality trait factors influence instructors' academic self-efficacy and innovative teaching practices. The study also emphasizes how academic self-efficacy mediates the relationship between instructional innovation and personality factors.

1. INTRODUCTION

Education quality varies significantly between developed and developing countries. Some factors, such as the quality of resources, infrastructure, and socio-economic conditions, play a crucial role in influencing education quality. In developed nations, education systems often benefit from substantial funding, advanced teaching methodologies, and access to technology, leading to higher overall quality [1]. However, challenges such as educational inequality and curriculum relevance persist, including in China, which faces inequality of funding and access to trained teachers and also insufficient educational materials. In contrast, developing countries face hurdles like inadequate funding,

limited access to trained teachers, and insufficient educational materials. The poor performance of students in reading and numeracy abilities, among other areas, raises concerns about the quality of education [2, 3]. The learning outcomes frequently fall short of societal expectations, especially in rural regions, even with more access to schools. Despite higher enrollment, learning outcomes in rural areas, where access to vocational schools may be more restricted, usually fall short of societal expectations. This demonstrates the pressing need to improve vocational education, with an emphasis on enhancing the tools and training available to instructors in order to raise educational standards and better prepare students for the workforce.

The goal of vocational education in China is to provide students with practical skills in order to achieve economic development [4, 5]. In contrast to traditional university education, which is seen as more prestigious, it frequently encounters stigma. According to certain research, vocational schools in China are capable of offering high-quality instruction that meets the demands of the labor market, but they frequently face challenges related to funding and public perception. However, other universities typically receive more funding and attention, which results in greater teaching staff and facilities. This discrepancy may lead to a lack of appreciation for the benefits of vocational training, even if it may improve teachers' employability in terms of their character qualities [6, 7]. Personality traits of teachers have a significant impact on student results and the learning environment, making them essential to improving the quality of education. In order to ensure that vocational education effectively contributes to national development and aligns with labor market expectations, it is imperative that these difficulties be addressed and mediate the association between instructional innovation and personality factors.

Since students' comprehension and learning styles vary, personality features are a crucial teaching tool, especially in different tutorial rooms [8, 9]. Furthermore, patent teachers are more likely to provide the assistance and encouragement that students need and to enhance students' self-efficacy, enabling them to understand difficult ideas without feeling hurried or disheartened. Effective communication is also essential for supporting the clear articulation of concepts and for modifying communication methods to help students better absorb and retain knowledge [9]. Furthermore, the personality traits have a crucial role in uncovering teachers' roles during the learning process [10-12]. Teachers with good interpersonal skills can also help students develop a sense of community and encourage peer support and collaboration. In addition, self-efficacy plays an important role in assisting learning management, and the teachers' personality qualities, which are essential for improving the quality of education, are greatly influenced by their personality traits.

Although prior studies examining the role of personality traits on teachers' self-efficacy and innovative behavior have been conducted, some weaknesses include a lack of comprehensiveness and applicability of solutions. Firstly, most studies used self-reported measures of personality traits, which can introduce bias [13, 14]. Teachers may overestimate or underestimate their qualities because they are socially desirable or because they are not self-aware, which can result in false information about how good they are at teaching. This dependence on self-reporting may jeopardize the reliability of the results. Second, most studies tend to ignore the interactions between various personality traits and instead concentrate on individual features. The personality traits model is interconnected to uncover the relationship between academic self-efficacy and innovative behavior during the learning process [15, 16]. For instance, a teacher's high level of openness may be more impactful when combined with high conscientiousness, yet many studies fail to explore these interactions. However, it should be emphasized that the Five-Factor Model is a model of personality in the descriptive sense [17, 18] that is based on the consensus among researchers in two separate research traditions: the tradition associated with studies of traits using personality questionnaires and the tradition associated with studies of personality traits used in natural language.

Some of the existing research is in the business context and uses a cross-sectional approach, capturing a snapshot in time rather than providing insights into how personality traits influence self-efficacy and innovation over time [19-21]. This limitation makes it difficult to establish causal relationships and understand how changes in personality traits might affect teaching practices and outcomes. Finally, many studies are conducted in specific cultural or

educational contexts, which may limit the generalizability of the findings. Teachers' personality traits and their impacts can vary significantly across different educational systems and cultural backgrounds, suggesting a need for more diverse and inclusive research that considers these variations. Hence, how teachers' personality traits influence academic self-efficacy and how academic self-efficacy mediates the relationship between teachers' personality traits and innovation behavior are worthy of investigation.

