

Explaining Pre-Service Teachers' Career Adaptability through the Mediating Role of Academic Motivation

Lin Ma^{a*}, Azlina Mohd Kosnin^b and Yulong Liu^c

^{ab}*School of Education, Faculty of Social Science and Humanities, University Teknologi Malaysia.*

^c*School of Mathematics and Statistics, Taiyuan Normal University, China*

*Corresponding author: malin@graduate.utm.my

Abstract: Career adaptability plays a vital role in shaping students' professional development, particularly in teacher-training programs. Guided by the broaden-and-build theory, this study employs a structural equation modeling (SEM) method to investigate the interplay between career adaptability and negative emotion. To delve into how negative emotion impact career adaptability and whether adaptive academic motivation mitigates adverse emotional effects, data were gathered from public-funded undergraduate students enrolled in teacher-training programs. The results of this study indicate that academic motivation acts as a mediator in the relationship between negative emotion and career adaptability. Implications for educational institutions and teacher training programs are discussed, highlighting strategies to enhance students' adaptability and well-being.

Keywords: Pre-service teacher education, academic motivation, career adaptability, negative emotion

1. Introduction

Pre-service teacher education is a crucial element in shaping the knowledge base, attitudes, and skills of future educators. The research emphasizes the crucial role of pre-service teacher training in various aspects. Firstly, it is emphasized that pre-service teacher training is essential for developing teachers' foundational knowledge (Munifatullah, 2019). Additionally, studies suggest that attitudes toward inclusive education can be positively influenced through pre-service teacher education experiences (Qandhi & Kurniawati, 2019). The practicum component of teacher education programs is widely recognized as essential for

providing pre-service teachers with valuable real-life teaching experiences and insights (Yıldırım & Örsdemir, 2019).

Furthermore, the preparation of pre-service teachers significantly impacts their commitment, and professional orientation toward the teaching profession (Saied, 2023). Inclusive and multicultural education are also highlighted as crucial areas teacher-training programs should cover to equip future teachers with the necessary competencies (Durmuş & Korkmaz, 2023). Effective pre-service teacher training programs are noted to enhance the combination of “technological, pedagogical, and content knowledge”, which is essential for modern teaching practices.

The growing interest in the study of public-funded undergraduate students in teacher-training universities has been triggered by the increasing role that teachers are playing in China. Most articles focus on enhancing the quality of pre-service teachers, for instance, can be achieved by focusing on developing their pedagogical skills and abilities to effectively apply subject matter knowledge in teaching (Abdullah et al., 2018). Few articles pay attention to the transition of pre-service teachers from university to the workplace. Career adaptability in pre-service teachers involves equipping them with the flexibility, resilience, and proactive mindset needed to navigate the challenges and opportunities they will face in their future teaching careers.

In addition, few articles link career adaptability with psychological factors. Thus, rigorous research is expected in this field. Previous studies have looked at how each of these factors (negative emotion, and academic motivation) affects career adaptability separately. However, there exists a significant dearth of research regarding the interactions among these factors. The researcher endeavors to address this gap by conducting an in-depth exploration of the relationships among negative emotion, academic motivation, and career adaptability. In this study, a quantitative analysis was employed to examine the predictive effects of negative emotion on career adaptability, with academic motivation acting as a mediator.

The structure of this paper is as follows: Firstly, a thorough review of the literature on career adaptability, negative emotion, academic motivation, and public-funded teacher-training education, was presented. Next is the methodology and the scale items. CFA is discussed after the data analysis. The psychometric properties of the scales are then presented, followed by the results, and theoretical and practical implications. The study also concludes future research to assist public-funded undergraduate students in enhancing their career adaptability based on the findings.

2. Literature review

2.1 Career adaptability

Career adaptability is crucial for pre-service teachers as it contributes to their mental and physical well-being (Mercan & Öztene, 2023; Liu et al., 2023). Teaching is a demanding profession that necessitates substantial mental and emotional resilience. Career adaptability equips these students with the skills to endure challenging situations, recognize areas for improvement, and actively work on enhancing their abilities and knowledge. This process can enhance their professional development and career progression. Additionally, factors like emotional intelligence, goal-setting, and the pursuit of personal goals impact career adaptability (Mercan & Öztene, 2023).

Studying career adaptability is crucial due to its significance in individuals' career success. Career adaptability refers to an individual's ability to adjust to changes in the workplace effectively and maintain a balanced career trajectory during transitions (Johnston, 2016). It involves readiness for vocational tasks, transitions, and unexpected challenges (Coetzee & Harry, 2014). Additionally, pre-service teachers' interest, satisfaction, and commitment to their career choices are closely connected to their academic experiences and satisfaction with their career decisions (Shen & Luen, 2022). As a result, career adaptability plays a vital role in their professional development as it significantly impacts their shift from university to workplace, their well-being, and their career development.

2.2 Negative emotion

Negative emotion can have a substantial influence on career adaptability among teachers. Studies indicate that throughout the teacher-training, feelings like nervousness are commonly reported and may differ from the emotional experiences of more seasoned educators (Ji et al., 2022).

Negative emotions are crucial for pre-service teachers' well-being. Negative emotions, such as anxiety, anger, and stress, frequently occur during teaching practicums (Bach & Hagenauer, 2022). These emotions can impact pre-service teachers' overall professional experience (Bach & Hagenauer, 2022). Additionally, The mental health of future teachers has been linked to their job satisfaction and overall occupational health (Lam et al., 2022). Addressing negative emotions can lead to increased job satisfaction and better mental health outcomes among teachers (Lam et al., 2022).

