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Research Article

The Effectiveness of Technology Based Collaborative Training in Optimizing Organizational Decision Making: *A Systematic Literature Review*

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Abstract: *This study aims to provide a comprehensive understanding of the context and theoretical foundations applied in organizational decision-making, specifically in optimizing technology-based collaborative training. Using the PRISMA systematic review method, this study analyzed 10 empirical articles on learning and decision-making published from 2020 to 2024 from various countries. Each theory applied in these studies is outlined with a brief description and recommendations for a future research agenda. Although various previous studies have produced extensive findings, this review found that most studies focused on the effectiveness of technology-based collaborative training in improving learning and decision-making processes. The reviewed theories, such as Constructivist Learning Theory, Flow Theory, and Markov Decision Process Theory, highlight the importance of collaborative learning, incremental decision-making, and high engagement and motivation in organizational contexts. The results of this study have significant implications for the field of learning and decision-making, which practitioners should seriously consider. These findings are expected to form the basis for policy recommendations that encourage the adoption of innovative and evidence-based learning methods within organizations.*

Keywords: Learning, Decision Making, Collaboration, Technology.

1. INTRODUCTION

In a digital era full of rapid transformation, the technology sector has become one of the most dynamic and competitive industries. Constant change, emerging innovations, and ever-increasing market expectations force young professionals in this industry to possess robust and rapid decision-making skills (Je Drzejewski & Hernandez, 2024; Landwehr & Gnadig, 2022; Tweed & Wilkinson, 2019). Making the right decisions in ambiguous and stressful situations becomes an invaluable skill, especially when young professionals must adapt to new technologies and trends (Brnabic & Hess, 2021; Liu et al., 2023; Tweed & Wilkinson, 2019). In this context, collaborative training emerges as a promising approach to improving better and more strategic decision-making competencies.

Collaborative training, which involves team-based learning and intensive knowledge exchange, is designed to broaden participants' perspectives. It provides professionals with the opportunity to learn from the experiences and insights of their peers, while also facilitating the development of interpersonal and teamwork skills (Eskiyurt & Ozkan, 2024; Medel et al., 2024). This type of collaboration often creates a rich discussion environment,

where individuals can contribute ideas, test hypotheses, and collectively seek more creative and relevant solutions to real-world situations.

Furthermore, a collaborative approach can also help individuals develop an adaptive mindset, which is essential in the technology industry. Collaborative decision-making, where divergent ideas are brought together to form more holistic solutions, enables young professionals to be more critical in evaluating situations, identifying risks, and selecting appropriate strategies (Cui et al., 2024; Eskiyurt & Özkan, 2024; Medel et al., 2024; Rafie Papkiadeh & Razaghpoor, 2024). By working in teams, they learn how to consider multiple perspectives, take group dynamics into account, and ultimately make more informed and effective decisions (Brnabic & Hess, 2021; Heid, Hanselle, Fürnkranz, & Hüllermeier, 2024; Hu, Dillon, & Wilkinson, 2023; Kotorov, Krasylnykova, Pérez-Sanagustín, Mansilla, & Broisin, 2024; Liu et al., 2023; Speekenbrink, 2022).

However, while the potential of collaborative training to improve decision-making is widely recognized, the existing empirical literature on its effectiveness in the context of young professionals in the technology sector is still limited (Brnabic & Hess, 2021; Chen, 2024; Liu et al., 2023; Pei, Rojas-Arevalo, de Haan, Lipovetzky, & Moallemi, 2024). Numerous case studies and individual studies suggest that this training can improve collaboration and communication, but evidence pointing to direct improvements in decision-making quality still requires further investigation (Giovanniello, et al., 2023; Heid et al., 2024; JęDrzejewski & Hernandez, 2024; Landwehr et al., 2022; Loftus et al., 2020; Medel et al., 2024; Rafie Papkiadeh et al., 2024; Resch, 2023; Rosenbäck & Svensson, 2024). Thus, a systematic review is needed to identify patterns, gaps, and opportunities from previous research on this topic.

