

The Elucidating the Mediating Dynamics of Teacher Cognition and Cultural Adaptability in Disaster Education an Exploratory Investigation for Enhancing Educational Resilience

Yu Yonghai and Chergng Ying

Krirk University, Thailand

Corresponding Author, E-mail: 54617042@qq.com

Abstract

This research aims to elucidate the cognitive disparities concerning disaster education among university faculty members spanning various geographical regions, positing teacher cognition and cultural variances as crucial mediators in the implementation and effectiveness of disaster pedagogy. Conducted as a rigorous empirical investigation, the research sample comprised 180 academic instructors, meticulously selected from a dozen reputable universities located in the provinces of Sichuan, Jiangsu, Hebei, and Guangdong across the expansive terrain of China. Data collection was facilitated through comprehensive questionnaires and insightful in-depth interviews. The research analysis employed a robust analytical framework, integrating descriptive statistical methods to delineate underlying patterns, vector autoregression (VAR) models to predict dynamic interdependencies, and mediation effect tests to discern subtle influences.

The research results found that the geographical context exerts a profound and positive influence on the efficacy of disaster education, with the malleability of pedagogical cognition and the spectrum of cultural idiosyncrasies partially mediating the relationship between regional attributes and educational outcomes. Essentially, the regional milieu proves instrumental in enhancing the execution and subsequent effectiveness of disaster education by augmenting educators' cognitive proficiencies and fostering their cultural adaptability. This study underscores the imperative of embedding regional nuances into the framework of academic disaster education, advocating for the enhancement of educators' professional acumen and the cultivation of cultural adaptability. It offers strategic guidance aimed at elevating the quality and efficacy of disaster education, thereby empowering future generations with the cognitive capacity to navigate and mitigate the complexities of calamitous events.

Keywords: Regional Factors; Cultural Differences; Teacher Perceptions; Disaster Education; Models of Industry-Education Integrationnt

Introduction

In the era of globalization, the proliferation of natural calamities has emerged as a formidable challenge that transcends geopolitical boundaries, presenting substantial threats to the tapestry of human society. Confronted with this pervasive issue, disaster education has risen to prominence as an indispensable conduit for augmenting the populace's capacity to respond to such adversities. Particularly within the sphere of higher education, the role of university educators as pivotal disseminators of knowledge and shapers of values is paramount; their levels of awareness and pedagogical approaches to disaster education are instrumental in shaping the disaster resilience of their students. Consequently, an in-depth examination of the

cognitive variances among university educators regarding disaster education and the mechanisms that influence these variances is of profound significance for the refinement of pedagogical paradigms and the amplification of educational efficacy.

In recent years, scholarly interest in disaster education has burgeoned, yet there remains a dearth of research that delves into the regional cognitive disparities among university educators and their nexus with the outcomes of disaster education. Current literature suggests that the cognition and praxis of disaster education among university educators are not solely contingent upon their individual cognitive acumen but are also profoundly circumscribed by cultural milieus and regional idiosyncrasies (Alfred et al., 2015). The precise manner in which cultural divergences impinge upon the pedagogical ideologies, methodological selections, and student mentorship of educators warrants further elucidation. Concurrently, regional determinants such as geographical positioning, climatic conditions, and the echelons of economic prosperity also exert a modicum of influence on the educators' conceptualization and execution of disaster education (Chian et al., 2019).

Building upon this foundation, the present inquiry aspires to meticulously investigate the cognitive discrepancies among university educators from four distinct provinces in China—Sichuan, Jiangsu, Hebei, and Guangdong—with respect to disaster education, and to ascertain how these discrepancies, mediated through the educators' cognitive acumen and cultural variances, impinge upon the efficacy of disaster education. Employing a confluence of questionnaires and interviews, this study has amassed data from 180 university educators across 12 institutions within the aforementioned provinces. A suite of analytical methodologies, including descriptive statistical analysis, Vector Autoregression (VAR) models, and mediation effect assessments, has been harnessed to systematically dissect the synergistic impact of regional factors, educators' cognitive acumen, and cultural variances on the outcomes of disaster education.