The research has shown that the emotional experiences of pre-service teachers can vary (Heryatun & Septiana, 2020). The ability to manage these emotions effectively is essential for their success in the classroom. It has been noted that pre-service teachers are expected to self-manage and regulate negative emotions encountered during their training (Teng, 2017). Emotional intelligence plays a significant role in how pre-service teachers perceive and handle their emotions, suggesting that teacher education programs should focus on developing emotional intelligence skills among pre-service teachers (Öz & Kiris, 2018).

Additionally, Chen et al., (2022) argued that teacher support can reduce students' negative emotions and enhance positive academic emotion in China.

Moreover, the relationship between emotional regulation and metacognition has been highlighted as crucial for future teachers' development (Wei et al., 2021). Effective emotion regulation can positively influence self-efficacy levels, which are vital for teachers' confidence and performance in the classroom (Wei et al., 2021). Therefore, by implementing strategies to enhance emotional intelligence and regulation skills, teacher-training programs can equip future teachers more effectively to handle the challenges they may encounter throughout their teaching careers.

2.3 Academic motivation

Academic motivation among pre-service teachers is crucial because it greatly influences their professional growth and the teaching quality they provide. Research has shown that training motivation influences how much they benefit from their training (Shamdas, 2023). For instance, autonomous motivation toward the teaching profession is essential as it can enhance the effect of teacher-training programs (Shamdas, 2023). Moreover, the quality of motivation, such as controlled motivation, can affect the quality of future teachers (López-García, 2023). Longitudinal studies are needed to understand the sustainability of the effects of different motivational types on academic engagement throughout teacher education (López-García, 2023).

Exploring motivations for choosing teaching as a career can provide insights into the reasons behind individuals entering the teaching profession (Ahmed, 2021). Studies have also highlighted the importance of examining the educational drive of future teachers in various disciplines, such as visual arts and history (Taskesen, 2019). Academic motivation has been linked to academic achievement among future teachers (Yüce et al., 2013).

Moreover, the gender differences in reasons for pursuing a career in teaching emphasize the need to consider individual preferences and intrinsic desires when supporting pre-service teachers (Topkaya & Uztosun, 2012). Extrinsic entry career motives may undermine long-term commitment to teaching (García-Martínez et al., 2021). Additionally, the impact of emotional regulation on academic motivation and stress levels among future teachers underscored the importance of emotional skill training programs to support their well-being and coping mechanisms.

Academic motivation has been found to influence career adaptability with adversity quotient mediating this relationship among nursing students (Mahmoud, 2023). Additionally, academic motivation has been shown to predict career decidedness among university students, indicating its significant role in shaping career-related decisions (Koyuncuoğlu, 2020). No literature has studied the

mediating role of academic motivation between negative emotion and career adaptability.

2.4 The role of academic motivation as a mediator between negative emotion and career adaptability

Several studies have explored the connection between academic motivation and negative emotions. For instance, research has shown that academic motivation and emotions influence self-regulated learning strategies, which subsequently impact academic achievement (Oliveira et al., 2023).

The research highlighted the various reasons that inspire individuals to enter the teaching profession in Korea, Indonesia, and Kuwait (Jeong, 2016; Lestari & Arfiandhani, 2019; Alanezi, 2022). These motivations play a crucial role in molding career adaptability. They achieve this by exerting an impact on individuals' dedication and involvement in their prospective teaching positions. However, there is a shortage of studies exploring how the mediating role of academic motivation in the relationship between negative emotion and career adaptability. This gap in knowledge presents an area ripe for further exploration to enhance our understanding of the complex interplay among these psychological and career-related factors.

2.5 Teacher-training education

The importance of teacher training in enhancing competencies and skills has been highlighted in various contexts. For example, in South Africa, efforts have been made to strengthen teacher education through legislative and policy measures to enhance teacher competencies (Nseibo et al., 2022). Similarly, in Germany, Greece, Cyprus, the United Kingdom, and Italy, initial teacher training and continuous professional development are considered critical for advancing inclusive education systems (Tsibidaki et al., 2020). The development of teacher education has been shown to positively impact teachers' beliefs and practices, leading to improved student learning outcomes (Ahmad, 2014).

Furthermore, providing professional development for teachers is important for the effective adoption of new teaching methodologies, such as activity-based learning (Acharya, 2019). Teacher training institutes must focus on developing effective teachers during their training period to ensure they are well-prepared for the demands of the profession (Mohamed et al., 2015). Additionally, recommendations include enhancing the coordination of training organizations, offering targeted training based on teachers' needs, and implementing innovative training models to better support rural education (Li, 2024).

2.6 Public-funded teacher-training education in China

Public-funded teacher-training education is a crucial element of educational development. The challenges such as issues with teacher stress and workload standardization in primary and secondary schools (Zhang et al., 2023), and the need for enhanced training and education (Wang et al., 2018). Additionally, concerns have been raised about the uneven distribution of educational resources (Xie, 2024). The responsibility for teacher training in China involves coordination and collaboration among various parties, including teachers, training providers, educational management, and schools (Yan & He, 2011). Efforts to enhance teacher education in China, including Shanxi Province, have been emphasized in recent years. Innovations such as adapting teacher training programs, promoting excellent teacher plans for sustainability (Li et al., 2022), and implementing significant improvements in teacher education quality (Han, 2012).

In public universities, teacher-training programs primarily focus on developing future educators. In China, there are three main types of teacher-training programs: Normal Universities, Normal Universities overseen by the Ministry of Education, and Normal Universities managed by state governments. The key distinction among the three types of Normal Universities lies in their financial support and obligations. Normal students typically cover their tuition and must pass a qualification exam to become certified teachers. They do not have mandatory service obligations after graduation. They seek employment independently and have more flexibility in career choices compared to public-funded students. They also have the option to pursue full-time postgraduate studies. However, public-funded normal students do not need to pay tuition fees and receive government funding for their education, covering tuition and living expenses. In return, they have service obligations, such as committing to teaching in specific regions or schools for a certain period after graduation. These students have stable job guarantees, but they need to work for at least one year before they can take the post-graduate entrance examination, their admission process is more competitive due to limited funding slots.