This systematic review aims to explore the effectiveness of collaborative training in helping young professionals in the technology sector improve their decision-making skills. This research will compile evidence from various studies, both quantitative and qualitative, to evaluate the impact of collaborative training on decision-making. Furthermore, this study will consider factors that influence training effectiveness, such as training duration, delivery method, and participant characteristics.

Furthermore, this review will also explore whether there are specific contexts in which collaborative training is more effective, such as in specific technology-based projects or in more interdisciplinary environments. By understanding these optimal conditions, stakeholders in the technology industry can more effectively design and implement training programs tailored to the specific needs of their companies and teams. In the long run, this can contribute to increased productivity and overall company competitiveness.

Additionally, the results of this review are expected to provide insights for academics and practitioners on how collaborative training can be integrated with other human resource development strategies. For example, how this training can be combined with technology-based learning, such as simulations or gamification, to further stimulate intelligent and sustainable decision-making. Thus, these findings are expected to form the basis for further research that combines training innovations with the latest technological developments.

This systematic review will make a significant contribution to understanding the effectiveness of collaborative training in improving the decision-making of young professionals in the technology sector. Considering the rapidly changing dynamics of the industry, collaborative training may be a key factor in equipping young professionals with the skills they need to more effectively face future challenges.

2. LITERATURE REVIEW

Learning in Organizational Contexts

Learning in organizational contexts is understood as a systematic and continuous process through which individuals and groups acquire, internalize, and apply knowledge to enhance organizational adaptability and performance. Organizational learning extends beyond individual knowledge acquisition and emphasizes the organization's capacity to transform collective experience into routines, practices, and improved decision-making processes (Argote & Miron-Spektor, 2021).

In increasingly complex and dynamic work environments, organizational learning has shifted from predominantly individual-based approaches toward collaborative learning models. Collaborative learning emphasizes social interaction, shared knowledge construction, and collective reflection, which have been shown to be more effective in addressing complex problems than isolated individual learning (Fiore et al., 2022). Through collaboration, organizations develop collective cognitive capabilities that are essential for managing uncertainty and making informed decisions.

Recent studies further highlight that well-designed learning processes enhance analytical, evaluative, and reflective skills at both individual and group levels. Continuous and experience-based learning strengthens organizational capacity to anticipate risks, interpret complex information, and respond adaptively to environmental changes, thereby directly contributing to decision-making effectiveness (Senge et al., 2020).

Decision Making in Organizations

Organizational decision making is a multidimensional process involving problem identification, information interpretation, evaluation of alternatives, and the selection of appropriate actions under conditions of uncertainty. Contemporary literature emphasizes that decision making is rarely fully rational, as it is influenced by cognitive limitations, individual biases, time pressure, and social dynamics within organizational groups (George et al., 2021).

In modern organizations, decision quality is increasingly determined by the ability to integrate diverse knowledge sources and perspectives. Decisions produced through collective processes tend to be more robust and sustainable, as they incorporate multiple viewpoints and reduce the likelihood of individual judgment errors (Cristofaro et al., 2022). Consequently, decision making is closely intertwined with organizational learning and collaborative practices.

Moreover, the growing complexity of organizational environments and the proliferation of data have intensified the need for learning-oriented and technology-supported decision-making approaches. Effective organizational decisions require not only analytical and data-processing capabilities but also shared understanding and coordination among stakeholders, which can be enhanced through structured training and learning interventions (Elbanna et al., 2020).

Collaboration as a Mechanism for Learning and Decision Making

Collaboration is widely recognized as a key mechanism linking learning processes to decision-making outcomes in organizations. It enables individuals and teams to exchange knowledge, challenge assumptions, and develop shared interpretations of complex problems. Recent research underscores the importance of collaboration in enhancing both learning effectiveness and decision quality within organizational settings (Hughes et al., 2021).

Through collaborative interactions, learning becomes a socially constructed process characterized by dialogue, reflection, and collective problem solving. Collaboration also helps mitigate cognitive biases by encouraging critical evaluation of information and alternative courses of action. Empirical evidence suggests that well-functioning collaborative teams are more likely to produce innovative, evidence-based, and higher-quality decisions than individuals working independently (Salas et al., 2020).