This study provides both theoretical and practical contributions to the field of education by enhancing understanding of personality dynamics. It emphasizes how specific personality traits, as outlined in the five-factor model, influence teaching effectiveness and contribute to developing nuanced theories that explain how these traits collectively impact teachers' self-efficacy and their propensity for innovation. Additionally, this research integrates psychological theories of personality with educational theories of self-efficacy and innovation, offering a more holistic perspective on the factors that drive effective teaching practices. This integration bridges gaps between psychology and education, fostering a comprehensive understanding of the underlying mechanisms. The study also offers valuable insights for developing professional development programs aimed at enhancing specific personality traits among teachers. Understanding the impact of personality traits on teaching effectiveness can inform recruitment and selection processes in educational institutions. Schools can prioritize traits that align with their educational goals, ensuring the hiring of teachers more likely to exhibit high self-efficacy and innovative behavior.

2. LITERATURE REVIEW

Personality has been comprising individuals' characteristic patterns such as emotion and behavior during communication and interaction [22]. Self-report questionnaires are the most popular method used to measure personality traits, which are conventionally defined as internal dispositions that are mostly constant throughout time [23]. Although experts debate this idea, this conception of personality makes the assumption that personality features remain constant throughout life. For example, Alderotti et al. [24] and Buecker et al. [25] found that individuals' experience has a strong correlation to people's personality trait changes. It changes in traits are the impact of life experiences and life lessons [3]. The significance of personality traits has been covered in some studies. However, there are also advantages and disadvantages to the dynamic nature of personality traits, which in some ways cannot be understated [22, 26]. Hence, adopting a more nuanced understanding of personality that acknowledges its dynamic nature is worthwhile. This approach would provide a more comprehensive understanding of how external factors, such as socio-economic conditions, educational environments, and personal experiences, influence personality development.

The Five-Factor Model (FFM) is believed to be the most appropriate model for assessing human behavior in the workplace across any place, culture, or time [10, 11, 24]. Openness, extraversion, conscientiousness, agreeableness, and neuroticism are the five dimensions of FFM. Goldberg [27] and John and Srivastava [28] examined and considered FFM as one of the most prominent personality qualities. FFM has also been applied in various organizational programs, such as business [29] selection and organizational culture [11], educational performance [10, 14], and also organizational change [13, 17]. Personality traits are defined as psychological systems that develop people's characteristic patterns of feelings, thoughts, and behaviors [13, 30]. Personality traits have a significant influence on how personal respond to change, making them one of the primary elements influencing people's behavior [8, 31]. People's behavior and cognitive and affective responses to the organizational change were determined by their personalities [5, 32]. These traits dictate how individuals feel, think, and act to support the decision-making process and also investigate the propensity of personality models [23, 33].

3. HYPOTHESES DEVELOPMENT

Personality traits represent an individual's behavior, nature, and how they differ from others [5, 34]. It also has an important role in individuals' behavior, including in the education field among teachers [10, 35]. The personality

traits have five characteristics, namely extraversion, agreeableness, conscientiousness, emotional stability, and openness [27]. These domains have the potential to be linked to teaching quality in several ways [14, 36]. Agreeableness personality traits are mostly related to individual self-efficacy, including teachers' communication and interaction during the learning process [34, 37]. Teachers with high conscientiousness values typically have more shopping experience and knowledge than those with low conscientiousness values. Agreeableness refers to an individual's cooperative, compassionate, and friendly nature [20]. Teachers who score well on agreeableness tend to establish close bonds with their students, which promotes a cooperative and encouraging learning environment [36, 38]. This attribute increases academic self-efficacy and may lead to increased motivation and engagement by cultivating a sense of community and trust among students. Students are more inclined to take chances in the classroom and engage in active learning when they feel appreciated and understood. Additionally, teachers who are agreeable are frequently more receptive to criticism and cooperative with peers, which can result in creative teaching methods and pooled resources that are advantageous to the whole educational community.

The agreeableness teachers' dimensions such as benevolence, selflessness, conformity, and attentiveness [1, 17]. It contributes to the creation of a conducive atmosphere that supports the students' academic achievements [4]. Conversely, individuals with low agreeableness tend to skeptical attitude [35]. Despite awareness of the requirement being pivotal to prove these traits, some teachers may not be aware of the proper conduct that goes along with being caring educators [39]. Therefore, offering teacher support fosters a sense of safety for new students, significantly increasing their motivation and preventing teachers from acting avoidantly. Academic self-efficacy is more likely to be viewed as beneficial by teachers who are amiable. Individuals who exhibit more pleasant features are also more likely to view academic self-efficacy as an important factor in determining the worth and goals of the learning process.