2.7 Theoretical Framework

Developed by Barbara Fredrickson in 1998 (Compton, 2005), the broaden-and-build theory suggests that positive emotions enhance individual positive actions and feelings. Fredrickson's initial focus was on how experiencing happiness leads to greater attentiveness. Later theorists have built on this idea by emphasizing the importance of psychological expansion in contrast to the psychological narrowing typically associated with negative emotions. They use this theory to underscore the necessity of cultivating positive emotions. The theory has been cited 5,212 times on Google Scholar.

The broaden-and-build theory helps explain the relationships between academic motivation, negative emotions, and career adaptability. This theory

proposes that positive emotions improve focus and expand thinking, which boosts mental and personal resources, and supports skill-building, reaching goals, and handling challenges. Conversely, negative emotions can restrict focus and thinking, resulting in a reduced set of resources, and obstacles in reaching goals and adapting.

3. Methods

3.1 Introduction

This study primarily aims to explore the impact of negative emotions on career adaptability, with academic motivation serving as a mediating factor. The research question and hypothesis are outlined as follows:

Research Question:

Is there a significant mediating effect of academic motivation on the relationship between negative emotion and career adaptability?

Hypothesis 1 for research question:

H1: Academic motivation significantly mediates the relationship between negative emotion and career adaptability.

To address the stated research question, this study uses a quantitative research approach (Creswell, 2012), allowing for statistical analysis to determine relationships between variables. This study employs a questionnaire survey as its research method.

The method is designed to assess pre-service teachers' career adaptability, negative emotion, and academic motivation. This study adopts a questionnaire survey research method, which involves systematically collecting data from samples through structured questionnaires. To explore this question, this study utilized established questionnaires of three variables (negative emotion, academic motivation, and career adaptability):

1. Career Adapt-Abilities Scale short form (CAAS-SF)
2. The Achievement Emotions Questionnaire for Teachers (AEQ-S)
3. Motivated Strategies for Learning Questionnaire (MSLQ)

3.2 Samples

This study's sample comprised 349 public-funded undergraduate students in teacher-training programs. Demographic information such as gender, birthplace, and enrollment year was gathered. The final valid sample comprised 349 participants. There was a notable disparity in gender distribution, with females outnumbering males significantly. Specifically, 282 females (80.8%) were included in the sample, compared to 67 males (19.2%), resulting in an approximate gender ratio of 4:1. In terms of birthplace, the majority of the samples were from rural areas. Precisely, 239 samples (68.5%) had a rural birthplace, whereas 110 samples (31.5%) originated from urban areas. Moreover,

the study also investigated the participants' enrollment year. Seniors constituted the largest group, with 126 students (36.1%). They were followed by freshmen, numbering 85 (24.4%), sophomores, with 76 students (21.8%), and juniors, totaling 62 (17.8%).

3.3 Measures

3.3.1 Career adaptability

The 12-item CAAS-SF, which is a revised iteration of the CAAS, has undergone validation within the population of Chinese university graduates, demonstrating comparable factor structures and measurement characteristics to the original CAAS as reported by Chunze et al. in 2023. Additionally, the CAAS-SF has also proven to possess good reliability when applied to Portuguese undergraduate students, as demonstrated by the research of Soares et al. in 2022. For the assessment using the CAAS-SF, participants are required to respond on a five-point Likert scale. The scale ranges from 1, representing the "not strong" level, to 5, denoting the "strongest" level. Given that the CAAS-SF questionnaire has a total reliability score of 0.944, this adapted version was employed for the current study.

3.3.2 Negative emotion

The AEQ-S, introduced by Bieleke et al. in 2021, was employed to evaluate the emotions of pre-service teachers associated with their studies, as documented by Çetin and Eren in 2022. This particular scale consists of nine sub-scales, as identified by Frenzel, Pekrun, and Goetz in 2010. In the present study, specific sub-scales were carefully chosen to evaluate the negative emotions experienced by pre-service teachers. These selected sub-scales focus on measuring states of anger, anxiety, shame, hopelessness, and boredom. Each subscale includes four items, with four items assessing anger, four for anxiety, four for shame, four for hopelessness, and four for boredom. The AEQ-s, a comprehensive measure of negative emotions, demonstrates high reliability and validity and is commonly used to assess both positive and negative emotions.

3.3.3 Academic motivation

In this study, academic motivation is evaluated using the original MSLQ created by Pintrich in 1991. The instrument consists of 26 items, each of which is rated on a 7-point Likert scale. The scale has a range of responses from 1 to 7. When participants in the sample perceive a statement to be entirely true for themselves, they are instructed to circle 7. Conversely, if they believe a statement is completely false, they should circle 1. In cases where a statement is only partially true, they are required to select a number between 1 and 7 that best reflects their opinion.

Regarding the interpretation of scores, higher scores on the questionnaire signify a greater degree of motivation. The MSLQ has been shown to possess a stable factor structure, reliable internal consistency, and valid construct representation. It is a dependable instrument for assessing motivation in different educational environments, including university and professional study programs.

3.3.4 Translation

Since the original version is in English and the target group speaks Chinese, translating the questionnaire into Chinese was essential. This study used back-translation as the method for this study (Brislin & Freimanis, 2001; Saunders et al., 2009).

