



Disaster Preparedness and Resiliency Among Vocational College Students in Hunan, China: A Quantitative Assessment

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ABSTRACT

This study examined the culture of preparedness and disaster resiliency among college students in a vocational college in Hunan Province, China. It aimed to assess students' levels of disaster resilience and preparedness culture to inform the development of targeted interventions and educational programs that enhance safety and mitigate the impact of future disasters on this vulnerable population. The study involved 384 college students enrolled in a vocational college in Hunan Province. Data were collected using a self-constructed questionnaire specifically designed to address the study's objectives. The findings revealed that the majority of respondents were young male students from Generation Z, aged 19 to 22, predominantly in their first year of study and majoring in Fire Protection Information and Security. Results indicated a generally positive culture of preparedness, characterized by shared awareness and understanding, proactive engagement, supportive environments, community building and resilience, and a commitment to continuous learning and improvement. Regarding disaster resiliency, students exhibited strong agreement across psychological, social, cognitive, and adaptability/resourcefulness domains. Significant differences were observed in both preparedness culture and disaster resiliency when grouped by age. However, no significant differences were found when grouped by sex. Analysis by academic year level revealed significant differences in preparedness culture, while both preparedness culture and disaster resiliency varied significantly when grouped by academic program or major. Based on the results, an action plan was proposed to enhance the culture of preparedness and disaster resiliency among vocational college students.

KEYWORDS

Culture of Preparedness, Disaster Resiliency, Vocational Education, College Students, Hunan Province.

1. INTRODUCTION

The increasing frequency and intensity of disasters—both natural and human-induced—has become a defining global challenge of the 21st century. From earthquakes and typhoons to industrial accidents and public health emergencies, these hazards have underscored the critical need for a paradigm shift from reactive emergency response to proactive disaster risk reduction. Disaster preparedness is now widely recognized as an essential strategy that enhances the capacity of individuals and communities to reduce harm, respond effectively, and accelerate recovery after a crisis [1]. It involves coordinated planning, education, early warning systems, and resilience-building initiatives that mitigate the long-term impacts of hazards.

In recent years, China has faced mounting threats from climate-related disasters and rapid urban development. Provinces such as Hunan have been particularly vulnerable to hydrometeorological hazards like torrential floods, droughts, and landslides. According to a 2023 report by China's



Ministry of Emergency Management, Hunan was among the provinces most severely affected by the summer flooding that displaced thousands of residents and caused billions in agricultural and infrastructural losses [2]. These risks are intensified by the province's geographical location in the Yangtze River basin and the increasing unpredictability of climate patterns. Consequently, there is a growing need for locally rooted, education-driven approaches to disaster readiness, particularly for youth who will serve as frontline actors in future resilience efforts.

The Sendai Framework for Disaster Risk Reduction (2015–2030), endorsed by the United Nations, identifies education as a fundamental pillar of disaster resilience. It calls on member states to incorporate risk reduction into school curricula and to empower young people with the skills and knowledge to engage actively in disaster planning and recovery [3]. In this context, vocational colleges in China play a crucial role. These institutions train students for careers in essential sectors—such as public health, engineering, construction, and emergency services—that are directly implicated in disaster response and infrastructure resilience. However, despite this alignment, there remains a significant research gap concerning the actual preparedness levels of vocational students and how institutional culture shapes their attitudes and competencies toward disaster readiness [4].

This study seeks to address that gap by investigating the culture of preparedness and disaster resiliency among students in a vocational college in Hunan Province. Specifically, it aims to:

1. Describe the demographic profile of respondents in terms of age, sex, year level, and major;
2. Assess their culture of preparedness in terms of shared awareness and understanding, proactive engagement, supportive environment, and continuous learning;
3. Evaluate their disaster resiliency across psychological, social, cognitive, and adaptability domains;
4. Identify significant differences in preparedness and resilience based on demographic variables; and
5. Propose a targeted action plan to strengthen disaster preparedness and resiliency among vocational college students.

2. METHODS

This study adopted a descriptive quantitative research design, a method well-suited for examining and documenting the current perceptions, behaviors, and attitudes of a population without altering existing conditions. The descriptive approach was selected to systematically explore the extent of disaster preparedness and resiliency among vocational college students. Unlike experimental designs that introduce variables to test causal relationships, descriptive designs are observational and focus on "what is" rather than "what could be," making them ideal for studies centered on perceptions and self-reported data.

The research was conducted in a vocational college located in Hunan Province, China, a region that has historically experienced frequent and varied natural disasters such as floods, landslides, droughts, and extreme weather events.

The study involved 384 student respondents from the target vocational college. Participants were drawn from various academic year levels (first to fourth year) and represented several disciplinary programs, notably Fire Protection Engineering Technology, Fire Protection Network Information and Security, Environmental Art Design, and Firefighting Vehicle Services and Management.