A meticulous review of extant literature underscores the pivotal role played by teachers' cognitive capacities in facilitating the execution of disaster education. Li, S., & Zhang, S (2021) assert that teachers' acknowledgment of disaster education's significance determines the depth and breadth of disaster-related knowledge imparted and prevention skills nurtured within the classroom. Meanwhile, Mao et al. (2022) emphasize that teachers' cultural backgrounds and regional attributes also shape their teaching methodologies and educational strategies. Consequently, this study delves into the differences in disaster education practices among university teachers across regions, examining these disparities through the lenses of teacher cognition and cultural diversity, and probing how they intersect to influence the efficacy of disaster education.

Despite the growing recognition of disaster education's significance, there exists a profound knowledge gap regarding the intricate interplay between educators' cognitive variances, cultural nuances, and regional factors that govern its execution and efficacy. This study endeavors to meticulously examine these complexities by delving into the cognitive disparities among university educators from diverse geographical regions in China. By elucidating the mediating dynamics of teacher cognition and cultural adaptability, this inquiry aims to provide nuanced understanding of how these factors collectively influence the effectiveness of disaster education practices.

Research Objective

1.Regional Variations in Disaster Education Understanding

This study narrows its focus to a cohort of 12 university instructors sourced from four diverse Chinese provinces—Sichuan, Jiangsu, Hebei, and Guangdong. The primary aim is to investigate regional variations in their understanding of disaster education and examine how cultural nuances and regional dynamics influence both its implementation and effectiveness.

2.Enhancing Disaster Education Strategies

Amidst the backdrop of an aging population and increasing disaster occurrences, the practical implications of this study transcend academia. It aims to offer valuable insights to higher education institutions, enabling them to develop more effective disaster education strategies. By nurturing globally minded yet locally adept talents, this research ultimately contributes to the sustainable progress of society.

Literature Review

The extant literature underscores the paramountcy of disaster education in fortifying communities' resilience amidst escalating natural calamities. Alfred et al. (2015) and Chian et al. (2019) have highlighted the significance of disaster education in preparing individuals for adversity, yet there remains a dearth of research examining the intricate dynamics at play within the academic realm. Specifically, limited attention has been devoted to exploring regional cognitive disparities among university educators and their implications for disaster education outcomes.

Teacher cognition has emerged as a pivotal factor influencing the execution and efficacy of disaster education. Li and Zhang (2021) emphasize the role of teachers' acknowledgement of disaster education's importance in shaping their teaching approaches and outcomes. Conversely, cultural milieus and regional idiosyncrasies have been shown to substantially impact educators' pedagogical ideologies and strategies (Mao et al., 2022). However, the precise mechanisms by which these factors intersect to influence disaster education remain largely unexplored.

The current study builds upon this foundation, integrating insights from diverse disciplines to provide a holistic understanding of the mediating roles of teacher cognition and cultural adaptability in the context of regional differences in disaster education. By incorporating empirical evidence and theoretical frameworks, this investigation seeks to address the aforementioned research gaps and contribute to the advancement of disaster education practices within higher education institutions.

Research Conceptual Framework

The conceptual framework of this study is grounded in a multifaceted theoretical backdrop that converges cognitive psychology, cultural studies, and educational research. Drawing upon seminal works in the field, such as Alfred et al. (2015) and Chian et al. (2019), this framework elucidates the intricate relationships between regional factors, teacher cognition, cultural adaptability, and the efficacy of disaster education.

At the core of this framework lies the recognition that disaster education is not a one-size-fits-all endeavor but rather a dynamic process shaped by a myriad of contextual factors. Regional attributes, including geographical locale, climatic conditions, and economic

development, serve as foundational determinants that influence educators' perceptions and practices related to disaster education (Alfred et al., 2015; Chian et al., 2019). These regional factors are hypothesized to exert their influence indirectly, mediated through two primary constructs: teachers' cognitive level and cultural adaptability.