3.3.5 Data Analyses

The collected data underwent a comprehensive analysis using Structural Equation Modeling (SEM) via the Amos software. To begin with, descriptive statistical analysis was carried out on the data set. This step was crucial for understanding the basic characteristics of the data. After the descriptive analysis, a regression model was applied to explore relationships and draw further conclusions between the variables of interest and demographic information. This sequential approach of first getting a general sense of the data through descriptive statistics and then delving into variable relationships using a regression model offered a systematic and structured way to gain insights from the data. Following this, a confirmatory factor analysis, encompassing career adaptability, negative emotion, and academic motivation, be carried out to assess the dimensionality of these constructs: CAAS-SF, AEQ-S, and MSLQ. After ensuring an acceptable model fit, the structural model evaluation, including freely estimated paths from negative emotion to career adaptability, and through academic motivation. Mediating effects be evaluated using bootstrap tests with 2,000 replications, a mediating effect is considered significant if the 95% confidence intervals do not encompass zero.

3.3.5.1 Regression analysis

The Variance Inflation Factor (VIF) values and Durbin-Watson (D-W) statistics in the linear regression equations of this mediation model were calculated individually. The VIF values in the model were all below 5, suggesting that there were no issues with multicollinearity. Additionally, the D-W values were approximately 2, indicating the absence of autocorrelation and confirming that the model is well-constructed (see Table 1).

R^2 value was 0.582, which means that NE and AM explained 58.2% of CA ($F=160.265$, $p<0.000$), based on the AMOS results, which demonstrate moderate explanatory strength (Chin, 1998). Chin (1998) describes endogenous

latent variables in path models are classified as weak, moderate, and substantial with R^2 values of 0.19, 0.33, and 0.67, respectively. Following the evaluation of VIF and R^2 , the next step involved measurement model evaluation. Then, path estimates for the hypothesized relationships were examined, and the mediating effects using a bootstrapping approach with 2000 resamples.

Table 1 Regression analysis

Model	R	R Square	Adjusted R Square	Std.Error of the Estimate	Durbin-Watson	F	p
1	.763a	0.582	0.579	0.42543	1.47	160.265	.000b

	unstandardized coefficients		standardized coefficients		collinearity statistic		
	B	SE B	Beta	t	p	tolerance	VIF
constant	1.442	0.117		12.316	0		
AM	0.342	0.02	0.707	17.175	0	0.714	1.401
NE	-0.006	0.026	-0.009	-0.234	0.815	0.906	1.104

Note: constant=career adaptability, NE=negative emotion, AM=academic motivation

3.3.5.2 Measurement Model Evaluation

Check for missing values, exclude straight-line responses and outliers, an assessment of collinearity among the predictor variables was performed, and then, Table 2 displays the convergent validity of the measurement model. In line with the guidelines proposed by Hair et al. (2011), items with factor loadings lower than 0.60 are to be eliminated. As depicted in Table 2, the factor loadings of all items range from 0.628 to 0.905, surpassing the 0.60 threshold suggested by Hair et al. (2011). In addition, Hair et al. (2012) posited that each variable's Average Variance Extracted (AVE) should be greater than 0.50. The data in Table 2 reveals that the AVE values of all variables fall within the range of 0.525 to 0.688, above the acceptable minimum of 0.50.

To assess reliability, according to Hair et al. (2016), values of Cronbach's α and Composite Reliability (CR) should reach 0.70 or higher. The results showed strong internal consistency. Specifically, Cronbach's α values span from 0.928 to 0.978 (Table 2), and all CR values exceed the 0.70 cutoff recommended by Hair et al. (2016).

The Discriminant Validity (DV) was evaluated by analyzing the square root of the AVE, following the Fornell-Larcker criterion (Hair et al., 2011). The results confirmed that for each construct, the square root of the AVE is higher than its

correlations with other constructs, meeting all the conditions for DV. Thus, Table 2 confirms the convergent and discriminant validity of the measurement model.

Table 2 Convergent Validity and Discriminant Validity

Convergent Validity

First Constructs	Order	Items	Loading $s > 0.6$	AVE > 0.5	CR > 0.7	Cronbach' $s \alpha$
CA		CA1	0.665	0.525	0.93	0.928
		CA2	0.786			
		CA3	0.683			
		CA4	0.678			
		CA5	0.696			
		CA6	0.723			
		CA7	0.773			
		CA8	0.752			
		CA9	0.628			
		CA10	0.702			
		CA11	0.777			
		CA12	0.81			
NE		NE1	0.687	0.688	0.978	0.978
		NE2	0.555			
		NE3	0.709			
		NE4	0.779			
		NE5	0.853			
		NE6	0.864			
		NE7	0.872			
		NE8	0.853			
		NE9	0.804			
		NE10	0.748			
		NE11	0.905			
		NE12	0.855			

