Journal of Education and Learning (EduLearn)
Vol. 19, No. 4, November 2025, pp. 2012~2023
ISSN: 2089-9823 DOI: 10.11591/edulearn.v19i4.22934

Investigation of antecedents to teacher effectiveness of higher education sector in India

Damanpreet Kaur, Hemant Sharma
GNA Business School, GNA University, Phagwara, India

Article Info

Article history:

Received Aug 1, 2024
Revised Dec 12, 2024
Accepted Mar 19, 2025

Keywords:

Emotional intelligence
Higher education institutions
Proactive personality
Self-efficacy
Teacher effectiveness

ABSTRACT

This paper aims to examine the variables involved in improving Teacher effectiveness through self-efficacy (SE) while focusing on higher education. The authors collected data from 600 usable responses from Northern India. The data was analyzed by structural equation modelling using analysis of moment structures (AMOS). The results indicate that drivers such as emotional intelligence (EI) and proactive personality (PP) contribute to the raised levels of SE, working as a mediating variable, which in turn triggers teacher effectiveness (TE) positively in the field of higher education. This study provides valuable insights for educational institutions to improve TE. The drivers propose that achieving widespread recognition of these factors necessitates implementing many training programs and workshops to boost TE. The contribution lies in providing a holistic study of TE drivers and the mediating role of SE in enhancing overall TE. This study is a new endeavor since it combines EI, PP, SE, and TE into a unified research model and tests it through empirical data. This study explores topics in research that have not been studied before by examining the interconnections between these variables with the context to higher education.

Corresponding Author:

Damanpreet Kaur
GNA Business School, GNA University
Phagwara, Punjab, 144401, India
Email: damankaur21@gmail.com

1. INTRODUCTION

Higher education institutes (HEIs) are committed to training scholars, teachers, and students who can succeed internationally while connecting to the global knowledge economy [1]. Teachers of HEIs play a vital role in spreading knowledge for societal benefits [2]. In recent years, the significance of TE in HEIs has increased worldwide [3]. Teacher effectiveness (TE) refers to teacher performance that impacts student learning outcomes, whereas self-efficacy (SE) plays a significant role in shaping TE [4]. In Bandura [5] "SE" theory, SE is a psychological trait processed by a person and their belief in their ability to succeed in a certain behavior. The theory suggests that behavior (performance) is a significant outcome of SE, where TE is considered a performance [6].

Past research on TE mainly focused on examining the "what" aspect of TE [7]. Whereas fewer studies investigate the "how" of improving TE. Analyzing a diverse range of factors, such as gender, color, teaching experience, college, postgraduate degrees, certifications, and working tenure, reveals that these factors account for less than 8% of TE [8]. Further elucidation is required to delineate the factors contributing to the varying TE levels. A timely call facilitates enhanced understanding and focus of global

research and policymakers to explore the factors contributing to TE. This study specifically addresses several TE-related questions, with a proposed research model. These questions are:

- RQ1. How does SE influence TE in the higher education sector?
- RQ2. What are the independent factors that impact the SE of teachers in the higher education sector?

The research provides abundant evidence that SE significantly influences a teacher's behaviors [9]. Besides, empirical research on the relationship between TE and SE, especially in Northern India, is lacking. While taking a research model as a base and using structural equation modeling, we expanded the scope of scholarly literature, as it is essential to analyze the influence of several other new factors on SE and then its further impact on TE, specifically focusing on higher education.

The answers to the discussed research questions are important not only for scholars and practitioners but also for education policymakers and directors of institutions, since numerous variables are still to be developed in TE practices. The study's findings indicate that understanding the other factors through which colleges can improve TE by fostering SE attitudes while implementing targeted training and development programs for teachers.

This paper proposes a research framework that specifies driving variables for SE and its impact on TE to address the research questions. Researchers surveyed to collect data from 600 college teachers on how they evaluate these factors independently to better understand their effectiveness. The validity of the study model is confirmed by the examination of the survey data. This paper contributes in several ways. Firstly, it starts by putting a study model outlining the drivers of SE to the test. Secondly, it demonstrates how these variables have the greatest influence and suggests that they are the reason behind policymakers' decision to set up training programs. Thirdly, it presents the results on TE using the mediating role of SE through additional variables that were examined but were not included in the unified model in earlier research. The paper's conclusion addresses the limitations of the study and gives recommendations for further research topics in this area.

2. THEORETICAL FRAMING AND DEVELOPMENT OF HYPOTHESES

This section gives a theoretical basis for our research model and reviews the relevant research literature. The study takes its base from [5] SE theory emphasizes that people's emotions affect their assessments of their efficacy and explains some variation in SE; as a result, variations in teacher emotions result in variations in effectiveness, with context for teachers [10]. Several other "SE" theory [5], [11], supported the notion that an individual's self-perception influences their behavior, actions, and ultimately their performance. According to the framework, the study not only focuses on the impact of SE on TE but also adds two relevant antecedents of SE, namely "emotional intelligence (EI)" and "proactive personality (PP)," which were explored considering this context-specificity. The relevant research on TE, other factors, and their relationships will be reviewed in the next sections.

2.1. Teacher effectiveness

Some teachers are better than others at promoting the desired educational results [12]. Determining the characteristics that contribute to TE is crucial in improving education. For this reason, throughout the previous few decades, a great deal of interest has developed in the empirical investigation of teacher traits related to TE [13]. Effectiveness in education usually refers to the kinds of activities that result in learning. The definition of TE, it measures teaching quality based on regular performance [14]. Firstly, the focus of our integrative review is TE, which encompasses the cultivation of adaptive motivational patterns and the promotion of self-regulated learning [15]. Secondly, throughout a teacher's career, there is always interest in assessing their performance, but in the initial years when the advantages could be highest, this interest is especially strong. Teacher attrition is at its peak during these years [16]. Therefore, it would be helpful to focus retention efforts if it were possible to consistently distinguish between better and less successful teachers. Thirdly, to accumulate knowledge about TE over the past 35 years, academics have looked to teacher behaviors as predictors, gradually incorporating newer learning theories into their models [17], [18]. TE is a factor that neither be avoided by teachers nor administrators can avoid for the growth of the education sector in a nation [19].

2.2. Self-efficacy

SE is the ability of a person to carry out such desired actions that support valued objectives [5]. SE of teachers is defined as the assessment of the concerned capacity to project and accomplish specified actions in each professional setting [12]. SE is positively connected with desired educational results as an appealing concept [20]. It fosters continuous growth professionally [21], [22] and reflects practice [23], [24] particularly as teachers encounter emerging tasks [25]. This study addresses the gap by summarising the results of a phenomenological investigation conducted in higher education over a period.

2.3. Emotional intelligence

The term "emotion workers" is now used to describe educators, and the way teachers teach and grow professionally is greatly influenced by their EI [26]. EI's main area of interest is the way people view "their emotional world" [27]. EI is the capacity to identify emotions in both oneself and other people [28]. Its constituents include self-discipline, perseverance, zeal, and the ability to motivate oneself. People with high EI can self-regulate better [29]. Specifically, research indicates that teachers who possess EI also tend to have better levels of optimism, self-worth, and social support [30], [31] well-being, and a fulfilling life [32], [33].