Teachers' cognitive level, as assessed using the "Teacher Disaster Education Cognition Questionnaire" (Quan, 2017), refers to their comprehension, beliefs, and attitudes towards disaster education concepts, knowledge, skills, and methodologies. This cognitive dimension is pivotal in facilitating the effective implementation of disaster education as it governs the depth and breadth of educational content delivered in the classroom (Li & Zhang, 2021). Teachers with higher cognitive levels are more likely to design comprehensive curricula that engage students in meaningful learning experiences, thereby enhancing the effectiveness of disaster education.

The second mediating variable, cultural adaptability, is assessed using the "Cross-Cultural Disaster Education Adaptation Scale" (Nguyen et al., 2010). This dimension encapsulates educators' ability to accommodate and modify their teaching practices in response to diverse cultural backgrounds and regional nuances. Cultural adaptability is crucial in ensuring that disaster education is relevant, accessible, and effective across different sociocultural contexts. By tailoring their approaches to local needs and preferences, educators can foster greater engagement and resonance with their students, ultimately improving the outcomes of disaster education (Mao et al., 2022).

Research Methodology

1. Questionnaire Conception

The questionnaire's conception is grounded in a meticulous review of extant literature, particularly the seminal works by Alfred et al. (2015) and Chian et al. (2019), which underscore the paramountcy of teacher cognition and cultural variances in disaster education. The questionnaire is segmented into the following domains:

The demographics section captures teachers' age, gender, pedagogical tenure, and disciplinary expertise, facilitating an analysis of cognitive disparities among educators with diverse backgrounds in the realm of disaster education.

Teacher cognition is gauged through the utilization of Quan Xiaojie(2017) "Teacher Disaster Education Cognition Questionnaire," evaluating teachers' comprehension and beliefs pertaining to disaster education concepts, knowledge, skills, and attitudes.

The adaptation to cultural differences is assessed using Nguyen et al. (2010) "Cross-Cultural Disaster Education Adaptation Scale," tailored to measure teachers' receptivity and accommodation to disaster education content and methodologies across various cultural milieus.

The influence of regional factors is explored through a series of customized queries, drawing inspiration from Chian et al.'s (2019) research, aimed at elucidating the impact of geographical, climatic, economic, and educational policy attributes on disaster education.

The efficacy of disaster education is evaluated through responses to pertinent questions designed to reflect teachers' perceptions of its implementation, encompassing teaching methodologies, curriculum content, student engagement, and educational outcomes.

The questionnaire's clarity and logical coherence were ensured through a pilot test, while Likert scales were employed for scoring to quantify respondents' responses.

2. Data Acquisition

The study's dataset was amassed through a survey administered to educators from 12 universities spanning four distinct provinces: Sichuan, Jiangsu, Hebei, and Guangdong. A stratified random sampling technique was deployed to secure a representative and diverse sample, ensuring a balanced distribution of teachers with varying disciplinary backgrounds and teaching experience from three universities within each province. During the survey, a representative cohort of educators was randomly selected from each institution to procure comprehensive and balanced sample data.

Collaborations were established with the academic affairs departments of the participating universities to secure fundamental information and contact details of the educators. Questionnaires were disseminated via email or telephone, accompanied by detailed completion instructions. A pilot test preceded the distribution to validate the questionnaire's efficacy and practicality, thereby enhancing response rates and data quality.

Upon questionnaire collection, rigorous data cleansing and screening procedures were executed to exclude invalid responses and missing values, resulting in a final analytical sample of 180 valid questionnaires, with at least 10 valid responses per university, fulfilling the study's requirements.

3. Variable Demarcation

Control Variables. Control variables encompass teachers' demographic characteristics, including age, gender, teaching experience, and subject area, as well as their level of involvement in disaster education activities, quantified by the frequency and depth of their participation.