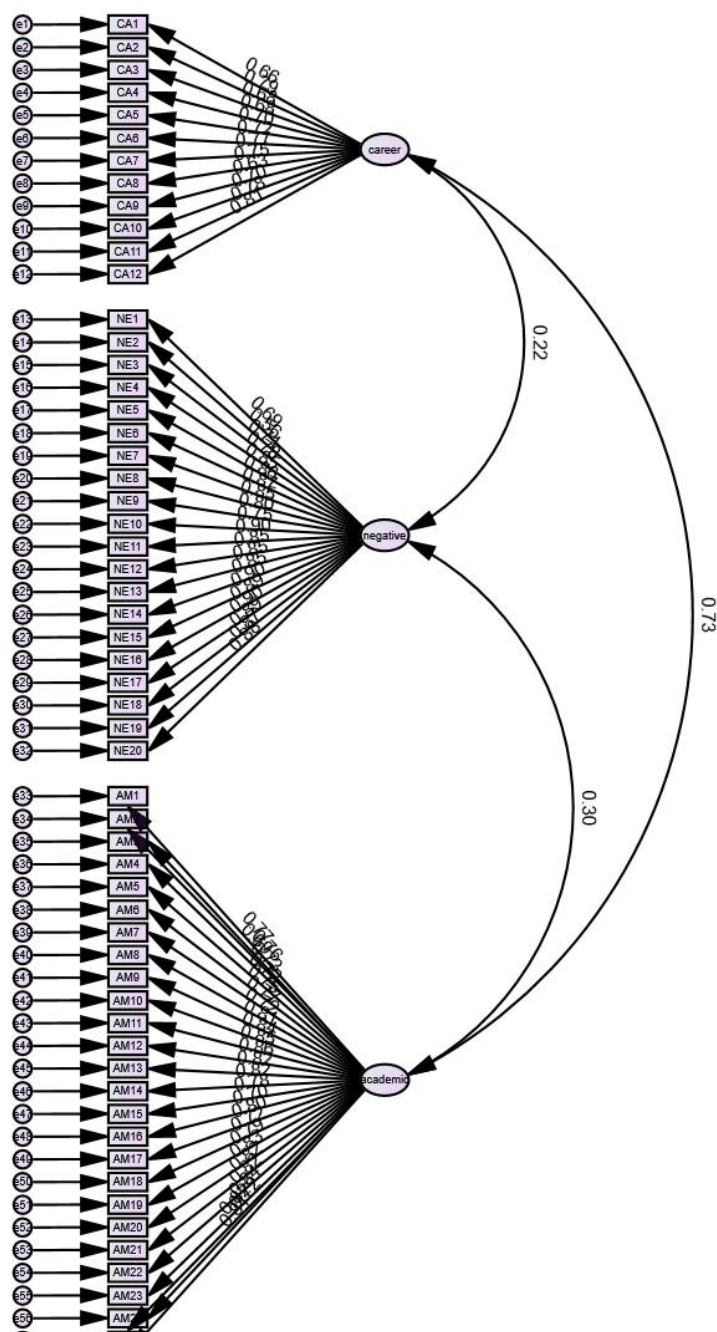
	NE13	0.848			
	NE14	0.848			
	NE15	0.896			
	NE16	0.888			
	NE17	0.903			
	NE18	0.886			
	NE19	0.869			
	NE20	0.879			
AM	AM1	0.768	0.616	0.977	0.963
	AM2	0.693			
	AM3	0.759			
	AM4	0.727			
	AM5	0.725			
	AM6	0.754			
	AM7	0.767			
	AM8	0.718			
	AM9	0.81			
	AM10	0.844			
	AM11	0.846			
	AM12	0.859			
	AM13	0.817			
	AM14	0.823			
	AM15	0.785			
	AM16	0.697			
	AM17	0.801			
	AM18	0.725			
	AM19	0.79			
	AM20	0.831			
	AM21	0.818			

AM22	0.824
AM23	0.84
AM24	0.72
AM25	0.824
AM26	0.809

Discriminant Validity

	CA	NE	AM
CA	0.495		
NE	0.136	0.688	
AM	0.67	0.373	0.599
AVE square root	0.703	0.829	0.774

Figure1 Confirmatory Factor Analysis(CFA) for measurement model evaluation



4. Results

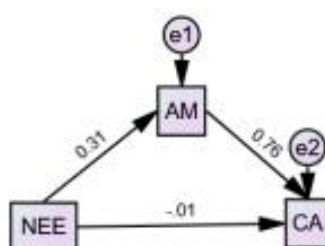
4.1. Fitness of the structural model

The obtained Comparative Fit Index (CFI) value was 0.823, while the Tucker-Lewis Index (TLI) registered at 0.817. Both of these values fell below the commonly-accepted cut-off of 0.9. However, it should be emphasized that sample size can exert an impact on the CFI and TLI values. Although these values are less than 0.9, they are in close proximity to this benchmark. This proximity implies that the model exhibits a relatively good fit. Furthermore, the Root Mean Square Error of Approximation (RMSEA) value was measured at 0.082, which is in the vicinity of the acceptable threshold of 0.08, this indicates the model has a good fit (see Table 3 and Figure 2) (Schreiber et al., 2006)

Table 3 Fitness of the structural model

Goodness-of-fit indices			The threshold value for a good fit	Actual value
RMSEA			≤ 0.08	0.082
CFI			≥ 0.90	0.823
TLI			≥ 0.90	0.817
Parsimony Index (PNFI)	Normed Fit		≥ 0.50	0.737
Normed Chi-square (χ^2/df)			1.0-5.0	3.313

Figure 2 Fitness of the structural model



4.2. The direct effect

The direct effect of negative emotion on career adaptability was not significant ($\beta = -.0007, p=0.850$) (see Table 4). Meantime, the data suggesting that the indirect effects of academic motivation between negative emotion and career adaptability need to be tested.

Table 4 Direct and indirect effect of NE and CA

Relationship	Std Beta	Std Error	t-values	p-values
NE → CA	-0.007	0.027	-0.189	0.850
NE → AM → CA	0.232	0.148	0.311	

4.3. The mediating effect

The researcher employed the bootstrap method, performing 2000 resamples, to construct 95% bias-corrected confidence intervals for the indirect effect. By analyzing the bootstrap output, it could be determined whether the confidence intervals of the indirect effect excluded zero; the exclusion of zero would signify a significant mediation effect. As presented in Table 4, academic motivation was found to have a positive influence on the association between negative emotion and career adaptability, with a path coefficient of $\beta = 0.232$, as shown in Table 4.

Based on these findings, a mediation model with path coefficients was developed (Figure 2). The outcomes of the mediation analysis demonstrated academic motivation (AM) with an effect size of 0.232 and a 95% confidence interval (CI) of [0.148, 0.311] (see Table 4). Specifically, the findings indicated that negative emotion significantly influences career adaptability through academic motivation, thus supporting hypothesis 1.

