

A Risk-based Decision Support System (R+DSS) Framework for Enhancing Riskassessment in Teaching and Learning Environments

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Higher education institutions (HEIs) face diverse risks in teaching and learning, including system failures, cybersecurity threats, assessment issues, and policy violations. However, risk management practices in HEIs remain largely reactive and rely on simplistic decision-making tools that inadequately address uncertainty and complexity. This study proposes a structured Risk-Based Decision Support System (R+DSS) framework to enhance risk assessment and decision-making in HEIs. The research objectives were to develop an R+DSS framework, design a fuzzy Multi-Criteria Decision-Making (MCDM) model using the Fuzzy TOPSIS method, and implement and evaluate a web-based system to support practical decision-making. The study was conducted in three phases: framework development, fuzzy MCDM model construction, and system implementation using PHP and MySQL. The system enables data input, fuzzy computation, and risk ranking. Usability was evaluated using the USE questionnaire administered to 30 academic and administrative staff. Results indicate that the framework is suitable for HEI contexts, the fuzzy MCDM model effectively ranks risk alternatives under uncertainty, and the system is perceived as useful, easy to use, and beneficial for decision-making. The study concludes that a structured, expert-based R+DSS can significantly support HEIs in managing teaching and learning risks and recommends its adoption to improve strategic academic risk management.

Keywords: Decision Support System (DSS), Higher Education Institution (HEI), Multi-Criteria Decision Making (MCDM), Risk Assessment, and Teaching and Learning (T&L)