2.4. Proactive personality

PP assists a person in handling pressure from the environment, seeing possibilities for growth, taking initiative, and ultimately improving performance [34]. PP people get involved in more activities positively [35]. Several investigations find an empirical connection between PP and better performance [36], [37]. The one who exhibits proactive behavior is seen as possessing a PP, which is demonstrated by a readiness to assume accountability for both innovation and constructive change [38]. High levels of self-assurance, optimism, fulfillment, and optimism are commonly associated with strong PP, along with a minor degree of anxiety, desperation, fear, and other negative affective components [39]. PP teachers are happier because they are always looking for methods to enhance their situation. Highly proactive people mostly participate in concept production, distribution, and execution [40]. To strengthen the basis of our research, we examined previous studies and practices that have been documented by academics and practitioners. We will now discuss the impacts of independent factors (EI and PP) on SE and examine how SE can affect TE further.

2.5. Teacher effectiveness as an outcome of self-efficacy

The belief in one's performance is the key indicator of a TE [41], [42]. Bandura [5], SE can be a useful tool for raising TE teachers who possess high efficacy and can exert control over their environment while taking appropriate actions to attain their desired results [43]. SE beliefs are a major determinant of how prospective teachers conceptualize their teaching abilities and are a crucial measure of the success of teacher preparation programs [44]. The effectiveness of teacher education programs is also influenced by future SE, which predicts their performance and anticipates their competency throughout [45]. Strong SE beliefs are linked with improved performance, more successful planning [46] and a greater propensity to hold their students to high-performance standards. SE refers to the teacher's ability to involve students and get the best learning results from disengaged students as well [47]. Numerous studies support the need to design training programs for teachers to boost their SE, leading to increased TE. Therefore, it can be hypothesized that: *H1. SE has a direct positive impact on TE.*

2.6. Self-efficacy as an outcome of emotional intelligence

The research is notable because it meets the need for EI and SE, which is subject and culture-specific [19], [48]–[50] also addresses the prevalent knowledge gap. Additionally, a considerable body of research indicates that EI is important in predicting SE [51] and confidence in one's abilities, which leads to efficacy [52]. In this context, studies have demonstrated the significance of SE [13] and EI [53]–[55]. Consequently, EI is one of the most important variables within the range of abilities and behavior. Research has shown a connection between EI and SE of teachers, with proof that they work together to boost teachers' performance [56] . These studies declare SE is the outcome of EI. Therefore, it can be hypothesized that: *H2. EI has a direct positive impact on SE.*

2.7. Self-efficacy as an outcome of proactive personality

The current studies have not thoroughly examined the relationship between SE and PP. It is suggested by theorists as [57] that this connection should exist. Theoretically, SE is flexible and open to change, in contrast to personality qualities that are steady and largely fixed. PP leads to better results, which boosts SE and confidence [58]. PP people are self-initiated, change-oriented, and future-focused. For instance, PP is shown to support people's SE, which in turn drives their actions and results [59]. PP tends to participate in task-related actions and strongly believes in their abilities, SE. Proactive people are more likely to take advantage of opportunities when they present themselves and use them to improve both their own and other people's conditions [38]. Taking the basis of the discussed studies, it assumes that PP is one of the factors that contribute to SE. Therefore, it can be hypothesized that: *H3. PP has a direct positive impact on SE.*

3. THEORETICAL PROPOSED MODEL

The research model for TE in higher education has been established, based on the SE theory of Bandura [5] which supports that SE is a psychological trait that a person possesses and confidence in their

capacity to succeed in a particular behavior. In other words, it suggests that behavior and performance of an individual are influenced by SE, Chapman *et al*. [6] explains TE as performance. The theory supports, that SE has a direct positive impact on TE. Since several studies examined the influence of EI on SE and its ssubsequent effect on TE, there exists a significant absence of research on the incorporation of PP in this framework, particularly in the realm of higher education. The research model fills a significant gap in the scholarly literature, here EI and PP influence SE, which subsequently impacts TE in higher education shown in Figure 1. This work clarifies the intricate interactions and cascading effects among these constructs which play a vital role in the higher education sector.

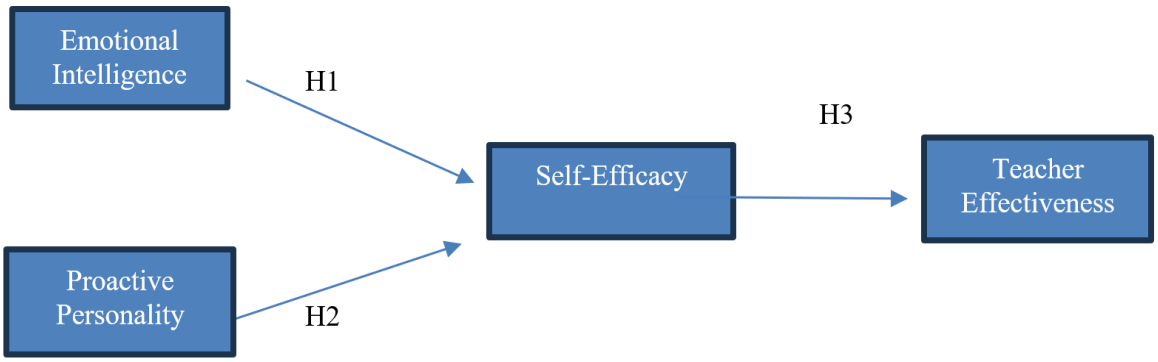

Figure 1. Hypothesized model of TE where EI, PP have a direct positive impact on SE, and SE leads to TE

The research model incorporates all research hypotheses and defines the roles of factors. The researcher used a questionnaire survey to empirically collect the data and test the hypotheses. Table 1 summarizes the questionnaire's construct dimensions, important variables, definition, and literature base. As shown in Figure 1, the research model describes the drivers, mediating role, and output in the form of TE.

Table 1. Constructs, variables, definitions, and literature base

Construct	Variable	Definition	Literature base
Drivers	EI	EI is the ability to track one's own emotions as well as those of others, distinguish among different kinds of emotions, and use this knowledge to monitor their thoughts and behaviors.	[27], [28]
	PP	PP people are often very driven, goal-oriented, go-getters and inclined to look for fresh challenges and chances.	[32], [33]
Mediating variable	SE	SE is the motivation that permits them to put out the necessary effort and perseverance to complete a task and reach their goals.	[13]–[60]
Outcome	TE	TE is the teacher's belief in their ability to effectively give education and demonstrate personal control in the teaching process.	[61], [62]

There are two drivers: EI and the PP of teachers. The mediating variable is SE in teachers. The main outcome is the teacher's effectiveness. Major research papers that are utilized as references are included in the literature base as summarised in Table 1. In addition to the higher education and respondent profiles, the questionnaire design contained the driver, mediating, and outcome.