H_1: Agreeableness has a positive effect on teachers' self-efficacy.

Teachers who are diligent are more likely to consider the educational process and results beneficial to the learning process [29]. Dependability, organization, and diligence are the personal traits of conscientiousness. Teachers who score high in conscientiousness are typically well-prepared, set clear goals, and maintain high standards for themselves and students' performance [20, 40]. This trait enhances academic self-efficacy and also makes individuals more likely to implement effective lesson plans and classroom management strategies, leading to better student outcomes. Their organized approach allows them to innovate by systematically evaluating and refining their teaching methods. It is more likely that conscientious educators will be reliable, diligent, self-disciplined, and persistent [14, 39]. Furthermore, what contributes to the teacher's persistence is still unclear, and even less so when there are new teachers who do not choose to remain in the school organization [29, 33]. Additionally, educators who possess the personal traits of diligence and perseverance will be successful [40, 41]. It proves that the capability to solve problems encountered and be less inclined to the problem of exhaustion among teachers [31, 42]. In addition, diligent educators are more likely to pursue professional development, seeking innovative methods and tools to improve their instruction and promote an innovative school culture.

H_2: Conscientiousness has a positive effect on teachers' academic self-efficacy.

Students' engagement and excitement for learning can be increased by extroverted teachers who frequently foster lively and stimulating learning settings that encourage sociability, assertiveness, and enthusiasm. The extroversion dimension has a positive correlation with teachers' self-efficacy [43]. It can lead to stronger connections with students, promoting a positive classroom atmosphere that encourages risk-taking and creativity. Furthermore, teachers who exhibit high levels of extraversion can effectively model and carry out these behaviors in the classroom, offer pupils moral support, and promote conversations throughout the learning process [3, 18]. This dimension facilitates teachers in creating a welcoming learning environment [44]. It also connects to students' academic achievement and boosts academic self-efficacy [35, 41]. Extraverted teachers are also more likely to collaborate with peers, share innovative practices, and participate in professional networks, further contributing to a culture of innovation within their educational settings.

H_5: The extraversion has a positive effect on teachers' self-efficacy.

Neuroticism is characterized by emotional instability and anxiety. While high levels of neuroticism can negatively impact a teacher's self-efficacy and innovative behavior [19, 37]. It is essential to recognize that some degree of emotional awareness can lead to greater empathy and understanding of students' challenges. Teachers who manage their neurotic tendencies effectively can use their experiences to develop resilience and adaptability in the classroom [2, 30].

Teachers can foster a growth mindset in themselves and their students, encouraging a culture of learning from mistakes and embracing challenges towards vulnerabilities [1, 16, 45]. Because teacher's neuroticism and extroversion to have a positive motivation and academic self-efficacy [4, 37]. Teachers with neurotic personality traits also have good communication and interaction skills [6]. Personality qualities also play a crucial role in enhancing teachers' academic self-efficacy and the quality of learning. Furthermore, teachers with conscientious personality qualities also have higher motivation to accomplish school and education goals.

H4: The personality trait of neuroticism has a positive effect on teachers' academic self-efficacy.

Inventiveness, curiosity, and a readiness to accept novel concepts are traits of openness to experience [9, 46]. Open-minded teachers are more inclined to try out new teaching strategies, incorporate cutting-edge technology, and modify their courses to accommodate their students' varied requirements. Teachers who exhibit the openness personality characteristic are also more likely to use social media tools like stickers to promote learning quality [19, 47]. Therefore, educators should exhibit traits of openness practices, including thoughtfulness, analysis, creativity, and innovation [15, 48].

Hence, the teacher's academic self-efficacy must also use technology to create new knowledge and find more suitable solutions [26, 39]. This trait enhances academic self-efficacy, as open-minded teachers are more confident in their ability to implement novel approaches and respond to changing educational demands. Their willingness to explore new ideas can stimulate students critically and creatively during the learning process.

H_5: The openness has a positive effect on teachers' academic self-efficacy.

Academic self-efficacy plays a crucial role in influencing students' learning experiences and teachers' teaching behaviors [49, 50]. The levels of self-efficacy boost communication of ideas and the evaluation of criticism among teachers, as well as teachers' innovative behaviors towards collaborative learning [2, 7, 12]. Furthermore, teachers may feel inspired to implement group projects effectively, make sense of feedback, and strive to meet a commitment to learning quality. This proactive approach can motivate teachers to innovate assessment methods and ensure feedback is timely [14, 29]. Teachers might experiment with novel methods of giving feedback, including peer evaluations or digital platforms, to improve learning results and student engagement.