However, the effectiveness of collaboration is contingent upon appropriate team structures, communication quality, and organizational support. Poorly managed collaboration may lead to conflict, coordination failures, or groupthink, ultimately undermining decision quality. Therefore, collaborative processes must be deliberately designed and supported through training systems and organizational practices that foster productive interaction (Ratcheva et al., 2020).

Technology as an Enabler of Collaborative Learning and Decision Making

Advancements in digital technology have fundamentally transformed how organizations facilitate learning and decision making. Technology increasingly functions as an enabler of collaborative learning by providing platforms that support interaction, knowledge sharing, and joint problem solving across temporal and geographical boundaries (Bond et al., 2021).

In technology-based training contexts, digital tools such as learning management systems, collaborative platforms, and artificial intelligence applications enhance learning effectiveness and decision quality. These technologies enable data visualization, scenario simulation, and real-time collaboration, thereby strengthening analytical capabilities and supporting more informed organizational decisions (Margherita & Bua, 2021).

Nevertheless, the literature consistently emphasizes that technology alone does not guarantee improved outcomes. The effectiveness of technology-based collaborative training depends on organizational digital readiness, users' technological literacy, and the alignment between training design and decision-making objectives. Without proper integration of

technological, human, and organizational process dimensions, the potential of technology to support collaborative learning and decision making remains limited (Verhoef et al., 2021).

3. METHOD

In this study using systematic literature review (SLR), the article search strategy follows the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) approach to ensure transparency and accuracy in identifying articles related to "The Effectiveness of Collaborative Training in Improving Young Professionals' Decision Making in the Technology Sector: A Systematic Review" The PRISMA approach consists of the identification, screening, eligibility, and inclusion stages, which are explained as follows:

1) Identification Stage

To obtain relevant literature, a search was conducted on the Scopus database. This database was chosen because of its extensive coverage of research relevant to learning and decision-making, particularly in the field of management. The primary keywords in the search included "learning and decision-making," "learning-based decision-making," "organizational learning," and "cognitive learning in decision-making." Additional keywords were used to ensure that all articles related to this topic were included in the search, namely journals considered to have reputations from Q1–Q4 from 2020–2024, with a total of 199 articles identified.

2) Screening Stage

The first stage of screening was carried out by filtering articles based on search keywords related to "learning and decision-making," "learning-based decision-making," "organizational learning," and "cognitive learning in decision-making." The selected categories were journals in the fields of Business, Management and Accounting (n=45), Social Sciences (n=42), and Economic, Econometrics and Finance (n=20). After focusing based on these journal fields, the number of articles remaining was 80 articles.

3) Eligibility Criteria

Articles that pass the first stage of screening are then further assessed based on several eligibility criteria, including:

- Inclusion Criteria: Articles with a primary focus on learning processes directly related to decision-making, whether in the context of organizations, technology, or decision support systems. Articles developing or testing theoretical or empirical models that integrate learning elements into decision-making were prioritized, with a maximum of 45 articles.
- Exclusion Criteria: Articles that examine decision making in specific contexts such as supplier selection or logistics, articles that do not contain empirical data or in-depth theoretical discussion with a total of 35 articles.

4) Inclusion Stage

In the final stage, articles that met the inclusion criteria were further analyzed through the research focuses of "learning and decision-making," "learning-based decision-making,"

"organizational learning," and "cognitive learning in decision-making." After final adjustments, the number of articles selected for further analysis was 20.

5) Presentation of Results with PRISMA Diagram

A PRISMA diagram will be used to illustrate each stage of the article search and selection process, from the number of articles identified in the initial stage, through the number of articles screened based on title, through the number of articles included in the eligibility assessment, to the final articles included in the analysis. The flow of the article selection process is presented below.