4. RESEARCH DESIGN

4.1. Instrument operationalization

A survey instrument was employed in this study by selecting suitable measures from the literature review. To ensure significant statistical multiplicity across survey responses, the constructs were evaluated using a five-point Likert scale ranging from strongly disagree (1) to strongly agree (5). We conducted two content validity pre-tests on our instrument before starting data collection. Firstly, we asked for valuable feedback from three researchers regarding the questionnaire's ambiguity, clarity, and appropriateness. Additionally, we requested the researchers to evaluate how well the measures addressed the topic. Secondly, the survey instrument was discussed with thirty senior teachers, who were requested to assess it' for clarity, readability, completeness, and structure. The senior teachers' feedback was integrated into the final survey

instrument, which enhanced the instrument's clarity. A high content validity survey instrument was produced because of this approach. Every construct in the model was operationalized as reflective.

The PP was measured by using the condensed four-item [63] scale. The short-form teachers' SE scale (TSES), created by Dipaola and Tschannen-Moran [64], was used in the current study to gauge the SE of teachers Huang *et al*. [65] modified the short-form TSES. EI-the Wong and Law EI scale (WLEIS) was given in 2002 is one of the famous scales used to measure EI. TE scale a well-known instrument used to evaluate TE.

4.2. Data collection

The researchers used the integrated approach for data collection. The combination of qualitative and quantitative methods was used to answer the complicated research questions. We conducted interviews with teachers to learn about their perspectives and experiences, and held discussions to get better insights on the subject. To maximize the geographical diversity, the teachers of five big cities of Northern India, such as Amritsar, Panipat, Delhi, Chandigarh, and Agra, were covered. The educational institutions of these cities included universities and colleges located in these areas. The researcher also sent the survey questionnaire to respondents through email and in official WhatsApp groups with the help of top management. The teachers of 201 colleges were covered in the study. A total of 600 valid responses were received. The final sample size included "professors", "associate professors", "assistant professors", and "lecturers" of various colleges.

TE is found to be positively correlated with age, work experience, and academic background [66], [67], asserts that there exists a strong and positive correlation between student accomplishment and a teacher's certification status and degree in the subject matter they teach. It was discovered that teacher experience significantly improved students' reading test results, even when fixed instructor quality was considered [68]. One of the three criteria that positively impacted student achievement was the experience of the teachers [69]. Additionally, it has been discovered that the antecedents of SE for inexperienced and seasoned teachers vary [47]. One could argue that our theories should be influenced by our educational background and professional experience. Therefore, age, work experience, and educational background were considered control factors.

5. DATA ANALYSIS AND RESULTS

To test the proposed hypothesis, we used analysis of moment structures (AMOS) [70]. Researchers using the software have a choice between two entirely distinct model specification modes. This study attempts to investigate the connections between various variables that are hypothesized in a proposed research model [71]. Before the evaluation of the reliability and validity of the constructs and their measures, we conducted tests to determine if there was constant variance, the presence of outliers, and compliance to normality assumptions. We employed residual plots based on expected values and computed skewness and kurtosis statistics. The measurements' highest absolute skewness and kurtosis in the remaining data set were within the specified limitations. No plots were found, and the statistics did not show any significant deviations from the assumption.

5.1. Measurement validation

The AMOS result uses a two-step process: a measurement model and a structural model [72]. The validity and reliability of the items were initially determined by testing the measurement model. To evaluate the appropriateness of the data for factor analysis, two techniques were employed: Bartlett's test and the Kaiser-Meyer-Oklin (KMO) measure. Based on the KMO and Bartlett's test results, the data is deemed appropriate for factor analysis. Having a KMO rating of 0.811, which falls within the "meritorious" range, suggests that a substantial portion of the variance is likely attributable to underlying variables. The discriminant validity of the measurements was assessed using SPSS principal component factor analysis with varimax rotation. According to Table 2, exploratory factor analysis (EFA) discusses the loading of the items that were loaded into factors (discussed in Table 2), all of which were directly mapped to the theoretical constructs. Every factor loading exceeds the 0.45 threshold.

The AMOS result uses a two-step process: a measurement model and a structural model [72]. The validity and reliability of the items were initially determined by testing the measurement model. To evaluate the appropriateness of the data for factor analysis, two techniques were employed: Bartlett's test and the KMO measure. Based on the KMO and Bartlett's Test results, the data is deemed appropriate for factor analysis. Having a KMO rating of 0.811, which falls within the "meritorious" range, suggests that a substantial portion of the variance is likely attributable to underlying variables. The discriminant validity of the measurements was assessed using SPSS principal component factor analysis with varimax rotation. According to Table 2, EFA loading, the items were loaded into factors (discussed in Table 2), all of which

were directly mapped to the theoretical constructs. Every factor loading exceeds the 0.45 threshold. Here in Table 2, self-emotional appraisal (SEA), others' emotional appraisal (OEA), regulation of emotion (ROE) and use of emotion (UOE). PP1-first statement of PP, till PP4, which is the fourth statement. Classroom management (CM), student engagement (SE), instructional strategies (IS) and support from others (SO). Teachers' effectiveness has 7 statements starting from TE1 to TE7.

Table 2. Measurement model (factor loading)

Construct name	Item	EFA loading
Drivers	SEA: I have a good understanding of my own emotions.	0.841
	OEA: I am sensitive to the feelings and emotions of others.	0.842
EI	ROE: I am a self-motivated person.	0.705
	UOE: I have good control of my emotions.	0.720
PP	PP1: No matter what the odds, if I believe in something, I will make it happen.	0.779
	PP2: I love being a champion for my ideas, even against others' opposition.	0.624
	PP3: I excel at identifying opportunities.	0.762
	PP4: If I believe in an idea, no obstacle will prevent me from making it happen.	0.624
Mediating variable	CM: How much can you do to control disruptive behaviour in the classroom?	0.653
	SE: How much can you do to motivate students who show low interest in schoolwork?	0.773
SE	IS: To what extent can you craft good questions for your students?	0.649
	SO: How much can you use a variety of assessment strategies?	0.633
Outcome	T1: I do have a quest for gaining knowledge.	0.741
	T2: I am transparent.	0.896
TE	T3: I involve students in the learning process.	0.896
	T4: I do counsel students.	0.816
	T5: I am able to become a role model for the students.	0.866
	T6: I have the ability to promote the overall development of the students.	0.892
	T7: I have good analytical skills.	0.614

We looked at each item's loading importance on the constructs. Table 2 displays the item loadings for the measurement model. The findings show that every item loads substantially on the proposed constructions. This study also investigated the average variance extracted (AVE). A generally accepted measure for determining each construct's convergent validity is an AVE of 0.50 or above. Every construct has an AVE of more than 0.50, which is over this cutoff limit, as indicated. Using a threshold value of 0.70, the composite reliability of all constructs was also investigated in this study. Every construct in this investigation has composite reliabilities (CR) of 0.75 or more. Significantly, the Cronbach's Alpha score for each construct examined by the questionnaire's items is close to 0.80. Consequently, it was determined that the instruments indicated good reliability. This study examined Cronbach's α and composite reliability values to assess the dependability of the construct, and the threshold value exceeds 0.80, suggesting strong internal consistency [73].