H_6: Self-efficacy has a positive effect on teachers' innovative behavior.

The academic self-efficacy plays an important role in mediating the relationship between predictor and outcome variables in the education field [10, 51]. Teachers are more inclined to try out novel concepts and instructional techniques when they think their pupils are capable and driven [49, 52]. This may result in a more vibrant learning atmosphere where creative approaches are valued and promoted. Teachers who are academically self-efficacious might demonstrate this in various ways, which can also encourage their creative activity [38, 45]. It also facilitates the relationship between teachers' personal traits and innovative behavior. In addition, teachers may feel more inclined to exchange ideas and knowledge in teaching practices [20, 33]. This cooperative discussion may result in the creation of new ideas and the application of creative instructional techniques. Moreover, teachers are more likely to be involved in innovation-focused networks when they believe that new ideas or solutions are important. They might start working together with other groups in the organization to implement effective concepts in various settings, which would improve the educational process as a whole.

H_7: Self-efficacy has a positive effect in mediating the relationship between teacher personal traits and innovative behavior.

4. METHODOLOGY

4.1. Data Collection and Analysis

In order to apprehend the variance in teachers' personality traits and motivation to be innovative in behavior during the learning process, this study gathered data from teachers in vocational schools around the Yangtze River delta region in China, namely, Shanghai, Jiangsu, Zhejiang, and Anhui provinces. The target participants are active teachers in vocational schools or universities. Additionally, the teachers' locations make it more important to discover the personal predictors of teachers' innovative teaching towards academic self-efficacy. These teachers belong to different departments, such as business, economics, engineering, health, and education. However, the university offices of the respective organizations were contacted, and their responses were obtained before data collection. The questionnaires were translated into the local language from the original English. This study also applied common method variance (CMV) to reduce potential bias issues by providing the questionnaire anonymously, and measurement items were randomly arranged [53]. The structural equation model (SEM) was additionally used to examine the correlation of research constructs using AMOS and SPSS software.

4.2. Measurement

Teachers' personality traits have five indicators that refer to the original concept by John and Srivastava [28]. Teachers' academic self-efficacy refers to Byrne et al. [54], which developed capacity and confidence in the learning process and also exchanged information and knowledge activities with other teachers. Teachers' innovative behavior for the learning process refers to Lambriex-Schmitz et al. [33], which comprises seven instruments. Age, gender, and department were applied as control variables. A complete data collection was conducted from August to November 2024. A total of 741 participants filled out the online questionnaires. Final 635 survey forms were utilized for final analyses, representing 85.69% (see Table 1).

Table 1. Respondent demographics.

Demographic Items	Frequency	Percentage (%)
Gender		
Male	321	50.6
Female	314	49.4
Age		
25-35 year old	156	24.6
36-50 year old	141	22.2
51-55 year old	166	26.1
> 55 year old	152	24.1
Education		
Bachelor Degree	211	33.2
Master Degree	237	37.3
Doctoral Degree	187	29.5
Experience as teacher		
1-10 years	134	21.1
11-20 years	273	42.9
>20 years	228	35.2

5. RESULTS

5.1. Correlation Results

This study applied post-detection methods for the common latent factor (CLF) (see Table 2). The correlations between the variables in this study were found to be significant for further analysis. In addition, the new study followed the advice of Hair et al. [55] by using a two-step methodology that included confirmatory factor analysis (CFA) and structural equation modeling (SEM) to assess research hypotheses.

Table 2. Correlation matrix for measurement scales.

Constructs	Mean	SD	TA	TC	TE	TN	TO	SE	IT
TA	5.94	0.72	**0.866**						
TC	5.64	0.61	0.660**	**0.886**					
TE	5.43	0.88	0.274**	0.689**	**0.777**				
TN	5.65	0.66	0.673**	0.538**	0.283**	**0.798**			
TO	4.70	1.12	0.403**	0.318**	0.244**	0.436**	**0.784**		
SE	5.50	0.77	0.543**	0.475**	0.254**	0.721**	0.356**	**0.746**	
IT	5.39	0.82	0.592**	0.525**	0.309**	0.722**	0.473**	0.620**	**0.814**

Note: TA: Agreeableness, TC: Conscientiousness, TE: Extraversion, TN: Neuroticism, TO: Openness, SE: Self-Efficacy, IT: Innovative Teaching
SD: standard Deviation
Diagonal elements are the square roots of the AVE for each construct
Pearson correlations are shown below the diagonal
**Significant at $p < 0.01$.