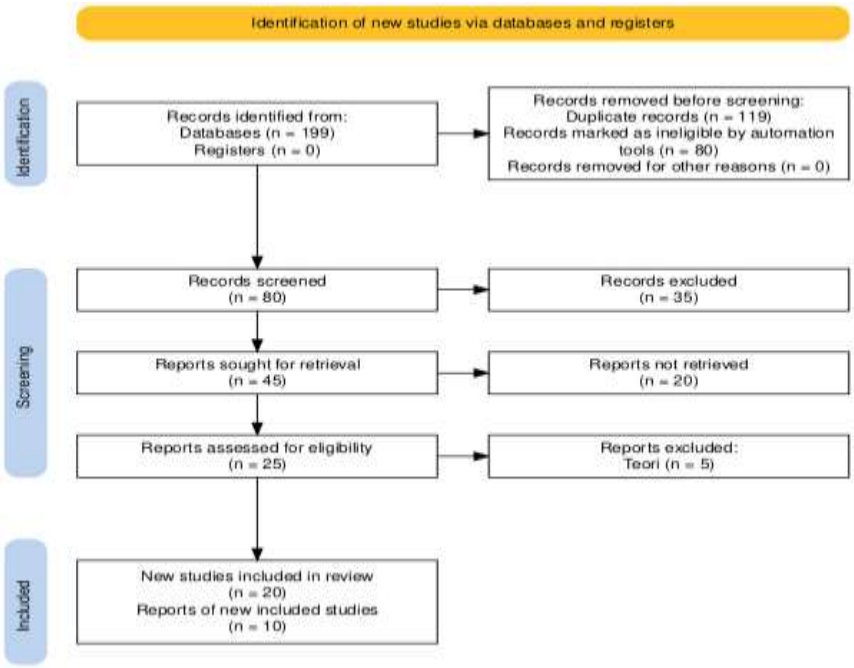

Figure 1. PRISMA diagram

In Figure 1. Above the PRISMA diagram, it is expected that the SLR process can be carried out systematically and transparently, thus producing a comprehensive review of the integration between learning and decision-making in a broader organizational and managerial context.

4. RESULTS AND DISCUSSION

Descriptive Analysis

In a systematic literature review (SLR) on the topic of Learning and Decision-Making, the main findings show that this field is increasingly developing with the use of various modern learning techniques that integrate technology and innovation in decision-making methodologies.

Key Findings and Trends

Virtual Game-Based Learning Simulation and Collaborative Learning

Key findings include increased use of virtual simulations, game-based learning, and collaborative learning, which have been shown to be effective in improving critical thinking and decision-making skills in nursing students, such as research fromEskiyurt & Ozkan, (2024) article title Exploring the impact of collaborative learning on the development of critical thinking and clinical decision-making skills in nursing students: A quantitative

descriptive design and article title Interactive Virtual Simulation Case: A Learning Environment for the Development of Decision-Making in Nursing Students.

Problem-Based and Task-Based Learning Approaches

This is also supported by the problem-based and task-based learning approaches which provide different benefits in the clinical context, especially in transfusion education in pediatric nursing, as explained in the study. Rafie Papkiadeh et al., (2024) in the article title Comparing the effects of problem- and task-based learning on knowledge and clinical decision-making of nursing students concerning the use of transfusion medicine in pediatric nursing: An educational quasi-experimental study in Iran.

Technological Developments Support Automated Decision Making

On the other hand, technological developments have enabled the use of machine learning (ML) to support automated decision-making, as seen in robotics studies from research. Cui et al., (2024) with the title Mobile robot sequential decision making using a deep reinforcement learning hyper-heuristic approach) and hybrid interpretation-based landslide susceptibility mapping (SHAP-PDP hybrid interpretation of decision-making mechanism of machine learning-based landslide susceptibility mapping: A case study at Wushan District, China. In the clinical realm, ML-based predictive models from this researchZhang et al., (2024) with the title A predictive machine-learning model for clinical decision-making in washed microbiota transplantation on ulcerative colitis, helps in decision-making related to microbiota transplantation, while the hybrid approach that combines MCDM with machine learning from research Abdulla & Baryannis, (2024) with the title A hybrid multi-criteria decision-making and machine learning approach for explainable supplier selection, is able to make supplier selection more transparent and explainable.