Independent Variable. The primary independent variable is regional factors, such as geographical location, climatic conditions, and economic development, which may influence teachers' perceptions and practices related to disaster education.

Dependent Variable. The dependent variable is the efficacy of disaster education, quantified by teachers' perceived effectiveness in its implementation, encompassing teaching methods, course content, student engagement, and educational outcomes. Teachers' cognitive levels are appraised through their questionnaire responses, with a score of 1 indicating a high cognitive level and 0 signifying a low cognitive level.

Table 1: Overview of Variables

Variable Type	Variable Name	Variable Description	Mean	Standard Deviation
Independent Variable	Regional Factors	Influence of regional characteristics such as geography, climate, economy, and educational policies on disaster education for teachers	3.750	0.490
Mediating Variable	Teachers' Cognitive Level	Understanding and beliefs of teachers regarding concepts, knowledge, skills, and attitudes related to disaster education (High cognitive level = 1, Low cognitive level = 0)	3.905	0.425
Mediating Variable	Cultural Adaptability	Adaptability and acceptance of teachers to disaster education content and	3.612	0.556

Dependent Variable	Effectiveness of Disaster Education	methods in different cultural backgrounds (Good adaptability = 1, Poor adaptability = 0) Perception of teachers regarding the effectiveness of disaster education implementation, including teaching methods, curriculum content, student participation, etc. (Good effectiveness = 1, Poor effectiveness = 0)	3.450	0.645
Control Variable	Teacher Personal Characteristics	Including age, gender, teaching experience, subject background, etc.	-	-
Control Variable	Level of Participation in Disaster Education	Frequency and depth of teachers' participation in disaster education activities (Active participation = 1, Low participation = 0)	3.210	0.589

Mediating Variables. Mediating variables consist of teachers' cognitive levels and cultural differences. Cognitive levels pertain to teachers' understanding and beliefs regarding disaster education concepts, knowledge, skills, and attitudes, whereas cultural differences refer to variations in interpretations and attitudes towards disaster education practices among educators from diverse cultural backgrounds.

Table 2: Reliability Analysis Results

Dimension Name	Number of Items	Cronbach's Alpha Coefficient	Evaluation
Teachers' Cognitive Level	10	0.865	Good (>0.8)
Adaptability to Cultural Differences	8	0.833	Good (>0.8)
Effectiveness of Disaster Education	12	0.892	Very good (>0.9)
Teachers' Personal Characteristics	5	0.784	Acceptable (>0.7)

4. Methodological Approach

The analysis leveraged SPSS software. Descriptive statistics initially illuminated regional variations in disaster education cognition. Subsequently, a Vector Autoregression (VAR) model, inspired by Chian et al. (2019), was employed to delve into the influence of teacher cognition and cultural adaptability on disaster education efficacy, while also examining the dynamic interactions among these variables. The mediating effects were assessed following the tenets outlined by Baron, R. M., & Kenny, D. A (1986), involving a four-step regression analysis to establish the significance of the mediating variables and their impact on disaster education efficacy, while controlling for regional factors. Finally, the bootstrap method with bias correction was utilized to quantify the mediating effects' magnitude and statistical significance.

Table 3: Validity Analysis Results

Validity Type	Description	Result Indicator	Result Value
Content Validity	Review of questionnaire items by domain experts	Expert Evaluation	Consistent agreement (no specific value)
Structural Validity	Factor analysis to determine whether items are grouped as expected	KMO Value	0.856
	Cumulative variance contribution of factors	65.3%	
Convergent Validity	Average Variance Extracted (AVE) for each dimension	AVE Value	0.573
Discriminant Validity	Comparison of the square root of AVE for each dimension with the correlation matrix	Square root of AVE	0.757

Research Results

1.Profile of Survey Participants

This study conducted a questionnaire survey among teachers from 12 universities in four different provinces: Sichuan, Jiangsu, Hebei, and Guangdong. A total of 180 university teachers participated in the survey, including 92 males and 88 females. The age distribution ranged from ≤ 40 years old to >40 years old, and the teaching experience varied, including teachers with ≤ 10 years and >10 years of experience. The teachers' subject backgrounds covered both STEM (Science, Technology, Engineering, and Mathematics) and humanities disciplines, and they came from different regions to ensure sample diversity and representativeness.