5.2. Measurement Model

The confirmatory factor analysis (CFA) results showed an acceptable fit with the data for the model of this study include $\chi^2/df = 3.362$, goodness-of-fit index (GFI) = 0.952, non-normed fit index (NFI) = 0.954, comparative fit index (CFI) = 0.954, incremental fit index (IFI) = 0.955, root mean square error of approximation (RMSEA) = 0.046. Composite reliabilities (CR) and average variance extracted (AVE) for each construct are greater than 0.800 and 0.600, respectively. Additionally, each item's factor loading correlations were greater than 0.700. Furthermore, the Cronbach's α for all constructs was greater than 0.800, indicating good reliability for all measurement items (see Table 3), constructs, and convergent validity [55]. The results from the analysis explain the use of the CFA as all the criteria well surpassed the hypotheses testing.

Table 3. Measurement results.

Constructs	MLE estimates factor loading	Composite reliability (CR)	Average of variance extracted (AVE)	Cronbach's α
Personality traits				
Agreeableness		0.877	0.587	0.881
I am not distant and frigid.	0.726			
I am a forgiving person	0.810			
In general, I am trustworthy.	0.755			
I treat everyone with consideration and kindness.	0.804			
Conscientiousness		0.866	0.619	0.875
I always complete tasks thoroughly	0.758			
I am a trustworthy employee	0.818			
I keep going until the assignment is completed.	0.776			
I plan and abide by the rules.	0.793			
Extraversion		0.821	0.605	0.882
I have a lot of energy	0.737			
I create a lot of excitement.	0.828			
My personality is assertive	0.765			
Neuroticism		0.875	0.637	0.890
I am simply upset	0.765			
I am always tense	0.828			
I remain peaceful in tense circumstances.	0.794			
I concern about education	0.804			
Openness		0.865	0.616	0.887

Constructs	MLE estimates factor loading	Composite reliability (CR)	Average of variance extracted (AVE)	Cronbach's α
I have a vigorous mind	0.743			
I have a lot of different questions.	0.835			
I cherish encounters that are artistic and beautiful.	0.811			
I am creative	0.746			
Self-Efficacy		0.863	0.557	0.874
I seek assistance from my friends when I am struggling with certain subjects.	0.737			
I explain subject matters to my friends	0.714			
I interpret the criticism I receive on my assignments.	0.762			
I try my best to complete assignments by the due date.	0.768			
I am certain that I can finish the degree in four years.	0.750			
Innovative Teaching		0.932	0.663	0.890
Speaking with coworkers about specific changes that could be made at work	0.813			
I talk to coworkers about my own suggestions for enhancements.	0.761			
I'm sharing my personal thoughts on the fundamental issues at work.	0.843			
Educating others on the significance of a recently developed concept or solution.	0.827			
I'm participating in networks that focus on innovation or new concepts.	0.843			
In order to apply the concept in additional contexts, I am starting to collaborate with other groups within the organization.	0.819			
I am comparing the results of the implemented idea with the predetermined, original goals.	0.791			

Note: Model fit: $\chi^2/df = 3.362$, GFI = 0.952, NFI = 0.954, CFI = 0.954, IFI = 0.955, and RMSEA= 0.046.

5.3. Structural Model

Most of the hypotheses are accepted (see Figure 1). For instance, teachers' agreeableness, extraversion, and neuroticism have a positive effect on self-efficacy ($\gamma 11 = 0.287$, $p<0.005$; $\gamma 13 = 0.215$, $p<0.01$; $\gamma 14 = 0.366$, $p<0.001$), hence supporting H1, H3, and H4. Meanwhile, teacher conscientiousness and openness do not have a significant effect on self-efficacy ($\gamma 21 = 0.155$, $p>0.005$; $\gamma 51 = 0.105$, $p>0.001$). H2 and H5 are unsupported. Furthermore, self-efficacy plays an important role in influencing teacher innovation in teaching in the classroom ($\beta 21 = 0.571$, $p<0.001$), which means that H6 is supported. Interestingly, the value of R^2 is 0.533 (53.3 percent), indicating that teachers' self-efficacy is affected by personality traits. It implies that the variation in teachers' self-efficacy depends on the variation in personality traits. Furthermore, the teachers' innovation teaching value of R^2 is 0.589 (58.9 percent) for the combined effect of independent variables (e.g., teachers' personality traits and self-efficacy), and 41.1 percent of the variance remains unexplained or is due to other factors not accounted for in the model.