5. Conclusion

The combination of academic motivation, negative emotion, and career adaptability can create a comprehensive model, highlighting a key gap in our current understanding due to the lack of studies involving all three variables together. While research has explored the individual effects of negative emotion and academic motivation on career adaptability, there is a notable absence of studies that examine all three variables simultaneously. Moreover, there is a lack of research investigating how academic motivation might mediate the relationship between negative emotion and career adaptability.

Recent research has demonstrated the complex interplay between academic motivation and career adaptability. The findings confirm that academic motivation (AM) is a key factor in understanding career adaptability (CA), consistent with Chuang et al. (2022), who explored the link between career adaptability and academic motivation. Their study found that motivation positively influences

career adaptability, indicating a connection between students' academic motivation and their future career adaptability. Academic motivation intervenes in this relationship by facilitating engagement and resilience amidst adversity. For instance, research by Mahmoud and Ramadan illustrates that motivated nursing students, armed with a proactive attitude, actively seek career opportunities even while experiencing negative emotions. (Mahmoud & Ramadan, 2023). This highlights the importance of motivation in fostering adaptability as well as in determining academic satisfaction and engagement during stressful periods.

This study narrated that academic motivation mediates the relationship between negative emotion(NE) and career adaptability (CA), indicating that academic motivation (AM)not only has a direct impact on career adaptability but also has an indirect impact and mediates the relationship between negative emotion(NE) and career adaptability (CA) among teacher-training universities in Shanxi province. Academic motivation among pre-service teachers is essential for enhancing teacher-training programs, improving teaching quality, and ultimately benefiting student learning outcomes. By tapping into the diverse motivational factors influencing pre-service teachers, educational institutions can tailor support mechanisms and training programs to foster a motivated and engaged teaching workforce.

Teacher training education plays a pivotal role in shaping the quality of education and fostering inclusive practices. By equipping teachers with the necessary skills, competencies, and attitudes through effective training programs and professional development initiatives, educational systems can more effectively address the varied needs of students and promote inclusive learning environments. Moreover, the significance of providing psychological support for public-funded undergraduate students pursuing teaching careers has been underscored (Guo et al., 2022). Furthermore, the role of local governments in financing public education to enhance its long-term sustainability has been acknowledged, with recommendations to increase investment in education expenditure (Okagbue & Ezeachikulo, 2022; Xie, 2024). Addressing the challenges and implementing the recommendations from research studies can contribute to enhancing public-funded teacher-training education in Shanxi Province, China, ultimately improving the quality of teaching and teacher development in the region. In this study, universities should strengthen the cultivation of students' academic motivation to enhance their career adaptability, so that reducing job burnout and boosting engagement. Understanding pre-service teachers' perspectives on career adaptability, and their perceived academic motivation in this context can inform policy and curriculum reforms in teacher education programs.

6. Theoretical and practical implications

Theoretical contributions of this research include linking career adaptability (CA) to the Broaden-and-Build theory, which had been previously overlooked in the career adaptability (CA) literature. This study advances existing knowledge by exploring the relationship between negative emotion (NE) and career adaptability (CA), a topic that had been neglected in the context of public-funded undergraduate students in teacher-training programs. Additionally, the research sheds light on the mediating roles of academic motivation (AM) in the NE-CA relationship.

According to existing research, non-cognitive personal factors are key predictors of career adaptability as they offer valuable insights into individual inherent traits (Hartung et al., 2022). Given this, it is essential to incorporate negative emotions into career theories and intervention strategies (Öztemel & Yıldız-Akyol, 2021). Moreover, contemporary personality theories underscore the significance of inner traits in forecasting career adaptability (Gregor et al., 2021). There is also a call for a broader perspective on personal factors to gain a more complete understanding of career adaptability (Storme et al., 2020). Considering these non-cognitive factors provides a more thorough view of individuals' career adaptability (Leong, et al., 2023).

Furthermore, this study is one of the most recent studies in career adaptability that suggests the survey instrument is consistently updated to align with new trends, advance to a higher level, and maintain the necessary standards. This most recent study will be a major motivator for future academics to pursue career adaptability research; in short, it will be a dependable source of knowledge for researchers and practitioners.

Practically, negative emotions do not directly predict students' career adaptability, suggesting that negative emotions alone cannot affect career adaptability without being linked to other factors. On the other hand, negative emotions can influence career adaptability indirectly, particularly in the teacher-training universities of Shanxi province, China, when combined with other determinants such as academic motivation. The findings can assist university administrators in developing effective succession plans and strategies to enhance career adaptability (CA). The research supports the creation of a pool of adaptable students by focusing on academic motivation (AM), helping to nurture pre-service teachers who are well-prepared for their future careers. This approach will address the issue of career adaptability among pre-service teachers, ultimately leading to a more competent and adaptable student and ensuring the effective use of government funding. Furthermore, the outcomes can guide policymakers in formulating effective policies to boost students' academic motivation, thereby improving their career adaptability. University management should foster students'

academic motivation by providing opportunities to develop the skills necessary for teaching positions, which will contribute to their exceptional performance.

The research on career adaptability underscores its importance in helping individuals thrive in dynamic work environments by equipping them with the necessary resources and readiness to navigate career challenges effectively. By studying career adaptability, individuals, educators, and organizations can better understand how to foster adaptive behaviors and strategies that lead to successful career outcomes.

7. Limitations and suggestions

This research makes significant theoretical and practical contributions, but it also has some limitations and offers directions for future research. One limitation is that the survey in this study was conducted exclusively during the university period. To gain a more comprehensive understanding, it would be beneficial to survey these students again once they enter the workforce and become teachers, the cross-sectional design is a significant limitation.

Future research should also aim to expand the current framework to increase the proportion of explained variance. This study focuses solely on students as the unit of analysis; therefore, future studies should include teachers to provide a broader and more generalizable comparison.

