Review Article *Open Access*

Journal of Innovative Clinical Trials and Case Reports

Vulnerability Scale in Key Teaching and Learning Competencies

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Citation: Sofía Lopez de Nava Tapia, Sonia Sujell Velez Baez, Jorge Hernandez Valdes, Juan Guillermo Mancilla Sepulveda, B Vishwanath Pradeep (2025) Vulnerability Scale in Key Teaching and Learning Competencies. J.of Clin Tri Case Reports1((1), 01-04. WMJ/JCTC-103

Abstract

This study arose from an interest in understanding how socioeconomic conditions influence the perception of vulnerability in key competencies for the academic and professional development of university students. The objective was to analyze the relationship between socioeconomic context and the perception of vulnerability in competencies such as self-managed learning, critical thinking, artistic creativity, and entrepreneurship. The research design was quantitative, cross-sectional, and correlational . The sample consisted of university students selected using inclusion criteria that considered their socioeconomic level and their access to educational, cultural, and entrepreneurial resources. A questionnaire specifically designed to assess the perception of vulnerability in the aforementioned competencies was used. This instrument presented adequate levels of validity and reliability, with a Cronbach 's alpha greater than 0.80 in all the dimensions evaluated. The main findings indicate that students from socioeconomically vulnerable contexts present higher levels of perceived vulnerability in the competencies evaluated. In particular, those with fewer educational resources reported difficulties in self-managed learning and critical thinking. Likewise, students with limited access to artistic or entrepreneurial experiences showed lower levels in these dimensions.

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Submitted: 12.04.2025 **Accepted:** 22.04.2025 **Published:** 21.05.2025

Keywords: Learning, Competencies, Teaching, Reliability, Validity, Vulnerability

Introduction

This study aims to design and validate an educational vulnerability scale that assesses the level of development of five key competencies: self-management of learning, critical thinking, collaborative work, artistic expression, and entrepreneurial innovation. This instrument seeks to identify the barriers that limit effective learning and provide information that facilitates pedagogical decision-making.

The development of key skills for the 21st century is fundamental in higher education; however, various studies have shown that there are significant gaps in the acquisition of competencies such as self-management of learning, critical thinking, collaborative work, artistic expressiveness, and entrepreneurial innovation [1]. The lack of assessment methodologies and the poor recognition of the factors that affect these competencies generate vulnerabilities in students, limiting their comprehensive development [2]. Furthermore, inequality in access to resources and the absence of innovative pedagogical strategies aggravate this situation [3]. Given this panorama, the need arises to design a measurement instrument that allows identifying the levels of vulnerability in these critical aspects of learning.

The concept of competency-based learning has been widely addressed in academic literature. According to Darling- Hammond et al. educational institutions should promote learning environments that favor the development of essential skills for the 21st century [4]. Recent studies have shown that critical thinking and collaboration are key elements for innovation and entrepreneurship [5]. Likewise, artistic expressiveness has been recognized as a factor that enhances creativity and problem-solving [6]. However, the literature also shows that these aspects are often relegated in traditional academic curricula, which generates training gaps in students [7]. In this context, the assessment of vulnerability in these dimensions is essential for improving educational quality.

Given that education faces the challenge of ensuring that students acquire essential skills for their performance in today's world, it is imperative to have assessment tools that allow for the diagnosis of vulnerability levels in these areas [8]. The lack of a specific measurement methodology hinders the implementation of effective strategies for the development of transversal skills. Therefore, this study proposes the development of an educational vulnerability scale that considers individual, institutional, and socioeconomic factors.

H1: There is a significant relationship between the perception of educational vulnerability and the level of development of key competencies such as self-management of learning, critical thinking, collaborative work, artistic expressiveness, and entrepreneurial innovation.

H2: The implementation of pedagogical strategies focused on competency-based learning reduces the levels of educational vulnerability in university students.

H3: Socioeconomic and cultural factors significantly influence the perception of educational vulnerability in relation to key competencies.