5.2. Common method bias (CMB)

In the case of Survey research, checking CMB is important, and respondents provided self-report information and the same questionnaire was used to gather data for the same amount of time, we investigated whether CMB increased the risk of construct correlations [74]. Statistical analyses were conducted to evaluate the degree of CMB. Numerous statistical methods have been devised by researchers to account for the impact of CMB in survey-based study designs [75]. We used the Harman single-factor test and to perform the test, all the measures were loaded into an EFA. The result of 16% variance in the study is satisfactory and less than the ideal percentage of 50 and suggests that the data is not significantly affected by CMB. It is a good indicator that the data collection method and survey design are sound [76].

5.3. Structural model

In the second part of the data analysis for this study, we tested the hypotheses and assessed the structural model. Using AMOS, we constructed the route model [77], [78]. Additionally, we assessed the fit indices of the model, including p-value, chi-square minimum/degrees of freedom (CMIN/DF), goodness of fit index (GFI), comparative fit index (CFI) and root mean square error of approximation (RMSEA). We determined that all these fit indices were below the threshold level, as defined where CMIN/DF=3.272, GFI=905, CFI=0.933, and RMSEA=0.074.

Figure 2 displays the structural model's path coefficients as well as their significance levels. Every path's coefficient is statistically significant and points in the anticipated direction. First, there is a positive and substantial link between SE and TE (coefficient=0.38, $p<0.05$), suggesting that H1 is supported. H2 is substantiated by the large and positive association between EI and SE (coefficient 0.44, $p<0.05$). H3 is

supported by the large and positive association between PP and SE (coefficient=0.12, p<0.05). Consequently, we conclude that our study supports all the hypotheses (see Table 3).

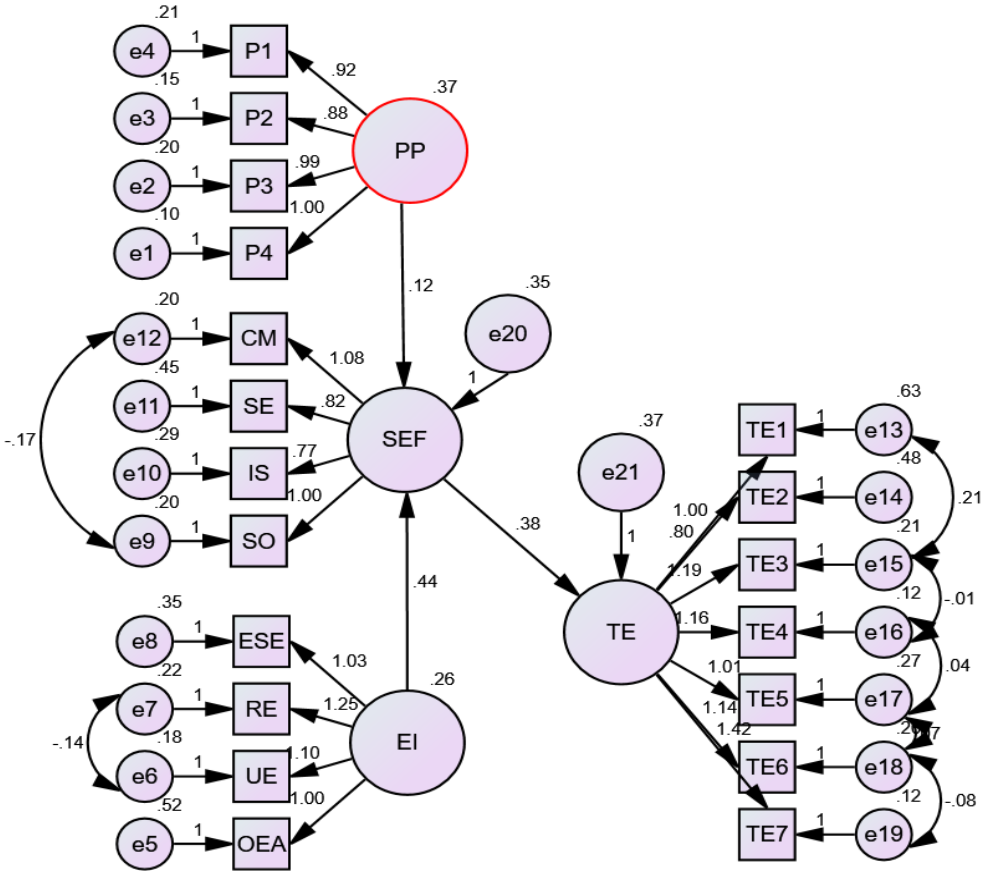

Figure 2. Structural model: TE model results

Table 3. Hypothesis results of a conceptual model

Hypotheses	Estimate	S.E.	P value	Significance
H1: TE<--- SEF	0.380	0.050	0.01	S
H2: SEF<--- EI	0.440	0.058	0.01	S
H3: SEF<--- PP	0.116	0.043	0.007	S

6. DISCUSSIONS

6.1. Theoretical implications

The researcher investigated how TE increases with SE, where PP and EI build the SE. Our first contribution is identifying new drivers to boost TE through SE in the higher education sector. The theories proposed highlight the importance of integrating [5]social cognitive theory into the hierarchical structure of EI traits [79], [80]. While emotions are characteristic of personality, they are less influenced by the surrounding circumstances compared to SE [81]. However, SE is more prone to changes in the real-world environment. Bandura [11], people's emotions have an impact on how they see their abilities, which can explain differences in SE [10]. Few studies included EI as the driver of SE, which leads to TE as discussed, but no such study has been conducted, especially in higher education, while noticing the effect of PP in the same model. Our study underlines the gap that PP has a direct impact on SE, along with EI, to improve TE. This is consistent with prior research, as SE is malleable and susceptible to change, unlike personality traits that are stable and mostly unchanging. Anticipated improvements are expected due to the presence of PP qualities, which are believed to enhance SE and confidence [58]. This idea is further substantiated by a multitude of empirical studies.

Our second contribution lies in proposing and validating a research model that explains, SE works as a mediator to enhance TE, which is based on "SE" theory [5] and supports the notion that an individual's self-perception influences their behavior, actions, and ultimately their performance. Here, it is proved empirically that the mediating effect of SE boosts TE in the higher education sector. This is consistent with other research showing a favorable relationship between SE and performance at work, especially research in the context of teaching [82], [83]. It is supported that SE affects a person's degree of goal setting, reported interest, task effort, persistence, and motivation levels [84], [85].