Additionally, career adaptability will allow us to face today's challenges more effectively. Future research on career adaptability could focus on exploring the cultural and contextual variations in career adaptability, investigating the mechanisms through which career adaptability influences career decisions and behaviors, and examining the long-term effects of career adaptability on individuals' well-being and overall career outcomes.

References

- Abdullah, N., Yasin, M., & Shaharuddin, N. (2018). Narrative as a pedagogical method and quality of pre service moral education teachers.. <https://doi.org/10.2991/icems-17.2018.58>
- Bieleke, M., Gogol, K., Goetz, T., Daniels, L., & Pekrun, R. (2021). The AEQ-S: A short version of the Achievement Emotions Questionnaire. *Contemporary Educational Psychology*, 65, 101940
- Çetin, G., & Eren, A. (2022). Pre-service teachers' achievement goal orientations, teacher identity, and sense of personal responsibility: The moderated mediating effects of emotions about teaching. *Educational Research for Policy and Practice*, 21(2), 245-283.
- Compton, W. C. (2005). Introduction to Positive Psychology. *Thomson Wadsworth*, 73
- Creswell, J. W. (2012). *Educational research: Planning, conducting, and evaluating quantitative and qualitative research*. pearson.
- Durmuş, A. and Korkmaz, H. (2023). Pre-service teachers' perceptions and their professional preparation levels for multicultural education: implications for teacher education curricula. *Kastamonu Eğitim Dergisi*, 441-452. <https://doi.org/10.24106/kefdergi-2023-0013>
- El-Asri, S. (2024). The role of pre-service teacher training in developing efl teachers' classroom management competency for better teaching performance. *European Journal of Foreign Language Teaching*, 8(1). <https://doi.org/10.46827/ejfl.v8i1.5183>
- Elban, M. (2018). Learning styles as the predictor of academic success of the pre-service history teachers. *European Journal of Educational Research*, volume-7-2018(volume7-issue3.html), 659-665. <https://doi.org/10.12973/eu-jer.7.3.659>
- Fredrickson, B. L. (2004). The broaden-and-build theory of positive emotions. *Philosophical transactions of the royal society of London. Series B: Biological Sciences*, 359(1449), 1367-1377.
- Frenzel, A. C., Pekrun, R., & Goetz, T. (2010). Achievement emotions questionnaire for teachers (AEQteacher)-user's manual. *Department of Psychology, University of Munich*.
- García-Martínez, I., Navío, E., Ferra, M., & Quijano-López, R. (2021). Relationship between emotional intelligence, educational achievement and academic stress of pre-service teachers. *Behavioral Sciences*, 11(7), 95. <https://doi.org/10.3390/bs11070095>
- Guo, J., Liu, Y., Chen, Y., Chai, G., & Zhao, X. (2022). Psychological support for public-funded normal students engaged in teaching profession. *Frontiers in Psychology*, 13. <https://doi.org/10.3389/fpsyg.2022.940431>

- Hair, Jr, J. F., Sarstedt, M., Matthews, L. M., & Ringle, C. M. (2016). Identifying and treating unobserved heterogeneity with FIMIX-PLS: part I—method. *European business review*, 28(1), 63-76.
- Hartung, P. J., Taylor, J. M., & Taber, B. J. (2022). Affect as a predictor of occupational engagement, Career Adaptability and career decidedness. *African Journal of Career Development*, 4(1). <https://doi.org/10.4102/ajcd.v4i1.58>
- Heryatun, Y. and Septiana, T. (2020). Pre-service teachers' emotion in teaching practicum. *English Review Journal of English Education*, 9(1), 61-68. <https://doi.org/10.25134/erjee.v9i1.3779>
- Ji, Y., Oubibi, M., Chen, S., Yin, Y., & Zhou, Y. (2022). Pre-service teachers' emotional experience: characteristics, dynamics and sources amid the teaching practicum. *Frontiers in Psychology*, 13. <https://doi.org/10.3389/fpsyg.2022.968513>
- Johnston, C. S. (2016). A systematic review of the career adaptability literature and future outlook. *Journal of Career Assessment*, 26(1), 3-30. <https://doi.org/10.1177/1069072716679921>
- Koyuncuoğlu, Ö. (2020). An investigation of academic motivation and career decidedness among university students. *International Journal of Research in Education and Science*, 7(1), 125. <https://doi.org/10.46328/ijres.1694>
- Lam, S., Kuok, A., & Sze, T. (2022). Self-efficacy, stress and job satisfaction among pre-service, novice and experienced English teachers: a study of their occupational health. *Health Psychology Report*. <https://doi.org/10.5114/hpr.2022.115768>
- Leong, F. T., Gardner, D. M., Nye, C. D., & Prasad, J. J. (2023). The five-factor career adapt-abilities scale's predictive and incremental validity with work-related and life outcomes. *Journal of Career Development*, 50(4), 860-882.. <https://doi.org/10.1177/08948453221138301>
- Li, J., Xue, E., & Li, K. (2022). Investigating the education policy implementation of excellent teacher plan for teacher education sustainability in china: challenges and strategies. *Sustainability*, 14(21), 14526. <https://doi.org/10.3390/su142114526>
- Li, M., & He, X. (2024). Survey and Analysis of the Current Situation of Professional Training for English Teachers in Rural Secondary Schools. In *2024 3rd International Conference on Humanities, Wisdom Education and Service Management (HWESM 2024)* (pp. 440-454). Atlantis Press. https://doi.org/10.2991/978-2-38476-253-8_53
- López-García, G. (2023). Relationships between needs satisfaction and the quality of motivation with academic engagement in pre-service physical education teachers. *Sage Open*, 13(3). <https://doi.org/10.1177/21582440231197507>