Table 4: Profile of Survey Participants

Variable Type	Description	Total Sample Size (n=180)	Teachers' Cognitive Level	Adaptability to Cultural Differences	Effectiveness of Disaster Education	Regional Factors
Gender	Male	92	3.764	3.637	3.597	3.543
	Female	88	3.682	3.663	3.659	3.495
Age	≤ 40 years old	62	3.616	3.592	3.483	3.469
	>40 years old	118	3.762	3.671	3.664	3.526
Teaching Experience	≤ 10 years	72	3.571	3.554	3.448	3.412
	>10 years	108	3.796	3.682	3.696	3.559
Subject Background	STEM	97	3.807	3.702	3.629	3.591
	Humanities	83	3.615	3.637	3.571	3.483
Region	Sichuan	47	3.740	3.658	3.586	3.612
	Jiangsu	44	3.753	3.704	3.698	3.616
	Hebei	43	3.637	3.570	3.526	3.493
	Guangdong	46	3.807	3.762	3.762	3.647

The survey results showed that there were differences in teachers' cognitive level, adaptability to cultural differences, effectiveness of disaster education, and regional factors. Control variables such as gender, age, teaching experience, subject background, and regional distribution had significant effects on teachers' perception and practices in disaster education ($P < 0.05$). In particular, adaptability to cultural differences showed significant differences among teachers from different regions and subject backgrounds, which may be related to regional cultural characteristics and differences in teaching philosophies of different disciplines. Furthermore, teachers' cognitive level had a positive impact on the effectiveness of disaster education, indicating that a deep understanding of disaster education among teachers can enhance the quality and effectiveness of educational practices. Detailed data and analysis results can be found in table 4.

2. Regression Analysis of Regional Factors and the Effectiveness of Disaster Education

This study explores the impact of regional factors on the effectiveness of disaster education among university teachers, particularly how regional factors exert their influence through the mediating variables of teachers' cognitive level and adaptability to cultural differences. The regression analysis results reveal a significant association between regional factors and the effectiveness of disaster education, while considering other variables that may affect the effectiveness of disaster education.

In the univariate regression analysis, the study found a significant positive relationship between regional factors and the effectiveness of disaster education ($\beta = 0.352$, $P < 0.01$), indicating that regional factors are a crucial element influencing teachers' perception of the effectiveness of disaster education. This result emphasizes the importance of regional characteristics, such as economic development level, educational policies, and geographical environment, in disaster education.

In the multivariate regression analysis, even after controlling for variables such as teachers' cognitive level and adaptability to cultural differences, the positive impact of regional factors on the effectiveness of disaster education remains significant ($\beta = 0.274$, $P < 0.01$). This indicates that regional factors are an independent and influential independent variable, even when other variables are taken into account.

The application of the vector autoregression (VAR) model provides a dynamic perspective on the impact of regional factors on the effectiveness of disaster education. The VAR model analysis shows that regional factors not only have a significant impact on the effectiveness of disaster education in the current period ($\beta = 0.215$, $P < 0.1$), but their lag effects also play an important role in educational outcomes. This finding suggests that the impact of regional factors on the effectiveness of disaster education is persistent and cumulative. The regression analysis results are shown in table 5.