Differences and Debates in Theories and Methods

Regarding differences and debates between theories and methods, several debates have emerged regarding the effectiveness of certain methods, such as collaborative learning, problem-based learning, and virtual simulation-based learning. Several studies have shown varying results depending on the teaching context and learning environment. For example, the Zoom-based simulation method implemented during the pandemic, as in the study Chan et al., (2024) The title "Effect of simulation-based zoom learning on clinical decision-making among undergraduate nursing students and experiences of students and instructors: A mixed methods study" shows varying results in its effectiveness, which depends on the readiness of the technology and the quality of interaction between students and instructors. Meanwhile, studies in the clinical field using machine learning to support medical decision-making highlight the debate between the accuracy of predictive models and their interpretability, as in the seventh and ninth titles.

Methodological Approach Used by Researchers

The methodological approaches used in these studies are quite diverse, ranging from descriptive quantitative designs, quasi-experimental, to mixed methods to answer specific research questions. Descriptive quantitative designs are widely used in studies that measure

the influence of learning methods on learning outcomes and decision-making skills, such as in the study Eskiyurt & Özkan, (2024) article entitled Exploring the impact of collaborative learning on the development of critical thinking and clinical decision-making skills in nursing students: A quantitative descriptive design and from research Medel et al., (2024) article entitled Interactive Virtual Simulation Case: A Learning Environment for the Development of Decision-Making in Nursing Students as well as from research Rafie Papkiadeh et al., (2024) The article entitled Comparing the effects of problem- and task-based learning on knowledge and clinical decision-making of nursing students concerning the use of transfusion medicine in pediatric nursing: An educational quasi-experimental study in Iran. On the other hand, simulation and ML-based evaluation approaches are dominant in studies focusing on automated decision-making in robotics and data-driven prediction, while mixed methods appear relevant in studies focusing on user experience and perception, such as in the Zoom-based simulation learning study from the study Chan et al., (2024) article entitled Effect of simulation-based zoom learning on clinical decision-making among undergraduate nursing students and experiences of students and instructors: A mixed methods study.

Theoretical Framework and Model

Constructivist Learning Theory

This theory explains how collaborative learning can improve understanding and critical thinking skills. Constructivism theory and experiential learning theory, especially in studies involving collaborative learning and simulations. For example, from research Eskiyurt & Özkan, (2024) In the article entitled Exploring the impact of collaborative learning on the development of critical thinking and clinical decision-making skills in nursing students: A quantitative descriptive design and the article entitled Interactive Virtual Simulation Case: A Learning Environment for the Development of Decision-Making in Nursing Students, social constructivism theory is the basis for seeing how collaborative interactions between students can strengthen critical thinking skills.

Flow Theory

This theory explains the high level of engagement and motivation that occurs in game-based learning. In this study, Vazquez.,ett.,all., (2024) with the article title Real-world and game-based learning to enhance decision-making which examines game-based learning, flow theory is likely to be used to explain student engagement and motivation in improving decision-making skills.

Markov Decision Process theory

This theory is often used in robotics to model the multi-step decision-making process. In the context of automation, such as from research Cui et al., (2024) In the title Mobile robot sequential decision making using a deep reinforcement learning hyper-heuristic approach and the title SHAP-PDP hybrid interpretation of decision-making mechanism of machine learning-based landslide susceptibility mapping: A case study at Wushan District, China, stepwise decision-making theories such as Markov Decision Process (MDP) and SHAP-PDP-

based interpretation are used to model more complex decisions in robotics and disaster mitigation.

GAP IN THE LITERATURE

Theoretical Gaps

Limitations of the Theory of Decision-Making Skills Development in the Context of Interactive Learning, research from Eskiyurt & Özkan, (2024) The articles "Exploring the impact of collaborative learning on the development of critical thinking and clinical decision-making skills in nursing students: A quantitative descriptive design" and "Interactive Virtual Simulation Case: A Learning Environment for the Development of Decision-Making in Nursing Students" highlight the effectiveness of collaborative learning and virtual simulation in improving critical thinking and decision-making skills. However, theories explaining how social interaction in learning influences clinical skill improvement are still limited. Further research is needed on theories linking direct experience to decision-making effectiveness in various educational contexts, particularly in nursing.