A convenience sampling technique was employed due to its practicality and accessibility. Students who were readily available and willing to participate—whether through classroom channels, online platforms, or institutional outreach—were included.

To collect the necessary data, the researchers developed a self-constructed, three-part questionnaire, tailored specifically for the study objectives and the local context of Hunan Province. The first section

gathered basic demographic data, including age, sex, academic year level, and program of study. This information helped in grouping the data for comparative analysis.

The second section assessed the students' culture of preparedness, which was broken down into four key dimensions: (1) shared awareness and understanding of disaster risks, (2) proactive engagement in preparedness activities, (3) presence of a supportive environment within the institution, and (4) continuous learning and improvement related to disaster planning and response.

The third section focused on disaster resiliency, examining the students' perceived ability to withstand and recover from disasters across four domains: (1) psychological resilience, (2) social resilience, (3) cognitive resilience, and (4) resourcefulness and adaptability. Each item was measured using a 4-point Likert scale (1 = Strongly Disagree to 4 = Strongly Agree), allowing for nuanced responses to each statement.

To ensure the reliability of the instrument, a pilot test was conducted involving 30 students who were not part of the final sample. The reliability analysis using Cronbach's Alpha indicated exceptional internal consistency across all dimensions, with a total reliability coefficient of 0.984, and individual subscale values all exceeding 0.900—falling under the “Excellent” category according to George and Mallery’s rule of thumb.

The collected data were subjected to quantitative analysis using statistical software (e.g., SPSS). Descriptive statistics, including frequency distributions, means, and percentages, were used to summarize the respondents' demographic characteristics and their average scores on preparedness and resiliency items.

To determine significant differences across demographic groups, the study employed inferential statistics. The t-test was used to compare two-group variables (e.g., sex), while one-way analysis of variance (ANOVA) was applied to compare mean differences across multi-category variables (e.g., age groups, year levels, academic programs). The level of statistical significance was set at $p < 0.05$, indicating a 95% confidence level. These tests allowed the researchers to identify which aspects of preparedness and resiliency varied significantly based on student characteristics, providing evidence for targeted interventions.

3. RESULTS AND DISCUSSION

3.1. Demographic Profile

Table 1. Profile of Respondents

| Variable | Frequency | Percentage |
|---------------------------------|-----------|------------|
| Age (19–22 years) | 288 | 75% |
| Sex (Male) | 212 | 55.2% |
| Year Level(1st Year) | 108 | 28.1% |
| Major (Fire Protection Network) | 115 | 29.9% |

The respondent profile reveals that the majority were young adult males, typically in their first year of vocational study. The dominance of students aged 19–22 is consistent with standard college-age demographics and suggests that findings reflect attitudes and capacities typical of Generation Z learners, who are generally considered tech-savvy but may lack real-world disaster experience. The high enrollment in safety-related programs may contribute to the elevated awareness of disaster issues observed in the study.

3.2. Culture of Preparedness

Table 2. Summary of Culture of Preparedness

| Dimension | Mean | Interpretation |
|-----------------------------------|------|----------------|
| Supportive Environment | 3.22 | Agree |
| Proactive Engagement | 3.16 | Agree |
| Shared Awareness & Understanding | 3.12 | Agree |
| Continuous Learning & Improvement | 3.09 | Agree |
| Composite Mean | 3.15 | Agree |

With an overall composite mean of 3.15, the findings indicate that students generally agreed that their institution fosters a culture supportive of disaster preparedness. The highest rating ($M = 3.22$) was for "Supportive Environment," suggesting students perceive the presence of clear safety policies, accessible emergency supplies, and administrative support. Such structural elements are foundational in institutional preparedness and corroborate findings from Amri et al. [5], who emphasized the critical role of administrative investment.

"Proactive Engagement" ($M = 3.16$) and "Shared Awareness and Understanding" ($M = 3.12$) also received high scores, indicating that students actively engage in preparedness-related learning and possess a shared understanding of hazard risk. However, "Continuous Learning and Improvement" ($M = 3.09$) was the lowest, implying a need to institutionalize ongoing feedback loops and innovation mechanisms to adapt to evolving threats.

3.3. Disaster Resiliency

Table 3. Summary of Disaster Resiliency

| Dimension | Mean | Interpretation |
|--------------------------|------|----------------|
| Psychological Resilience | 3.29 | Agree |
| Social Resilience | 3.22 | Agree |
| Cognitive Resilience | 3.18 | Agree |
| Resourcefulness | 3.15 | Agree |
| Composite Mean | 3.21 | Agree |

The disaster resiliency composite mean of 3.21 demonstrates that students generally believe they are capable of coping with, adapting to, and recovering from disasters. Psychological resilience scored highest ($M = 3.29$), suggesting a strong internal capacity to regulate stress and maintain focus during adversity—key traits identified in the literature as predictive of successful post-disaster recovery [6].