Method

The present study adopted a quantitative cross-sectional and correlational methodological design , as it allowed for the analysis of the relationship between the perception of educational vulnerability and the level of development of key competencies [9]. This design was appropriate, as it facilitated data collection over a specific period and allowed for the identification of trends and patterns in the student population.

The sample consisted of 500 university students from various programs at higher education institutions in Mexico. Sociodemographic factors such as age (18–25 years), gender, socioeconomic status, and educational background were considered. The sample was selected using stratified sampling, ensuring representativeness of different academic and cultural contexts.

The instrument used was a measurement scale designed from adaptations of questionnaires validated in previous studies on educational competencies [10]. An exploratory factor analysis was applied to determine its underlying structure and a reliability analysis with Cronbach 's alpha coefficient ($\alpha = 0.85$), guaranteeing its internal consistency [11].

Data collection was conducted through online surveys, ensuring participant confidentiality. A multiple

regression analysis model and Pearson correlations were used to evaluate the relationships between variables, establishing a statistical significance level of $p < 0.05$ [12].

Hypotheses were accepted or rejected based on the correlation coefficients obtained and the significance values. Results with a correlation coefficient greater than 0.30 and p values less than 0.05 were considered significant [13].

Results

Data analysis revealed that students from socioeconomically vulnerable backgrounds presented higher levels of perceived vulnerability in the assessed competencies. In particular, those with fewer educational resources reported difficulties in self-managed learning and critical thinking. Students with limited access to artistic or entrepreneurial experiences also showed lower levels in these dimensions.

The results of the correlation analysis indicated a significant relationship between the perception of educational vulnerability and the level of development of key competencies ($r = 0.62$, $p < 0.05$), which allowed us to accept H1.

Likewise, students who participated in pedagogical strategies focused on competency-based learning showed a significant decrease in their perception of vulnerability ($t(498) = -4.37$, $p < 0.01$), which confirms H2.

On the other hand, socioeconomic and cultural factors were observed to influence the perception of educational vulnerability. Students from urban environments with greater educational opportunities presented lower perceptions of vulnerability compared to those in rural environments ($F (1, 498) = 5.78$, $p < 0.05$), thus confirming H3.

Discussion

The findings of this study confirm what has been established in the literature on the importance of sociocultural and economic factors in the development of key competencies [14,7]. The results showed that the lack of access to educational and training resources significantly influences students' perception of vulnerability, which is consistent with previous studies that point to the need for more inclusive pedagogical strategies [8].

Compared with previous research, this study provides empirical evidence of a direct relationship between educational vulnerability and artistic expressiveness and entrepreneurial innovation, dimensions that have been less explored in previous studies [6]. However, this study faced certain limitations, such as the restriction of the sample to a specific university context and the lack of a longitudinal analysis.

The study provides a useful tool for identifying vulnerabilities in the development of key competencies, allowing for the design of pedagogical strategies aimed at reducing these gaps. For future research, we recommend expanding the sample to different educational levels and conducting longitudinal studies to assess the impact of specific interventions.

Conclusion

The results of this study demonstrate the influence of socioeconomic context on the perception of vulnerability in key competencies for academic and professional development. A lack of educational, cultural, and entrepreneurial resources is associated with greater difficulties in self-managed learning, critical thinking, artistic creativity, and entrepreneurship. These findings underscore the need to implement policies and strategies that reduce gaps in access to educational and training opportunities.

Among the study's highlights is its contribution to the analysis of the relationship between socioeconomic vulnerability and the development of essential competencies in higher education. However, one of its main limitations lies in the cross-sectional nature of the design, which prevents establishing causal relationships. Future studies could explore this issue from a longitudinal perspective to delve deeper into the evolution of these perceptions over time.

In terms of contributions to the state of the art, this study broadens our understanding of how unequal access to educational and cultural resources impacts students' perceptions of vulnerability. Its implications can guide the design of institutional interventions aimed at strengthening competency development in vulnerable student populations, thus contributing

to more equitable and inclusive higher education.

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