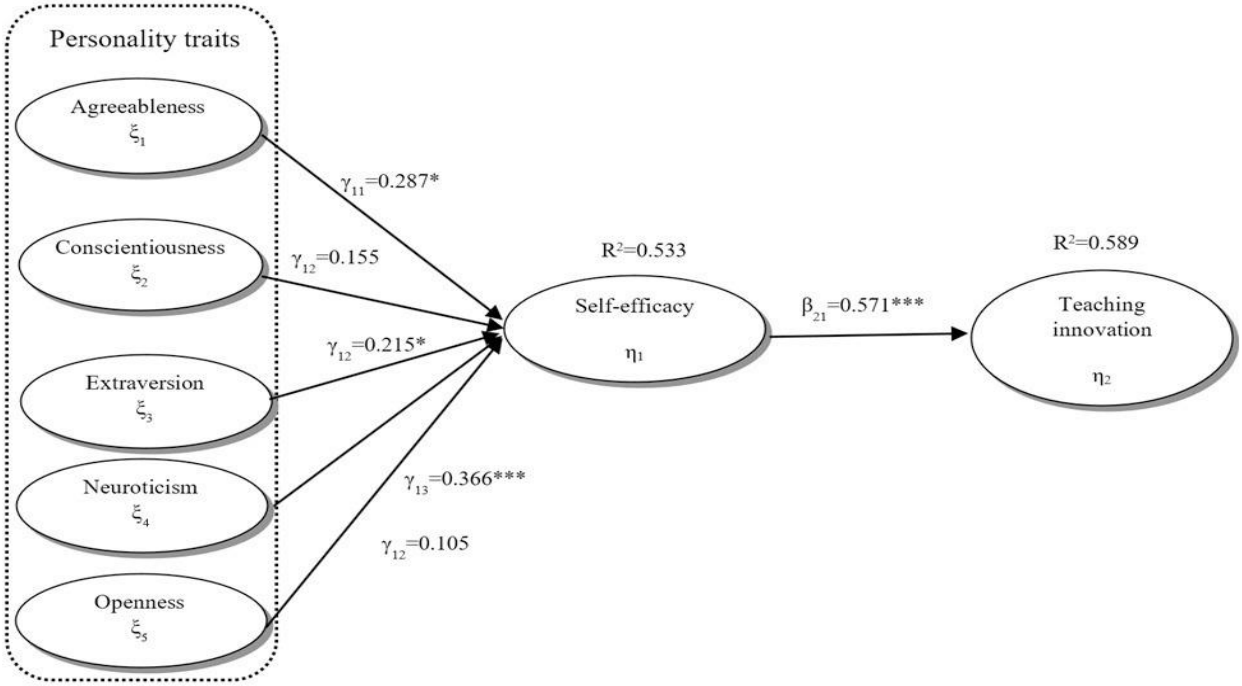

Figure 1. Structural model.

Note: Model fit: $\chi^2/df = 3.395$, GFI = 0.929, NFI = 0.927, CFI = 0.929, IFI = 0.929, and RMSEA= 0.053.
Significant at *: $p < 0.05$, ***: $p < 0.001$.

5.4. Direct and Indirect Results

This study tested the impact of teachers' personality traits on teachers' innovative teaching, both directly and indirectly, through self-efficacy, using the Hayes approach. Table 4 shows that teachers' personality traits impacted teachers' teaching innovation directly and indirectly towards self-efficacy.

Table 4. Mediation result.

Direct effect			**β**	***t***		**95% CI**
Agreeableness	→	Teacher innovation	0.416	10.500***		(0.338, 0.494)
Conscientiousness	→	Teacher innovation	0.400	8.862***		(0.312, 0.489)
Extraversion	→	Teacher innovation	0.152	5.089***		(0.093, 0.210)
Neuroticism	→	Teacher innovation	0.710	14.615***		(0.615, 0.805)
Openness	→	Teacher innovation	0.213	9.145***		(0.167, 0.259)
Indirect effect				B	SE	95% CI
Agreeableness	→	Self-efficacy	Teacher innovation	0.263	0.036	(0.195, 0.338)
Conscientiousness	→	Self-efficacy	Teacher innovation	0.305	0.038	(0.232, 0.380)
Extraversion	→	Self-efficacy	Teacher innovation	0.137	0.027	(0.087, 0.192)
Neuroticism	→	Self-efficacy	Teacher innovation	0.185	0.040	(0.106, 0.265)
Openness	→	Self-efficacy	Teacher innovation	0.136	0.021	(0.097, 0.180)

Note: ***Significant at $p < 0.001$.