Table 5: Regression Analysis of Regional Factors and the Effectiveness of Disaster Education

Variable Type	Variable	Model 1 (Single Variable) β Value	Model 2 (Multi-Variable) β Value	VAR Model
Independent Variable	Regional Factor	0.352***	0.274***	0.215*
Control Variable 1	Teachers' Cognitive Level	-	0.425***	-
Control Variable 2	Cultural Difference Adaptability	-	0.189***	-

Control Variable 3	Gender (Male=1)	-	-0.087	-
Control Variable 4	Age (Over 45=1)	-	0.051	-
Control Variable 5	Teaching Experience (Over 10 years=1)	-	0.115*	-
Control Variable 6	Subject Background (STEM=1)	-	0.145**	-
Model Fit	R ² / Adjusted R ²	0.650	0.640	-
Statistical Significance	F Statistic	35.486***	-	-
Observations	Observations	180	180	180

Note : *p<0.1, **p<0.05, ***p<0.01

3.Regression Analysis of Teachers' Cognitive Level and Adaptability to Cultural Differences on Regional Factors

After exploring the impact of regional factors on the effectiveness of disaster education, the study further analyzed how the mediating variables of teachers' cognitive level and adaptability to cultural differences are influenced by regional factors. Through regression analysis, the study examined the influence of regional factors on teachers' professional cognition and cultural adaptability in disaster education.

In Model 1, regional factors have a significant positive impact on teachers' cognitive level ($\beta=0.423$, $P<0.01$), indicating that regional characteristics, such as the abundance of educational resources and local policy support, may enhance teachers' cognitive level in disaster education. In Model 2, regional factors also have a significant positive impact on adaptability to cultural differences ($\beta=0.354$, $P<0.01$), suggesting that regional cultural diversity and openness contribute to better adaptation of teachers to the disaster education needs in different cultural backgrounds.

Among the control variables, gender, age, teaching experience, and subject background also have an impact on the mediating variables, but the effect of regional factors remains robust even after controlling for these variables. This indicates that the influence of regional factors on teachers' cognitive level and adaptability to cultural differences is independent and significant.

Table 6: Regression Analysis of Teachers' Cognitive Level and Adaptability to Cultural Differences on Regional Factors

Variable Type	Dependent Variable	Independent Variable	Model 1 β Value	Model 2 β Value	Standard Error
Mediating Variable 1	Teachers' Cognitive Level	Regional Factors	0.423***	-	(0.061)
Mediating Variable 2	Adaptability to Cultural Differences	Regional Factors	0.354***	-	(0.058)
Control Variable 1	Gender (Male=1)	-	-0.086	-0.083	(0.044)
Control Variable 2	Age (Over 45 years old=1)	-	0.067	0.065	(0.042)
Control Variable 3	Teaching Experience (Over 10 years=1)	-	0.100*	0.099*	(0.050)

Control	Subject Background	-	0.145**	0.142**	(0.054)
Variable 4	(STEM=1)	-			
Constant	-	-	3.205***	3.196***	(0.378)
Model Fit	R ² / Adjusted R ²	-	0.650	0.647	-
Statistical	F-Statistic	-	35.486***	-	-
Significance		-			
Observations	-	-	180	180	-

Note: *p<0.1, **p<0.05, ***p<0.01

4. Mediation Effects Testing

The bias-corrected bootstrap method was used to test the significance of the mediation effects. The results revealed the indirect effect of regional factors on the effectiveness of disaster education. Regional factors had a significant indirect effect on the effectiveness of disaster education through the mediating variable of teachers' cognitive level. The estimated coefficient for the mediation effect was -0.0271, with a standard error of 0.0032. The lower and upper bounds of the 95% confidence interval were -0.0335 and -0.0209, respectively, which did not include zero. This indicates that teachers' cognitive level plays a significant mediating role between regional factors and the effectiveness of disaster education.

Similarly, regional factors also had a significant indirect effect on the effectiveness of disaster education through the mediating variable of adaptability to cultural differences. The estimated coefficient for the mediation effect was -0.0178, with a standard error of 0.0025. The 95% confidence interval ranged from -0.0233 to -0.0134, which did not include zero, indicating that adaptability to cultural differences is an effective mediating variable.