Our third contribution lies in the understanding that an educator becomes more effective when they are persistent in their efforts to enhance their teaching abilities and believe they have the power to impact students' learning. Our fourth contribution is that the study also adds to the existing body of literature on TE theory in higher education. The research model in this study is constructed by combining the SE theory with other variables. The study model and survey instruments are supported by measures of internal and external validity, which demonstrate their reliability and validity. Significantly, this study is among the initial research endeavors to incorporate the amalgamation of these components in Northern India, specifically concerning higher education. The results of this study validate the significance of EI, PP, and SE for TE.

6.2. Implications for teachers and colleges

Educational institutions are placing more emphasis on improving the effectiveness of teachers to promote the development of students, society, and the institution itself. This study offers valuable insights for addressing factors associated with TE in educational institutions. Firstly, this provides interesting insights to teachers who must comprehend the significance of EI, PP, and SE to enhance their performance. Sharing the relevant, complete information that would contribute to the betterment of teachers professionally. As was earlier said, there are concerns about the calibre of teachers in the Indian educational system. The drivers propose that achieving widespread recognition of these factors necessitates the implementation of many training programs and workshops to boost their effectiveness.

Secondly, to improve the effectiveness of teachers, it is necessary to ensure that their goals are strategically aligned. Strategic aims encompass the introduction and implementation of various policies to support and empower teachers, who are integral to the development of our country. Thirdly, the study strongly indicates that EI and PP are crucial factors in improving the SE of teachers, which has been proven to be an important determinant of TE in the higher education sector. Moreover, these factors have a positive impact on the performance of teachers, the nation builders. Finally, the current study utilizes a sample of teachers who are urged to work effectively, but the contributing factors were not identified. Hence, the empirical output offers guidance to teachers and colleges regarding TE to achieve better results.

7. CONCLUSION

Drawing on TE, we developed and tested a theoretical framework that reconciles two independent factors from literature studies as the antecedents that impact SE of teachers. We attempted to explicate how SE moderates between EI, PP, and TE in the higher education sector. Analysis based on 600 Indian college teachers supports the hypothesized relationship in the theoretical framework. The collaborative relationship between these factors provides new insights into the study of TE in higher education. As far as we know, no research has examined the amalgamation of these variables in higher education settings in Northern India. Significantly, this study reveals the importance of EI, PP, and SE with context to TE, which is the supreme need of every educational institution.

The limitations and further research directions are discussed in this section. Like other research endeavors, this study also has limitations. First, our research checked the effects of EI and PP as drivers, whereas many other variables can be added to the model as well, while being the independent factors to improve TE. Second, this study assessed TE using a self-evaluation technique. On the other hand, there is a chance for additional investigations of teachers, conducted by higher authorities such as Principals and Heads of Departments, or by students.

Third, this study also has the limitation of moderating the influence of demographic profile parameters, including age, gender, teaching experience, and highest degree level, which could have provided more insight into the correlations under investigation. These assessments can offer valuable perspectives on many viewpoints of the TE. Furthermore, it may be useful to conduct our study in other sectors to understand the role of independent factors (EI and PP) and the mediating factor (SE) to increase effectiveness in different nations, where another empirical research model can be created and tested.

FUNDING INFORMATION

No funding involved.

AUTHOR CONTRIBUTIONS STATEMENT

This journal uses the Contributor Roles Taxonomy (CRediT) to recognize individual author contributions, reduce authorship disputes, and facilitate collaboration.

Name of Author	C	M	So	Va	Fo	I	R	D	O	E	Vi	Su	P	Fu
Damanpreet Kaur	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓	
Hemant Sharma	✓	✓		✓	✓	✓	✓			✓	✓	✓	✓	

C : **C**onceptualization
M : **M**ethodology
So : **So**ftware
Va : **Va**lidation
Fo : **Fo**rmal analysis
I : **I**nvestigation
R : **R**esources
D : **D**ata Curation
O : Writing - **O**riginal Draft
E : Writing - Review & **E**diting
Vi : **Vi**sualization
Su : **Su**pervision
P : **P**roject administration
Fu : **Fu**nding acquisition

CONFLICT OF INTEREST STATEMENT

The authors state no conflict of interest.

DATA AVAILABILITY

The data that support the findings of this study are available on request from the corresponding author, [DK]. The data, which contain information that could compromise the privacy of research participants, are not publicly available due to certain restrictions.

REFERENCES

[1] M. A. Griffin, S. K. Parker, and C. M. Mason, "Leader vision and the development of adaptive and proactive performance: a longitudinal study," *Journal of Applied Psychology*, vol. 95, no. 1, pp. 174–182, Jan. 2010, doi: 10.1037/a0017263.

[2] K. Behari-Leak and S. McKenna, "Generic gold standard or contextualised public good? Teaching excellence awards in post-colonial South Africa," *Teaching in Higher Education*, vol. 22, no. 4, pp. 408–422, 2017, doi: 10.1080/13562517.2017.1301910.

[3] A. Vanacore and M. S. Pellegrino, "How reliable are students' evaluations of teaching (SETs)? a study to test student's reproducibility and repeatability," *Social Indicators Research*, vol. 146, no. 1–2, pp. 77–89, Nov. 2019, doi: 10.1007/s11205-018-02055-y.

[4] D. Holzberger, A. Philipp, and M. Kunter, "How teachers' self-efficacy is related to instructional quality: a longitudinal analysis," *Journal of Educational Psychology*, vol. 105, no. 3, pp. 774–786, Aug. 2013, doi: 10.1037/a0032198.

[5] A. Bandura, "Self-efficacy: toward a unifying theory of behavioral change," *Psychological Review*, vol. 84, no. 2, pp. 191–215, 1977, doi: 10.1037//0033-295x.84.2.191.

[6] C. Chapman, D. Muijs, D. Reynolds, P. Sammons, and C. Teddlie, *The routledge international handbook of educational effectiveness and improvement: research, policy, and practice*. London, pp. 1–539, 2015, doi: 10.4324/9781315679488.

[7] J. Leach and B. Moon, "Pedagogy, information and communications technology and teachers' professional knowledge," *Curriculum Journal*, vol. 11, no. 3, pp. 385–404, 2000, doi: 10.1080/09585170050200585.

[8] D. Aaronson, L. Barrow, and W. Sander, "Teachers and student achievement in the Chicago public high schools," *Journal of Labor Economics*, vol. 25, no. 1, pp. 95–135, Jan. 2007, doi: 10.1086/508733.

[9] M. S. Hussain and S. A. Khan, "Self-efficacy of teachers: a review of the literature," *Jamshedpur Research Review*, vol. 1, no. 50, pp. 110–116, 2022.

[10] R. E. Sutton and K. F. Wheatley, "Teachers' emotions and teaching: a review of the literature and directions for future research," *Educational Psychology Review*, vol. 15, no. 4, pp. 327–358, 2003, doi: 10.1023/A:1026131715856.

[11] A. Bandura, "Regulation of cognitive processes through perceived self-efficacy," *Developmental Psychology*, vol. 25, no. 5, pp. 729–735, 1989, doi: 10.1037/0012-1649.25.5.729.