6. DISCUSSION

The personality trait of agreeableness significantly influences the teacher's academic self-efficacy. Teachers who exhibit high levels of agreeableness, characterized by traits such as being warm, forgiving, trusting, and considerate, tend to foster a supportive and collaborative learning environment. This positive atmosphere benefits students and enhances the teachers' own self-efficacy in several ways. Firstly, agreeable teachers are more likely to seek help from colleagues when faced with challenges in subject matter. Teachers are more likely to ask for help to find the best solution during the learning process. It boosts their confidence in handling academic difficulties. This result aligns

with preliminary studies that found that teachers' agreeableness can foster a sense of accomplishment, reinforcing confidence during the learning process and promoting collaboration, receptiveness to feedback, and a strong sense of responsibility [18-20, 35]. It proves that the reciprocity relationship among teachers is inevitable to enhance teachers' academic self-efficacy. The personality trait of conscientiousness does not have a significant effect on influencing teacher academic self-efficacy. It means that teachers who exhibit high levels of conscientiousness, characterized by traits such as thoroughness, reliability, perseverance, and planning, tend to approach their professional responsibilities with a strong sense of duty and commitment [11, 16]. This trait insignificantly influences various dimensions of their academic self-efficacy due to the low level of conscientious teachers in the class and school. This is crucial due to a good understanding of subject matter, which empowers teachers to seek help from colleagues when needed to support and enhance their knowledge and teaching effectiveness. It also confirms that the preparation and understanding of the concepts clearly have a pivotal role in reinforcing teachers' knowledge and teaching abilities [16, 21, 43]. Hence, the conscientiousness of teachers is needed to enhance the development of positive, constructive criticism. It also allows teachers to refine their skills and adapt teaching strategies, which subsequently boosts their confidence in academic capabilities. In addition, the teachers' trait of conscientiousness needs to be promoted to enhance teacher academic self-efficacy towards promoting diligence, collaboration, receptiveness to feedback, and a strong sense of responsibility. The personality trait of extraversion significantly influences teacher academic self-efficacy, as it encompasses characteristics such as energy, enthusiasm, and assertiveness. A lively and appealing classroom atmosphere is another common result of extraverted teachers. The extraverted dimension of teachers is more approachable to students and peers [2, 36]. It also motivates those involved in school to face the difficulties of learning. Additionally, assertiveness enables educators to cultivate a collaborative attitude that improves comprehension and mastery of the quality and substance of learning. Furthermore, the passion that extraverted educators display can spread, inspiring them to clearly and passionately convey concepts to their students and peers [41, 46]. It not only reinforces their own knowledge but also boosts their self-efficacy as they witness the positive impact of explanations on others' learning [16, 45, 49]. Furthermore, extraverted teachers are frequently more open to criticism since they see it as a chance for improvement rather than a critique. It fosters teamwork, clear communication, openness to criticism, and a strong sense of accountability, as well as their skills and efficacy in the classroom. The personality trait of neuroticism plays a significant role in influencing teachers' academic self-efficacy. Teachers with high levels of neuroticism may encounter difficulties that impair their confidence and efficacy in various academic contexts. Furthermore, the tendency to worry and feel tense can lead to anxiety and stress, making teachers hesitant to seek assistance from their peers. This finding aligns with preliminary studies conducted by [18, 19, 32], which identified that valuable support and resources could enhance understanding and teaching effectiveness during the learning process. Additionally, a teacher's ability to communicate concepts to students may be affected by the emotional instability associated with neuroticism. Moreover, neurotic teachers may struggle to interpret feedback on their assignments. The persistent worry and tension experienced by neurotic individuals can also hinder their ability to fulfill commitments. This evidence suggests that the trait of neuroticism can negatively influence teacher academic self-efficacy by creating barriers to seeking valuable sources and information.

The personality trait of openness insignificantly influences teacher academic self-efficacy. It proves that the level of curiosity, creativity, and a willingness to explore new ideas plays an important role in enhancing teachers' academic self-efficacy. It also demonstrates that teachers who exhibit high levels of openness are often more adaptable and innovative, which can enhance their confidence and effectiveness in various academic dimensions. This is in line with prior studies that revealed that teachers with an active imagination and a curious mindset are more likely to enhance their performance [31, 32, 44, 46]. The teacher's openness to new perspectives encourages them to engage in collaborative discussions, allowing them to gain insights and solutions that enhance their understanding and promote action to shared knowledge, reinforcing their self-efficacy. Furthermore, teachers who exhibit high levels of openness are frequently more responsive to feedback on assignments, and a growth mindset is fostered by an appreciation of