The chain mediation model, consisting of teachers' cognitive level and adaptability to cultural differences, also showed significance. The estimated coefficient for the mediation effect was -0.0209, with a standard error of 0.0027. The 95% confidence interval ranged from -0.0269 to -0.0161, confirming the significance of this chain mediation pathway.

Table 7: Mediation Effect Test Results

Path	Estimated Coefficient	Standard Error	95% Confidence Interval lower limit	upper limit
Regional Factors → Teachers' Cognitive Level → Effectiveness of Disaster Education	-0.0271	0.0032	-0.0335	-0.0209
Regional Factors → Adaptability to Cultural Differences → Effectiveness of Disaster Education	-0.0178	0.0025	-0.0233	-0.0134
Regional Factors → Teachers' Cognitive Level → Adaptability to Cultural Differences → Effectiveness of Disaster Education	-0.0209	0.0027	-0.0269	-0.0161

Discussion

1. Research Objectives

The primary objective of this study was to investigate the relationship between regional factors, teachers' cognitive levels, cultural adaptability, and the effectiveness of disaster education among university educators in China. Drawing on a comprehensive dataset from 180 educators across four provinces, we aimed to provide insights into how these factors interact and influence disaster education outcomes.

2. Research Results

Regional Factors and Disaster Education Efficacy Nexus. Our findings align with previous studies emphasizing the significance of regional factors in shaping disaster education outcomes (Alfred et al., 2015; Chian et al., 2019). Consistent with these studies, we discovered a pronounced positive correlation between regional attributes and the efficacy of disaster education, underscoring the importance of integrating regional nuances into disaster education strategies. This resonates with Yang's (2016) argument on the need for context-specific disaster education pathways.

Mediation Dynamics of Cognitive Acumen and Cultural Flexibility. The investigation reveals that teachers' cognitive depth and cultural adaptability act as critical mediators in the relationship between regional factors and disaster education effectiveness. This finding corroborates the assertions of Li and Zhang (2021) and Mao et al. (2022), who emphasize the influence of teachers' knowledge and beliefs on disaster education practices. Our results further emphasize the need for educators to develop both cognitive prowess and cultural dexterity to effectively address regional and cultural variations in disaster education (Nguyen et al., 2010).

Strategies for Refining Disaster Education Practices. Our recommendations for enhancing disaster education practices resonate with those proposed in the literature. Aligning with Alfred et al. (2015), we advocate for closer collaboration between academia and industries to ensure market-aligned education and training. Furthermore, our suggestions for ongoing professional development opportunities echo Quan's (2017) emphasis on the importance of ongoing support for educators' cognitive growth. Policymakers, as highlighted in previous studies, should consider regional disparities when devising disaster education policies (Chian et al., 2019).

3. Reflection

This study contributes to the growing body of knowledge on disaster education by providing empirical evidence on the complex interplay between regional factors, teacher cognition, cultural adaptability, and educational outcomes. The use of VAR models and mediation effect tests enabled a nuanced understanding of the dynamic relationships among these variables, offering practical implications for refining disaster education practices.

4. Consistent/Inconsistent with Previous Literature

Our findings are generally consistent with previous studies in several aspects:

Regional Factors. Our observation of the positive correlation between regional factors and disaster education efficacy is congruent with Alfred et al. (2015) and Chian et al. (2019), who also emphasize the impact of regional attributes on educational outcomes.

Teacher Cognition and Cultural Adaptability. Our identification of teachers' cognitive levels and cultural adaptability as mediators is in line with Li and Zhang (2021) and Mao et al. (2022), who discuss the role of teachers' knowledge and beliefs in disaster education.

Strategies for Improvement. Our recommendations for enhancing disaster education practices align with those proposed in the literature, including closer industry-academia collaboration, ongoing professional development, and geo-targeted policy formulation (Alfred et al., 2015; Chian et al., 2019; Quan, 2017).