Uncertainty in Transfer of Learning to the Real World, in the context of game-based learning in research Vázquez-Calatayud et al., (2024) In the article "Real-world and game-based learning to enhance decision-making," a simulation-based approach, the role of transfer of learning theory in explaining how skills acquired from simulations and games are applied in real-world situations is less thoroughly explored. Most studies only measure immediate outcomes without examining the ongoing transfer to decision-making in the field.

Interpretability of Machine Learning Models in Clinical Decisions, from research (Sun et al., 2024) The article titled “SHAP-PDP hybrid interpretation of decision-making mechanism of machine learning-based landslide susceptibility mapping: A case study at Wushan District, China” and the article titled “A predictive machine-learning model for clinical decision-making in washed microbiota transplantation on ulcerative colitis” highlight the application of machine learning-based predictive models, but there is still a gap in the theory of ML model interpretation in the medical context. Theory explaining decision transparency in the clinical context needs to be further developed to support responsible data-driven decision-making, especially in decisions that affect patient health.

Limitations of MCDM Theory Integration in Machine Learning Based Systems, research from Abdulla & Baryannis, (2024) The paper, "A hybrid multi-criteria decision-making and machine learning approach for explainable supplier selection," mentions a hybrid MCDM and ML approach to supplier selection. However, theoretical studies on the integration of MCDM and machine learning theories are still limited, especially in complex contexts such as supplier selection and decisions that require detailed explanations.

Methodological Gaps

Limitations of Longitudinal Methods for Measuring Long-Term Learning Effects, most of the research from several articles, for example, research from Eskiyurt & Özkan, (2024) article entitled "Exploring the impact of collaborative learning on the development of critical

thinking and clinical decision-making skills in nursing students: A quantitative descriptive design" and articles from research Medel et al., (2024) with the title "Interactive Virtual Simulation Case: A Learning Environment for the Development of Decision-Making in Nursing Students" and articles from research Chan et al., (2024) The study, titled "Effect of simulation-based zoom learning on clinical decision-making among undergraduate nursing students and the experiences of students and instructors: A mixed methods study," used a short-term descriptive or experimental design without examining the long-term impact on decision-making skills. Longitudinal studies that can assess skill development over a longer period and its impact on real-world practice are urgently needed.

Lack of Randomized Controlled Trials in Nursing Education, in research Rafie Papkiadeh et al., (2024) The article, entitled "Comparing the effects of problem- and task-based learning on knowledge and clinical decision-making of nursing students concerning the use of transfusion medicine in pediatric nursing: An educational quasi-experimental study in Iran," was a quasi-experimental study, which is not as robust as a randomized controlled experiment. This indicates the need for randomized controlled experiments in testing learning methods to ensure the validity of the results, especially in the context of complex clinical education.

Limitations of Participant Variation and Study Context, most research, especially in the field of nursing education and medical decision making, on research Eskiyurt & Özkan, (2024) article entitled "Exploring the impact of collaborative learning on the development of critical thinking and clinical decision-making skills in nursing students: A quantitative descriptive design" and article entitled "Interactive Virtual Simulation Case: A Learning Environment for the Development of Decision-Making in Nursing Students" as well as researchRafie Papkiadeh et al., (2024) The article, "Comparing the effects of problem- and task-based learning on knowledge and clinical decision-making of nursing students concerning the use of transfusion medicine in pediatric nursing: An educational quasi-experimental study in Iran," tends to focus on students and healthcare professionals in a limited number of locations. This creates gaps in demographic representation, which reduces the generalizability of the results across different cultural contexts and educational systems.

Limited Use of Mixed Methods in Clinical Decision Studies, only a few studies from research Chan et al., (2024) In the article "Effect of simulation-based zoom learning on clinical decision-making among undergraduate nursing students and the experiences of students and instructors: A mixed methods study," a mixed methods approach was used to provide a holistic understanding of the effectiveness of learning methods on clinical decision-making. Most other studies tend to use a single method (quantitative or qualitative), which reduces the richness of data needed to understand the complexity of decision-making.