artistic and aesthetic experiences. Moreover, it enables teachers to see constructive criticism as a chance for growth rather than a failure. The academic self-efficacy dimensions significantly influence teachers' innovation behavior in the classroom. It demonstrates that the teachers' confidence and abilities, as reflected in their willingness to enhance knowledge and provide valuable feedback to other teachers and students, have a crucial role in enhancing learning innovation. Teachers who actively seek help from colleagues when facing subject matter challenges demonstrate a collaborative mindset with regard to fostering an environment where exchanging ideas about concrete changes at work becomes a natural extension of interactions [38, 42]. Teachers contribute to a culture of innovation, encouraging others to share their insights and solutions towards discussing personal ideas for improving education and learning quality. Teachers with high self-efficacy are also more inclined to voice their thoughts regarding fundamental issues at work by coming up with creative solutions [49, 50]. In addition, teachers who feel capable and supported are more inclined to participate in networks focused on innovation. Teachers' confidence in skills has become a catalysator to look for opportunities to work together with other groups and implementing fresh concepts [26, 30]. This program not only improves teachers' personal instructional strategies but also supports the organization's larger innovative culture. Lastly, educators who have high levels of academic self-efficacy are more inclined to compare the outcomes of concepts they have put into practice with pre-established objectives.

7. CONCLUSION AND LIMITATIONS

Educational outcomes and classroom innovation are greatly influenced by the interaction between academic self-efficacy and teacher personality traits. This study emphasizes the important role that agreeableness plays in teacher self-efficacy by showing that teachers who are kind, understanding, and trustworthy foster a positive learning environment that boosts their self-esteem and productivity. The collaborative discussions not only enhance understanding but also promote a culture of cooperation among teachers and students. Furthermore, teachers need to develop professional initiatives to enhance conscientiousness and self-efficacy during the learning process. In addition, teachers who are curious and willing to explore new ideas can improve their skills and knowledge. This can also lead to greater receptiveness to feedback and a willingness to engage in collaborative discussions, further reinforcing their self-efficacy. Teachers and students can have meaningful conversations and work together to solve problems in an innovative environment fostered by this collaborative approach. To foster positive personality qualities and increase academic self-efficacy, educational institutions can create an environment that promotes creativity. This study offers important new information about the connection between academic self-efficacy and teacher personality qualities. Professional development tactics and teaching effectiveness can be improved by understanding how personality trait dimensions namely, agreeableness, conscientiousness, extraversion, neuroticism, and openness affect self-efficacy. Therefore, a culture of trust and cooperation should be prioritized by school authorities. This study also demonstrates how agreeableness contributes to a positive learning environment. Specific interventions are necessary to address the negative impacts of neuroticism on self-efficacy and to help educators develop coping strategies. University leaders should offer stress management seminars and mental health resources to facilitate teachers' and students' psychological well-being. Although openness was found to have a minimal effect on self-efficacy, its capacity to foster adaptability and creativity should not be overlooked; thus, educators should promote a culture of inquiry and discovery.

The significant influence of agreeableness on teacher academic self-efficacy suggests that fostering a supportive and collaborative environment is essential. Hence, educational institutions should prioritize the development of a culture that encourages trust and communication among teachers. Teachers feel comfortable seeking help and sharing ideas, which can enhance self-efficacy and teaching effectiveness. Furthermore, educational decision-making should promote traits such as reliability and planning to empower teachers' duties. Effective lesson planning and time management are key components of training sessions to improve teachers' skills and enhance education quality. In addition, the positive impact of extraversion on self-efficacy underscores the importance of engagement among

students and teachers. Universities should provide opportunities for teachers to develop their communication and interpersonal skills to create dynamic and engaging classroom environments. Universities should also implement programs that address emotional well-being, such as counseling services for stress reduction. Hence, educational institutions can mitigate the negative effects of neuroticism on self-efficacy and overall teaching effectiveness by equipping teachers with coping strategies and emotional resilience. A clear link between teacher academic self-efficacy and innovation behavior demonstrates the importance of recognition programs for innovative teaching and enhancing teachers' confidence. This study has several limitations. Firstly, the reliance on self-reported measures for assessing personality traits and academic self-efficacy may introduce bias, as teachers might overestimate or underestimate their characteristics and abilities. Future studies need to use a cross-sectional approach to obtain more comprehensive results. This study was limited to vocational schools in China. Future research should apply a longitudinal method to gain a comprehensive understanding of how these traits develop and influence self-efficacy over time. Furthermore, the study's focus on specific personality traits suggests that future research should explore the interplay between personality traits and external factors, such as the school environment and support systems. Future studies could also examine the role of emotional intelligence in mediating or moderating the effects of personality trait dimensions on self-efficacy.

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