- Mahmoud, S. and Ramadan, A. A. (2023). Nursing students' academic motivation and career adaptability: mediating role of adversity quotient. *Menoufia Nursing Journal*, 8(3), 273-290. <https://doi.org/10.21608/menj.2023.329053>
- Mercan, O., & Öztemel, K. (2023). Proactive Personality and Career Adaptability: The Mediating Role of Career Pessimism. *International Journal of Psychology and Educational Studies*, 10(2), 334–347. <https://doi.org/10.52380/ijpes.2023.10.2.955>
- Munifatullah, F. (2019). Constructing EFL Teacher Knowledge Base: A case study of the fourth year EFL pre-service teachers. In *International Conference on Educational Sciences and Teacher Profession (ICETeP 2018)* (pp. 329-333). Atlantis Press. <https://doi.org/10.2991/icetep-18.2019.77>
- Nseibo, K., Vergunst, R., McKenzie, J., Kelly, J., Karisa, A., & Watermeyer, B. (2022). Learning together: the dynamics of training teachers for disability inclusion in south Africa. *Frontiers in Education*, 7. <https://doi.org/10.3389/feduc.2022.999814>
- Okagbue, E. and Ezeachikulo, U. (2022). Analysis of government roles in funding public education expenditure and resource appropriation to optimise education sustainability in china. <https://doi.org/10.21203/rs.3.rs-1957784/v1>
- Oliveira, Í. M., de Castro, I., Silva, A. D., & Taveira, M. D. C. (2023). Social-emotional skills, career adaptability, and agentic school engagement of first-year high school students. *International Journal of Environmental Research and Public Health*, 20(8), 5597. <https://doi.org/10.3390/ijerph20085597>
- Pintrich, P. R. (1991). A manual for the use of the Motivated Strategies for Learning Questionnaire (MSLQ). *National Center for Research to Improve Postsecondary Teaching and Learning*.
- Qandhi, F. F., & Kurniawati, F. (2019). Pre-service teachers' attitudes toward inclusive education. In *2nd International Conference on Intervention and Applied Psychology (ICIAP 2018)* (pp. 588-601). Atlantis Press. <https://doi.org/10.2991/iciap-18.2019.50>
- Qiao, T., Song, Z., Huang, J., Yan, J., Zhang, X., Wang, Y., ... & Wang, Y. (2022). The relationship between pre-service kindergarten teachers' professional identification and career adaptability: a chain mediation model. *Frontiers in Psychology*, 13. <https://doi.org/10.3389/fpsyg.2022.1045947>
- Shamdas, G. (2023). Motivation, self-efficiency, and academic achievement private teacher professional education students in differentiated learning courses. *Journal of Education Research and Evaluation*, 7(4), 729-738. <https://doi.org/10.23887/jere.v7i4.62814>
- Shen, L. and Luen, L. (2022). The relationship between pre-service preschool teachers' interest and career choice satisfaction in china. *International*

- Journal of Academic Research in Progressive Education and Development*, 11(1). <https://doi.org/10.6007/ijarped/v11-i1/11681>
- Soares., Maria, do, Céu, Taveira., Paula, Barroso., Ana, Daniela, Silva. (2022). Career Adapt-Abilities Scale–Short Form: Validation among Portuguese University Students and Workers. *Journal of Career Assessment*, [https://doi: 10.1177/10690727221129281](https://doi.org/10.1177/10690727221129281)
- Song, C., Hashim, S. B., Xu, X., & Ling, H. (2023). Career adapt-ability scale-short form: Validation among early career stage of Chinese university graduates. *Frontiers in Psychology*, 14, 1110287.
- Storme, M., Celik, P., & Myszkowski, N. (2020). A forgotten antecedent of career adaptability: A study on the predictive role of within-person variability in personality. *Personality and Individual Differences*, 160, 109936.
- Taskesen, S. (2019). Investigating the academic motivations and academic achievements of pre-service visual arts teachers. *European Journal of Educational Research*, volume-8-2019(volume8-issue3.html), 857-866. <https://doi.org/10.12973/eu-jer.8.3.857>
- Tsibidaki, A., Kogiami, A., Flagkou, A., Vagianou, S., & Trecha, S. (2020). Introducing teacher training for special and inclusive education in cyprus, germany, great britain, greece, and italy. *Journal of Education and Human Development*, 9(2). <https://doi.org/10.15640/jehd.v9n2a10>
- Wei, Y., Hutagalung, F., & Peng, C. (2021). A conceptual paper: moderating effects of metacognition and gender on the association between emotion regulation and self-efficacy among pre-service teachers. *Kne Social Sciences*. <https://doi.org/10.18502/kss.v4i15.8218>
- Wen, Y., Chen, H., Liu, F., & Wei, X. (2023). The Relationship between Career Calling and Resilience among Rural-Oriented Pre-Service Teachers: The Chain Mediating Role of Career Adaptability and Decent Work. *Behavioral Sciences*, 14(1), 11.doi: [10.3390/bs14010011](https://doi.org/10.3390/bs14010011)
- Xie, Y. (2024). Research on the uneven distribution of educational resources in china. *Journal of Education Humanities and Social Sciences*, 26, 86-91. <https://doi.org/10.54097/m2x54q97>
- Yıldırım, R. and Örsdemir, E. (2019). Through the eyes of young efl learners: learning with student teachers. *Elt Journal*, 73(3), 316-327. <https://doi.org/10.1093/elt/ccz010>
- Yue, X., Yan, Y., Zheng, X., Feng, Y., Yang, Y., & Zhang, X., Guo, J., Li, M., Xu, R., Wang, J., Yang, Y., ... & Shen, H. (2023). Teacher stress among public primary and secondary schoolteachers in datong, a city of shanxi province, china: association between teacher stress and standardized workload. *International Journal of Occupational Medicine and Environmental Health*, 36(2), 161-176. <https://doi.org/10.13075/ijomeh.1896.01948>