Social resilience ($M = 3.22$) and cognitive resilience ($M = 3.18$) also reflect strong interpersonal and problem-solving skills, such as maintaining peer support networks and interpreting alerts effectively. Resourcefulness and adaptability scored lowest ($M = 3.15$), highlighting an opportunity for growth in creative problem-solving, improvisation, and using available tools in emergencies.

3.4. Differences by Demographic Variables

Table 4. Significant Differences by Demographics

| Variable | Significant Domains | p-value |
|---------------|--|---------|
| Age | All preparedness and resilience dimensions | <0.05 |
| Sex | None | >0.05 |
| Year Level | All except continuous learning | <0.05 |
| Program/Major | Awareness, Engagement, Cognitive & Resourcefulness | <0.05 |

Age significantly influenced preparedness and resiliency, with older students reporting higher scores across all domains. This may be attributed to greater life experience and accumulated exposure to training or real-world challenges. Similarly, senior students displayed significantly higher preparedness and resilience than first-year students, likely due to prolonged exposure to institutional culture and curriculum.

The absence of significant differences by sex suggests gender-neutral access to training and support. However, significant variation across academic programs suggests unequal emphasis on preparedness training, with students in fire protection-related programs more attuned to disaster response than those in arts or service sectors. Such disparities emphasize the need to standardize disaster preparedness education across all vocational tracks.

4. CONCLUSIONS

The findings indicate a moderately favorable culture of preparedness and a commendable level of disaster resilience among vocational college students. However, several areas warrant strategic enhancement to achieve a more robust and adaptive disaster management framework within the academic setting.

Demographic analysis revealed that the majority of respondents were male, first-year students aged 19 to 22, predominantly enrolled in safety- and security-oriented programs. This profile suggests that the results largely reflect the perspectives of younger students who may possess limited real-world experience but are concurrently being trained in fields inherently associated with emergency response and risk mitigation.

Preparedness indicators demonstrated that students generally acknowledged the presence and efficacy of institutional support systems, particularly in establishing a supportive environment ($M = 3.22$). This finding suggests that physical infrastructure, administrative planning, and policy implementation are adequately in place. Active participation in preparedness initiatives ($M = 3.16$) and shared awareness regarding disaster risks ($M = 3.12$) were also perceived positively. However, the domain of continuous learning and improvement ($M = 3.09$) received the lowest mean score, highlighting a potential deficiency in adaptive learning practices and iterative evaluation mechanisms. The absence of these elements may limit the institution's ability to foster a sustainable and forward-looking culture of preparedness.

In terms of disaster resiliency, students reported the highest levels in psychological resilience ($M = 3.29$), suggesting a strong capacity for emotional regulation and mental fortitude in high-stress situations. These attributes are particularly critical during emergency response and recovery phases. Social resilience ($M = 3.22$) and cognitive resilience ($M = 3.18$) were also rated positively, indicating that students benefit from peer support systems and possess an adequate ability to process and act upon emergency information. Conversely, the lowest scoring dimension—resourcefulness and adaptability ($M = 3.15$)—points to limited improvisational capability and strategic flexibility during dynamic or uncertain disaster conditions.

Inferential analysis provided additional insights into the variability of preparedness and resilience across different student subgroups. Age was found to be a statistically significant determinant in all domains, with older students consistently reporting higher levels of preparedness and resilience. This trend aligns with existing literature suggesting that maturity, life experience, and prior exposure to risk scenarios enhance both perception and response efficacy. Year level was similarly associated with increased preparedness and resilience, implying that prolonged engagement in the academic environment contributes to cumulative knowledge and coping capacity.

In contrast, no significant differences were observed based on sex, suggesting that institutional disaster programs are equitably reaching both male and female students. However, statistically significant disparities were evident when students were grouped according to academic program.

Those enrolled in fire protection and emergency services-related disciplines demonstrated notably higher levels of awareness, proactive engagement, and adaptability compared to their peers in non-technical or design-oriented programs. This outcome suggests that curriculum content and disciplinary focus substantially influence student preparedness behaviors and resilience perceptions.

5. RECOMMENDATIONS

To strengthen disaster education across vocational institutions, it is recommended that disaster preparedness modules be integrated into all programs, regardless of their direct relation to safety or emergency response. This ensures that all students, regardless of major, are equipped with foundational knowledge and skills in emergency readiness.

Practical application should be emphasized through regular simulation drills tailored to the region's specific hazards, such as floods and landslides. Additionally, institutions should establish student-led preparedness innovation hubs that encourage collaborative emergency planning and creative problem-solving among the student body.

Mentorship initiatives should be introduced by pairing senior students with juniors in peer-led resilience workshops. Furthermore, policymakers and education bureaus are encouraged to mandate disaster education as a core requirement in vocational colleges to institutionalize these practices and ensure consistency across campuses.

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