[12] A. Atteberry, S. Loeb, and J. Wyckoff, "Do first impressions matter? predicting early career teacher effectiveness," *AERA Open*, vol. 1, no. 4, Oct. 2015, doi: 10.1177/2332858415607834.

[13] K. Ismayilova and R. M. Klassen, "Research and teaching self-efficacy of university faculty: relations with job satisfaction," *International Journal of Educational Research*, vol. 98, pp. 55–66, 2019, doi: 10.1016/j.ijer.2019.08.012.

[14] M. Akram, "Relationship between students' perceptions of teacher effectiveness and student achievement at secondary school level," *Bulletin of Education and Research*, vol. 41, no. 2, pp. 93–108, 2019.

[15] P. B. P. Jain, "Organizational commitment, work-life balance and teachers' effectiveness in school teachers," *Journal of Informatics Education and Research*, vol. 4, no. 2, 2024, doi: 10.52783/jier.v4i2.869.

[16] D. Boyd, P. Grossman, H. Lankford, S. Loeb, and J. Wyckoff, "Who leaves? teacher attrition and student achievement," NBER Working Paper No. 14022, 2008, doi: 10.3386/w14022.

[17] D. Muijs, "Measuring teacher effectiveness: some methodological reflections," *Educational Research and Evaluation*, vol. 12, no. 1, pp. 53–74, Feb. 2006, doi: 10.1080/13803610500392236.

[18] D. Muijs and D. Reynolds, "School effectiveness and teacher effectiveness in mathematics: some preliminary findings from the evaluation of the mathematics enhancement programme (primary)," *School Effectiveness and School Improvement*, vol. 11, no. 3, pp. 273–303, Sep. 2000, doi: 10.1076/0924-3453(200009)11:3;1-G;FT273.

[19] I. Oplatka and K. Arar, "Increasing teacher and leader professionalism through emotion management and engagement," *Journal of Professional Capital and Community*, vol. 3, no. 3, pp. 138–141, Jul. 2018, doi: 10.1108/JPCC-07-2018-036.

[20] H. Muhonen, E. Pakarinen, H. Rasku-Puttonen, and M. K. Lerkkanen, "Educational dialogue among teachers experiencing different levels of self-efficacy," *Learning, Culture and Social Interaction*, vol. 29, p. 100493, Jun. 2021, doi: 10.1016/j.lcsi.2021.100493.

[21] C. M. Kim, M. K. Kim, C. J. Lee, J. M. Spector, and K. DeMeester, "Teacher beliefs and technology integration," *Teaching and Teacher Education*, vol. 29, no. 1, pp. 76–85, Jan. 2013, doi: 10.1016/j.tate.2012.08.005.

[22] C. R. Lotter, S. Thompson, T. S. Dickenson, W. F. Smiley, G. Blue, and M. Rea, "The impact of a practice-teaching professional development model on teachers' inquiry instruction and inquiry efficacy beliefs," *International Journal of Science and Mathematics Education*, vol. 16, no. 2, pp. 255–273, Feb. 2018, doi: 10.1007/s10763-016-9779-x.

[23] L. Harrington and N. Walsh, "District support of alternative permit teachers for increasing efficacy and retention," *Management in Education*, vol. 36, no. 2, pp. 72–81, Apr. 2022, doi: 10.1177/0892020620942508.

[24] K. O. Siwatu, S. R. Chesnut, A. Y. Alejandro, and H. A. Young, "Examining preservice teachers' culturally responsive teaching self-efficacy doubts," *Teacher Educator*, vol. 51, no. 4, pp. 277–296, Oct. 2016, doi: 10.1080/08878730.2016.1192709.

[25] G. Marschall and S. Watson, "Teacher self-efficacy as an aspect of narrative self-schemata," *Teaching and Teacher Education*, vol. 109, p. 103568, Jan. 2022, doi: 10.1016/j.tate.2021.103568.

[26] S. Lavy and R. Eshet, "Spiral effects of teachers' emotions and emotion regulation strategies: evidence from a daily diary study," *Teaching and Teacher Education*, vol. 73, pp. 151–161, Jul. 2018, doi: 10.1016/j.tate.2018.04.001.

[27] S. Banjac, L. Hull, K. V. Petrides, and S. Mavroveli, "Validation of the Serbian adaptation of the trait emotional intelligence questionnaire-child form (TEIQue - CF)," *Psihologija*, vol. 49, no. 4, pp. 375–392, 2016, doi: 10.2298/PSI1604375B.

[28] J. D. Mayer, D. R. Caruso, and P. Salovey, "Emotional intelligence meets traditional standards for an intelligence," *Intelligence*, vol. 27, no. 4, pp. 267–298, Dec. 1999, doi: 10.1016/S0160-2896(99)00016-1.

[29] S. Farouk, "What can the self-conscious emotion of guilt tell us about primary school teachers moral purpose and the relationships they have with their pupils?" *Teachers and Teaching: Theory and Practice*, vol. 18, no. 4, pp. 491–507, Aug. 2012, doi: 10.1080/13540602.2012.696049.

[30] E. Lopez-Zafra *et al.*, "Social support and emotional intelligence as protective resources for well-being in Moroccan adolescents," *Frontiers in Psychology*, vol. 10, no. July, Jul. 2019, doi: 10.3389/fpsyg.2019.01529.

[31] C. Tejada-Gallardo, A. Blasco-Belled, C. Torrelles-Nadal, and C. Alsinet, "How does emotional intelligence predict happiness, optimism, and pessimism in adolescence? Investigating the relationship from the bifactor model," *Current Psychology*, vol. 41, no. 8, pp. 5470–5480, 2022, doi: 10.1007/s12144-020-01061-z.

[32] C. Salavera, P. Usán, P. Teruel, and J. L. Antoñanzas, "Eudaimonic well-being in adolescents: the role of trait emotional intelligence and personality," *Sustainability*, vol. 12, no. 7, pp. 1–11, Mar. 2020, doi: 10.3390/su12072742.

[33] L. H. Al-Obaydi, M. Pikhart, and A. Derakhshan, "A qualitative exploration of emotional intelligence in English as foreign language learning and teaching: evidence from iraq and the czech republic," *Applied Research on English Language*, vol. 11, no. 2, pp. 93–124, 2022, doi: 10.22108/ARE.2022.132551.1850.

[34] R. Garg, S. Islam, M. E. Student, and P. D. Scholar, "A study of teacher effectiveness in relation to emotional intelligence at secondary school level Introduction," *International Journal of Research in Social Sciences*, vol. 8, pp. 2249–2496, 2018.

[35] T. S. Bateman and J. M. Crant, "The proactive component of organizational behavior: a measure and correlates," *Journal of Organizational Behavior*, vol. 14, no. 2, pp. 103–118, Mar. 1993, doi: 10.1002/job.4030140202.

[36] A. B. Bakker, M. Tims, and D. Derks, "Proactive personality and job performance: the role of job crafting and work engagement," *Human Relations*, vol. 65, no. 10, pp. 1359–1378, Oct. 2012, doi: 10.1177/0018726712453471.

