Journal of
Management and educational perspective
https://www.jmep.ir

eISSN: 2676-7821
Volume 7, Issue 3, Autumn 2025, Pages 254 to 276

Original Article (Qualitative)

Problem-solving approach-based learning model for elementary school principals: A meta-synthesis study

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Receive:
24 April 2025
Revise:
06 July 2025
Accept:
13 August 2025

Keywords:
Manager training,
Problem solving approach,
school managers,
Problem formulation

Abstract

Using a meta-synthesis method, the present study has designed a systematic model for training elementary school principals with a problem-solving approach based on the seven-step approach of Sandolowski et al. (2007). The study population of this study included all articles published with full access between 2010 and 2024 in Persian and English. Using purposive sampling and applying entry criteria (time of publication, language of the article, and subject area), 41 articles were selected as the final sample. Exploratory coding was used to analyze the data at three levels: open code, category, and component. Findings were presented in the form of tabulation methods of findings and a conceptual model; therefore, tables were used to systematically display the findings, such as information extraction tables, tables presenting coding findings, and tables presenting quality control results; and a conceptual model was used to present the model. The findings led to the identification of 62 open codes, 12 categories, and three main components (problem formulation, problem identification, and problem solving), which ultimately resulted in a classification-process model. In this model, problem formulation was considered as input; problem identification as the main process; and problem solving as the output. The validity of the findings was confirmed through peer review, which indicates the applicability of this model in the design and implementation of training courses for elementary school principals. The innovation of the research lies in providing a systematic educational model for school administrators, which is the result of combining the findings of previous studies in the field of organizational training with an emphasis on a problem-solving approach.

Please cite this article as (APA): Javadzadeh, A., Golzari, Z. and Taleb, Z. (2025). Problem-solving approach-based learning model for elementary school principals: A meta-synthesis study. *Management and Educational Perspective*, *7*(3), 254-276.

https://doi.org/10.22034/jmep.2025.529163.1532

Publisher: Research Center of Resource Management Studies and Knowledge-Based Business

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eISSN: 2676-7821
Volume 7, Issue 3, Autumn 2025, Pages 254 to 276
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Management and educational perspective
https://www.jmep.ir

Extended abstract

Introduction

Problem-solving constitutes a critical function within learning organizations such as schools. It involves individuals overcoming adverse situations, obstacles, and challenges encountered while pursuing objectives (Tekin & Akın, 2021). Thus, problem-solving is a process requiring concerted effort to eliminate impediments hindering the achievement of specific goals (Güneş, 2022). Like all educational learning organizations, schools face diverse challenges, with primary responsibility for resolving these issues resting upon school principals. In today's complex and dynamic world, novel challenges continually emerge for organizations and leaders. Schools, as learning organizations, encounter unprecedented issues that demand capable leaders proficient in problem-solving to effectively address difficulties and leverage resulting opportunities (Leithwood et al., 2021). Consequently, contemporary schools require principals possessing demonstrable problem-solving competencies. As organizational leaders, principals must exhibit strong problem-solving skills to prevent costly operational disruptions when confronting multifaceted challenges (Billett, 2020). Therefore, acquiring problem-solving skills represents an essential prerequisite for all administrators, necessitating dedicated attention prior to or during their tenure.

Educational systems currently face complex challenges in training school principals. Given the pivotal role of primary school principals in guiding instructional processes and fostering optimal learning environments, designing effective learning models to enhance their professional capabilities is paramount. While problem-based learning (PBL) approaches have proven effective in other domains (e.g., public administration and engineering) (Perusso & Baaken, 2020), Iran notably lacks a comprehensive model grounded in meta-synthesis of existing research with an explicit focus on problem-solving approaches for primary school principal development. This research gap underscores the need for advanced qualitative methodologies to establish a practical learning framework. Accordingly, this study employs meta-synthesis to design a systematic problem-solving-based learning model for primary school principals. Findings aim to provide a structured framework for principal training programs and assist policymakers in developing targeted empowerment initiatives.

Research Questions

1. What components constitute a problem-solving-based learning model for primary school principals?
2. What is the structure of a problem-solving-based learning model for primary school principals?
3. To what extent is the proposed problem-solving-based learning model for primary school principals valid?

Theoretical Foundations

Problem-Based Learning (PBL) represents an instructional approach gaining increased attention in management education over the past decade. By simulating real-world challenges, PBL fosters critical thinking and collaborative skills among managers (Hung, 2019). For instance, Munoz-del-Campo (2023) demonstrated a 25% improvement in analytical skills among government employees through PBL interventions. Additionally, Sukackė et al. (2022) conducted a meta-analysis revealing PBL's superior adaptability to learner needs compared to other active learning methodologies.

While international research has examined problem-solving approaches across organizations, Sukackė et al. (2022) systematically analyzed 177 publications using the ADDIE model (Analysis, Design, Development, Implementation, Evaluation) to compare Problem-Based, Project-Based, and Challenge-Based Learning in engineering education. Their findings,

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https://www.jmep.ir
eISSN: 2676-7821
Volume 7, Issue 3, Autumn 2025, Pages 254 to 276

considering the differences between the three methods and the goals and characteristics of education for sustainability, identified Challenge-Based Learning as the optimal approach for sustainable engineering training, characterizing it as an evolution beyond project and problem-based methodologies.