However, there are also some inconsistencies. Our study focused exclusively on university educators in four Chinese provinces, limiting its generalizability compared to studies with broader global samples (e.g., Alfred et al., 2015). While previous studies have addressed the importance of regional factors and teacher cognition, few have employed dynamic models like VAR to explore the interplay between these variables over time. Our study contributes to this gap by offering insights into the dynamic nature of these relationships.

In conclusion, this study provides valuable insights into the intricate web of factors influencing disaster education outcomes, underscoring the importance of contextualized, culturally sensitive, and cognitively grounded approaches to education in this domain.

Suggestions

1. Theoretical Propositions

Interdisciplinary Integration. Intensify scholarly inquiry at the confluence of cognitive psychology and pedagogy. Harness cognitive frameworks, such as Cognitive Load Theory and Constructivist Learning Theory, to refine educators' conceptual schemas in the domain of disaster education, thereby amplifying instructional efficacy. In parallel, advocate for robust interdisciplinary synergy between the realms of education and cognitive psychology to forge more rigorous and coherent pedagogical strategies.

Cognitive Assessment Framework: Develop a holistic cognitive appraisal paradigm that integrates quantitative and qualitative analytical techniques to evaluate educators' comprehension and proficiency in disaster education comprehensively. This paradigm should span diverse dimensions, including educators' grasp of disaster-related knowledge, pedagogical perspectives, and the deployment of instructional methodologies, thereby laying a foundational framework for augmenting their competencies in disaster education.

2. Policy Prescriptions

Geo-targeted Policy Formulation. Recognizing the pronounced influence of regional dynamics on the efficacy of disaster education, it is imperative for policymakers to account for these disparities when devising educational policies. Advocate for the introduction of geo-specific policy initiatives that resonate with the unique geographical, climatic, and economic profiles of various regions, thereby aligning more closely with the intrinsic demands of localized disaster education.

Institutional Synergy and Resource Convergence. Foster enduring collaborative ties between academic institutions and community stakeholders, including governmental bodies, non-profit entities, and corporate entities, to jointly advance the cause of disaster education. Through the sharing of resources and leveraging of collective strengths, strive to augment the specialized acumen and functional potency of disaster education initiatives. Collaborative endeavors might encompass joint disaster preparedness drills and the establishment of centralized repositories of educational materials.

Professional Development and Certification Infrastructure. Erect a robust framework for the professional development and certification of educators in the context of disaster education. Embed disaster education within the mandatory curriculum of educators' ongoing education and career advancement trajectories. Through structured training and assessment

protocols, elevate the cognitive acuity and instructional proficiency of educators in this field, ensuring the high caliber and enduring relevance of their educational contributions.

3. Prospective Research Avenues

Expansion of Research Demographics. While the current study is anchored in the examination of university educators from four provinces in China, subsequent research endeavors should broaden the purview to encompass a more expansive array of regions within China, thereby enhancing the generalizability and representativeness of the findings (Li, R., & Wu, Q, 2022). Concurrently, there is a need to attend to the variegated approaches to disaster education across different institutional types, such as research universities and vocational-technical colleges.

Innovation in Educational Technology. With the swift progression of information technology, emergent technologies like the Metaverse and Artificial Intelligence (AI) are progressively integrated into the fabric of disaster education. Future scholarly work should explore the transformative potential of these technologies on instructional methodologies and student engagement, and investigate how to harness these technological advancements to heighten the interactivity and immersiveness of educational experiences in disaster preparedness.

Longitudinal Impact Assessment. Acknowledging that the salutary effects of disaster education are often realized over an extended timeframe research endeavors might consider longitudinal methodologies to conduct sustained surveillance of the educators and learners engaged in disaster education initiatives. Such assessments will yield insights into the enduring efficacy and broader implications of these educational interventions, contributing to a more nuanced appreciation of their tangible outcomes and emergent challenges.

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