[37] B. B. Belwalkar and J. J. Tobacyk, "Toward a tripartite model and measurement of proactive personality," *Journal of Personality Assessment*, vol. 100, no. 5, pp. 529–538, Sep. 2018, doi: 10.1080/00223891.2018.1480488.

[38] J. B. Fuller, K. Hester, T. Barnett, L. Frey, C. Relyea, and D. Beu, "Perceived external prestige and internal respect: new insights into the organizational identification process," *Human Relations*, vol. 59, no. 6, pp. 815–846, Jun. 2006, doi: 10.1177/0018726706067148.

[39] L. R. Tolentino, P. R. J. M. Garcia, V. N. Lu, S. L. D. Restubog, P. Bordia, and C. Plewa, "Career adaptation: the relation of adaptability to goal orientation, proactive personality, and career optimism," *Journal of Vocational Behavior*, vol. 84, no. 1, pp. 39–48, Feb. 2014, doi: 10.1016/j.jvb.2013.11.004.

[40] K. L. Randolph and J. J. Dahling, "Interactive effects of proactive personality and display rules on emotional labor in organizations," *Journal of Applied Social Psychology*, vol. 43, no. 12, pp. 2350–2359, Dec. 2013, doi: 10.1111/jasp.12184.

[41] T. Lutz, "Toward a new conceptual framework for teaching about flood risk in introductory geoscience courses," *Journal of Geoscience Education*, vol. 59, no. 1, pp. 5–12, Feb. 2011, doi: 10.5408/1.3543934.

[42] S. K. Khanshan and M. H. Yousefi, "The relationship between self-efficacy and instructional practice of in-service soft disciplines, hard disciplines and EFL teachers," *Asian-Pacific Journal of Second and Foreign Language Education*, vol. 5, no. 1, p. 1, Dec. 2020, doi: 10.1186/s40862-020-0080-8.

[43] L. A. Witcher *et al.*, "Teacher efficacy 1 running head: teacher efficacy and educational beliefs relationship between teacher efficacy and beliefs about education among preservice teachers permission to reproduce and disseminate this material has been granted by," *Institute of Education Sciences*, 2002.

[44] K. W. Yeung and D. Watkins, "Hong Kong student teachers' personal construction of teaching efficacy," *Educational Psychology*, vol. 20, no. 2, pp. 213–235, Jun. 2000, doi: 10.1080/713663713.

[45] H. Hamurcu and T. Canbulat, "Preservice teachers' perceived self-efficacy in selection of teaching methods and techniques," *Pedagogical Research*, vol. 4, no. 3, Jun. 2019, doi: 10.29333/pr/5837.

[46] R. M. Allinder, "An examination of the relationship between teacher efficacy and curriculum-based measurement and student achievement," *Remedial and Special Education*, vol. 16, no. 4, pp. 247–254, 1995, doi: 10.1177/074193259501600408.

[47] M. Tschannen-Moran and A. W. Hoy, "Teacher efficacy: capturing an elusive construct," *Teaching and Teacher Education*, vol. 17, no. 7, pp. 783–805, Oct. 2001, doi: 10.1016/S0742-051X(01)00036-1.

[48] T. Hoang, "Teacher self-efficacy research in English as foreign language contexts: a systematic review," *Journal of Asia TEFL*, vol. 15, no. 4, pp. 976–990, Dec. 2018, doi: 10.18823/asiatefl.2018.15.4.6.976.

[49] M. Uitto, K. Jokikokko, and E. Estola, "Virtual special issue on teachers and emotions in teaching and teacher education (TATE) in 1985-2014," *Teaching and Teacher Education*, vol. 50, pp. 124–135, Aug. 2015, doi: 10.1016/j.tate.2015.05.008.

[50] M. Wyatt, "Language teachers' self-efficacy beliefs: a review of the literature," *Australian Journal of Teacher Education*, vol. 43, no. 4, pp. 92–120, 2018.

[51] A. Martins, N. Ramalho, and E. Morin, "A comprehensive meta-analysis of the relationship between emotional intelligence and health," *Personality and Individual Differences*, vol. 49, no. 6, pp. 554–564, Oct. 2010, doi: 10.1016/j.paid.2010.05.029.

[52] M. J. Boland and W. H. Ross, "Emotional intelligence and dispute mediation in escalating and de-escalating situations," *Journal of Applied Social Psychology*, vol. 40, no. 12, pp. 3059–3105, 2010, doi: 10.1111/j.1559-1816.2010.00692.x.