Limitations on Measuring Interpretability of ML Models in Clinical Decision Making, an article that applies ML models in clinical decisions in research Zhang et al., (2024) The article, "A predictive machine-learning model for clinical decision-making in washed microbiota transplantation in ulcerative colitis," still lacks measures of interpretability and impact on

end-users. A more robust methodology is needed to assess the transparency and interpretability of these models, particularly in medical decision-making.

Contextual Gaps

Limitations in Decision Studies in Non-medical Contexts, although there are some studies outside the medical context for example, articles from research Cui et al., (2024) In the article entitled "Mobile robot sequential decision making using a deep reinforcement learning hyper-heuristic approach" and the article entitled "SHAP-PDP hybrid interpretation of decision-making mechanism of machine learning-based landslide susceptibility mapping: A case study at Wushan District, China" the article discusses robotics and disaster mitigation, most of the research focuses on nursing education and clinical decision making. Studies on the development of decision-making skills in other fields, such as management, general education, or technology, are still limited and need to be explored to broaden the context of application of research results.

Limitations in Cultural and Social Context, many studies on this topic are conducted in the context of a particular country such as in Iran from research Rafie Papkiadeh et al., (2024) The article titled "Comparing the effects of problem- and task-based learning on knowledge and clinical decision-making of nursing students concerning the use of transfusion medicine in pediatric nursing: An educational quasi-experimental study in Iran" may have specific educational values and structures. Different cultural and social contexts can influence how students respond to new learning methods, and this gap indicates the need for cross-cultural research to validate broader findings.

Limitations of Technology Implementation in Learning in Limited Access Areas, several studies, especially those using high-tech-based simulations such as VR and Zoom in research Medel et al., (2024) The research entitled "Interactive Virtual Simulation Case: A Learning Environment for the Development of Decision-Making in Nursing Students" and the research entitled "Effect of simulation-based zoom learning on clinical decision-making among undergraduate nursing students and experiences of students and instructors: A mixed methods study" are difficult to implement in areas with limited access to technology. This gap includes the development of technology-based learning and decision-making solutions that are more inclusive and appropriate for environments with limited resources.

5. CONCLUSION

Research on learning and decision-making is highly relevant in educational and professional contexts, especially in an era of increasing decision complexity. Analysis of various existing studies reveals that diverse learning approaches, such as collaborative learning, simulations, and game-based learning, have a significant impact on the development of decision-making skills among students. Active engagement in the learning process has been shown to enhance critical thinking skills and help students apply their knowledge to real-world situations, according to research findings (Eskiyurt & Özkan, 2024).

The existing literature review demonstrates an urgent need to deepen our understanding of how various learning methods can be integrated to produce better outcomes in decision-

making. While numerous studies have examined the effectiveness of specific methods, gaps remain in our understanding of the processes underlying decision-making (Brink, 2023; Brnabic & Hess, 2021; Eskiyurt & Özkan, 2024; Pei et al., 2024; Yoon, Scopelliti, & Morewedge, 2021). Future research should explore the underlying mechanisms by which learning methods influence the development of decision-making skills, including how social and cultural contexts influence these outcomes.

From a methodological perspective, it is important to create more diverse and comprehensive research designs, with particular attention to longitudinal studies that can measure the long-term effects of learning methods. Research focusing on cross-cultural approaches will also provide valuable insights into how learning strategies can be adapted to meet the needs of different contexts. This will be particularly relevant given the increasing globalization and cross-cultural interactions in education.

Furthermore, technological advances offer opportunities to enhance learning and decision-making. Hybrid models that combine machine learning with multi-criteria decision-making techniques can provide new and efficient insights into supplier selection and decision-making in other contexts. However, it is crucial to ensure that these models remain understandable and accountable to all stakeholders involved.

The findings of this study provide relevant recommendations for policymakers and educators. By leveraging existing research findings, educational institutions can design more effective and adaptive curricula that not only meet academic standards but also adequately prepare students for real-world challenges. Therefore, research in the field of learning and decision-making must continue to be encouraged to generate applicable knowledge and make tangible contributions to future educational and professional practice.

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