Perusso and Baaken (2020) employed comparative analysis to evaluate case-based instruction, management apprenticeships, and PBL for business students. Using four criteria—problem structure, realism, implementation feasibility, and reflective capacity—they determined that while no approach fully satisfied all criteria, PBL demonstrated the strongest alignment. Consequently, PBL was established as the most suitable methodology for management education.

Research Methodology

The present study employs a qualitative meta-synthesis methodology. Although problem-based learning (PBL) has been investigated internationally, its application within the context of Iranian school administrators represents an underexplored phenomenon requiring the development of a context-specific theoretical model. Consequently, this research utilizes Sandelowski et al.'s (2007) seven-stage meta-synthesis framework to derive a problem-solving-based learning model for Iranian principals.

The study population comprised all fully accessible Persian and English articles published between 2010 and 2024. Through purposive sampling with three inclusion criteria—publication date (2010–2024), language (Persian/English), and thematic relevance (principal development/problem-based learning)—41 articles were selected as the final sample.

Data analysis employed exploratory coding across three distinct phases:

1. Open coding (initial concept labeling)
2. Categorization (pattern identification)
3. Component formulation (theoretical abstraction)

Findings were presented through two complementary formats: comprehensive tables (including data extraction matrices, coding taxonomies, and quality control documentation) and a conceptual model visually representing the derived learning framework.

Research Findings

The research findings led to the identification of 62 open codes, 12 categories, and three main components: problem posing, problem identification, and problem-solving. Ultimately, a classification-process model was developed. In this model, problem posing was considered the input, problem identification the core process, and problem-solving the output.

To determine the structure of the problem-solving-based learning model for elementary school principals, axial coding was used to establish the relationships among the three components: problem posing, problem identification, and problem-solving. Selective coding was then employed to select the optimal model structure based on these inter-component relationships. In axial coding, the problem posing component serves as the starting point of the model, providing a foundation for creating challenging learning situations. This component, through categories such as "learning situation design" and "objective setting," is directly linked to the problem identification component, as it guides learners to analyze the situation and identify the problem. The problem identification component, with categories like "motivation generation" and "problem analysis," bridges problem posing and problem-solving. In axial coding, this component is identified as the "core phenomenon" because it facilitates the process of diagnosing and understanding the problem. Its connection to the problem-solving component, through solution generation and knowledge sharing, demonstrates a logical flow from identification to resolution. Finally, the problem-solving

component, with categories such as "solution implementation" and "evaluation," enables the ultimate conclusion of the learning process.
In selective coding, the relationships among the components are organized into a theoretical narrative. This narrative begins with problem posing, progresses through problem identification, and concludes with problem-solving. This integration indicates that the model is not merely linear but cyclical and interactive, such that problem-solving can lead to a revisiting of problem posing. The presented model, by combining axial and selective coding, creates a cohesive framework for understanding the complex relationships among the components of a problem-solving-based learning model. These relationships are not only linear but also cyclical and interactive, with each component influencing and being influenced by the others. Such a structure allows the model to adapt to the diverse needs of elementary school principals, making it a powerful tool for professional development.

Conclusion

This research aimed to design a problem-solving based learning model for elementary school principals by systematically reviewing and analyzing prior studies using a meta-synthesis approach, guided by the seven-stage framework of Sandelowski et al. (2007). The findings of this study not only address the existing gap in comprehensive models for principal training but also pave the way for the professional development of elementary school principals by offering a coherent and practical framework.
The designed model is a classification-process model that systematically and dynamically illustrates the relationships among the three core components: problem posing, problem identification, and problem-solving. Unlike previous linear models, this model is cyclical and interactive, meaning each component influences and is influenced by the others. This structure highlights the complexity of the problem-solving process in organizational environments like schools and emphasizes the importance of continuous review and improvement. In the axial coding phase, problem posing serves as the model's starting point, laying the groundwork for creating challenging learning situations. This component, through categories such as "learning situation design" and "objective setting," is directly linked to problem identification, as it guides learners to analyze the situation and identify the problem. This logical connection underscores the importance of careful and purposeful preparation of learning situations before delving into the problem analysis process. Problem identification has been identified as the "core phenomenon" of the model because it facilitates the process of diagnosing and understanding the problem, essentially forming a bridge between problem posing and problem-solving. Categories such as "motivation generation" and "problem analysis" fall within this section. Its connection to problem-solving through "solution generation" and "knowledge sharing" demonstrates a logical flow from identification to resolution. This implies that without proper analysis and understanding of the problem, achieving effective solutions will be impossible. Finally, problem-solving facilitates the ultimate conclusion of the learning process. What distinguishes this model is its cyclical and interactive nature. Selective coding reveals that the relationships between the components are organized into a "theoretical narrative" that begins with problem posing, progresses through problem identification, and concludes with problem-solving. However, problem-solving can lead to a revisiting of problem posing, meaning that after implementing and evaluating a solution, new issues might be identified, or there might be a need to redefine initial problems. This characteristic provides flexibility and adaptability to the model, allowing it to meet the evolving needs of elementary school principals. By addressing the complex demands of learning organizations like schools, this model trains principals who are not only capable of solving existing problems but also adept at identifying and managing new ones.