[53] N. G. Alghamdi, M. Aslam, and K. Khan, "Personality traits as predictor of emotional intelligence among the university teachers as advisors," *Education Research International*, vol. 2017, no. 1, Jan. 2017, doi: 10.1155/2017/9282565.
[54] S. M. J. -M. Dewaele, C. Gkonou, "Do ESL/EFL teachersémotional intelligence, teaching experience, proficiency and gender affect their classroom practice? 1," *Emotions in Second Language Teaching: Theory, Research and Teacher Education*, pp. 125–141, 2018.
[55] N. T. T. Phan and T. Locke, "Vietnamese teachers' self-efficacy in teaching English as a foreign language: does culture matter?" *English Teaching*, vol. 15, no. 1, pp. 105–128, 2016, doi: 10.1108/ETPC-04-2015-0033.
[56] Y. Zhang and F. Yang, "Proactive personality: mechanisms and future directions," *Advances in Psychological Science*, vol. 25, no. 9, p. 1544, 2017, doi: 10.3724/sp.j.1042.2017.01544.
[57] S. K. Parker and C. G. Collins, "Taking stock: integrating and differentiating multiple proactive behaviors," *Journal of Management*, vol. 36, no. 3, pp. 633–662, May 2010, doi: 10.1177/0149206308321554.
[58] H. H. Hsieh and J. T. Huang, "The effects of socioeconomic status and proactive personality on career decision self-efficacy," *Career Development Quarterly*, vol. 62, no. 1, pp. 29–43, Mar. 2014, doi: 10.1002/j.2161-0045.2014.00068.x.
[59] D. Fay and M. Frese, "The concept of personal initiative: an overview of validity studies," *Human Performance*, vol. 14, no. 1, pp. 97–124, 2001, doi: 10.1207/S15327043HUP1401_06.
[60] A. Penrose, C. Perry, and I. Ball, "Emotional intelligence and teacher self efficacy: the contribution of teacher status and length of experience," *Issues in Educational Research*, vol. 17, no. 1, 2007.
[61] T. Coladarci and W. A. Breton, "Teacher efficacy, supervision and the special education resource-room teacher," *The Journal of Educational Research*, vol. 90, no. 4, pp. 230–239, 1997.
[62] E. E. Boe, S. A. Bobbitt, L. H. Cook, S. D. Whitener, and A. L. Weber, "Why didst thou go? predictors of retention, transfer, and attrition of special and general education teachers from a national perspective," *Journal of Special Education*, vol. 30, no. 4, pp. 390–411, 1997, doi: 10.1177/002246699703000403.
[63] S. E. Seibert, J. M. Crant, and M. L. Kraimer, "Proactive personality and career success," *Journal of Applied Psychology*, vol. 84, no. 3, pp. 416–427, 1999, doi: 10.1037//0021-9010.84.3.416.
[64] M. Dipaola and M. Tschannen-Moran, "Organizational citizenship behavior in schools and its relationship to school climate," *Journal of School Leadership*, vol. 11, no. 5, pp. 424–447, Sep. 2001, doi: 10.1177/105268460101100503.
[65] S. Huang, H. Yin, and J. Han, "Do Chinese teachers perform emotional labor equally? multi-group comparisons across genders, grade levels and regions," *Frontiers in Psychology*, vol. 10, Feb. 2019, doi: 10.3389/fpsyg.2019.00190.
[66] M. I. Chowdhury and B. Wheeling, "Determinants of major field test (mft) score for graduating seniors of a business school in a small mid-western University," *Academy of Educational Leadership Journal*, vol. 17, no. 1, pp. 59–71, 2013.
[67] L. Darling-Hammond, "Teacher quality and student achievement: a review of state policy evidence," *Education Policy Analysis Archives*, vol. 8, no. 1, pp. 1–44, 2000.
[68] J. E. Rockoff, "The impact of individual teachers on student achievement: evidence from panel data," *American economic review*, vol. 94, no. 2, pp. 247–252, 2004.
[69] C. T. Clotfelter, H. F. Ladd, and J. L. Vigdor, "How and why do teacher credentials matter for student achievement?" Sanford Institute, Duke University, 2007.
[70] J. L. Arbuckle, *Amos^{TM} 6.0 user's guide*. USA: Amos Development Corporation, 2005
[71] T. J. Treangen, D. D. Sommer, F. E. Angly, S. Koren, and M. Pop, "Next generation sequence assembly with AMOS," *Current Protocols in Bioinformatics*, vol. 33, no. SUPP.33, pp. 1–18, Mar. 2011, doi: 10.1002/0471250953.bi1108s33.
[72] D. Gerbing and J. Anderson, "An updated paradigm for scale development incorporating uni," *Journal of Marketing Research*, vol. 25, no. 2, pp. 186–192, 1988.
[73] L. J. Cronbach, "Coefficient alpha and the internal structure of tests," *Psychometrika*, vol. 16, pp. 297–334, 1951.
[74] Y. L. Chang, "Examining relationships among elementary mathematics teachers' efficacy and their students' mathematics self-efficacy and achievement," *Eurasia Journal of Mathematics, Science and Technology Education*, vol. 11, no. 6, pp. 1307–1320, Sep. 2015, doi: 10.12973/eurasia.2015.1387a.
[75] A. Sharma, A. Bhardwaj, M. Pruthi, and M. Sharma, "Intellectual property rights in context of new education policy 2020," *Journal of Intellectual Property Rights*, vol. 27, no. 6, pp. 415–419, 2022, doi: 10.56042/jipr.v27i6.66630.
[76] P. M. Podsakoff, S. B. MacKenzie, J. Y. Lee, and N. P. Podsakoff, "Common method biases in behavioral research: a critical review of the literature and recommended remedies," *Journal of Applied Psychology*, vol. 88, no. 5, 2003, doi: 10.1037/0021-9010.88.5.879.
[77] J. Nevitt and G. R. Hancock, "Relative performance of rescaling and resampling approaches to model chi square and parameter standard error estimation in structural equation modeling," *Annual Meeting of the American Educational Research Association*, pp. 13–17, 1998.
[78] C. W. Wynne, "Issues and opinion on structural equation modeling," *Management Information Systems Quarterly*, vol. 22, no. 1, 2014.
[79] K. V. Petrides, M. Mikolajczak, S. Mavroveli, M. J. Sanchez-Ruiz, A. Furnham, and J. C. Pérez-González, "Developments in trait emotional intelligence research," *Emotion Review*, vol. 8, no. 4, pp. 335–341, 2016, doi: 10.1177/1754073916650493.
[80] K. V. Petrides, A. Furnham, and S. Mavrveli, "Trait emotional intelligence: moving forward in the field of EI," *The Science of Emotional Intelligence: Knowns and Unknowns*, 2012, doi: 10.1093/acprof:oso/9780195181890.003.0006.
[81] J. C. Pérez-González and M.-J. Sanchez-Ruiz, "Trait emotional intelligence anchored within the big five, big two and big one frameworks," *Personality and Individual Differences*, vol. 65, pp. 53–58, Jul. 2014, doi: 10.1016/j.paid.2014.01.021.
[82] R. B. Webb and P. T. Ashton, "Teacher motivation and the conditions of teaching: a call for ecological reform," *Source: Journal of Thought*, vol. 21, no. 2, pp. 43–60, 1986.
[83] R. K. Henson, "Teacher self-efficacy: substantive implications and measurement dilemmas," *Annual meeting of the educational research exchange*, p. 24, 2001.
[84] M. E. Gist, "Self-efficacy: implications for organizational behavior and human resource management," *Academy of Management Review*, vol. 12, no. 3, pp. 472–485, 1987, doi: 10.5465/amr.1987.4306562.
[85] M. L. Maehr, H. A. Meyer, M. L. Maehr12, and H. A. Meyer1, "Understanding motivation and schooling: where we've been, where we are, and where we need to go," *Educational Psychology Review*, vol. 9, pp. 371–409, 1997, doi: 10.1023/A:1024750807365.

BIOGRAPHIES OF AUTHORS

Damanpreet Kaur is a research scholar and associate professor with 13 years of experience in teaching. She has published research in international journals and presented papers at national and international conferences. She has delivered several guest lectures at various institutions. Her expertise in soft skills training and academic coordination has made her a vital part of the institution's leadership, contributing to student development and academic excellence. She has received prestigious awards, including the World Best Teacher 2022 by Axis Bank and recognition at the Naari Samman Samaroh 2023. She can be contacted at email: damankaur21@gmail.com

Hemant Sharma presently working as vice chancellor, GNA University, Phagwara, Punjab is an accomplished academician and a visionary administrator. He is a perfect blend of corporate and academics. His most of the research work is on the power sector but not limited to. He has guided many PhD scholars and is the member of consolidated panel of PhD examiners of many reputed Universities in India. He is an invited expert in the Board of Studies of many reputed business schools. He has conducted over 50 FDPs/workshops for faculty members/research scholars on research methods and data analysis tools. He is a well-recognized expert of statistical software's such as SPSS, ADENCO, JAMOVI, and R etc. He has many publications in the National and International journals of repute; indexed in Scopus and WOS. He is a subject expert and has developed new courses in the operations management, supply chain management and production technology. He has developed MOOCs for quantitative methods under the ePG Pathshala, an initiative of MHRD, Govt of India and student learning material of many subjects for the MBA students of various State government Universities. His e-book on Production Planning and Control has been ratified by Indian Institute of Material Management, New Delhi (An Institution of National Eminence). He can be contacted at email: vc@gnauniversity.edu.in