KMAN PUBLISHING INSTITUTE
Journal Website

Article history:
Received 16 August 2024
Revised 27 October 2024
Accepted 06 November 2024
Published online 01 January 2025

International Journal of Innovation Management and Organizational Behavior

Volume 5, Issue 1, pp 59-70

IJIMOB International Journal of Innovation Management and Organizational Behavior

E-ISSN: 3041-8992

Synthesis of Dimensions, Indicators, and Components of Appropriate Educational Leadership for Blended Learning (In-Person and Virtual) in Elementary Education

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A r t i c l e I n f o

Article type:
Original Research

How to cite this article:
Saraei, P., Maleki Avarsin, S., & Yari Haj Ataloo, J. (2025). Synthesis of Dimensions, Indicators, and Components of Appropriate Educational Leadership for Blended Learning (In-Person and Virtual) in Elementary Education. *International Journal of Innovation Management and Organizational Behavior*, *5*(1), 59-70.
https://doi.org/10.61838/kman.ijimob.5.1.7

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A B S T R A C T

Objective: The present study aimed to synthesize the dimensions, indicators, and components of appropriate educational leadership for blended learning (in-person and virtual) in elementary education.

Methodology: The present study was qualitative and of the synthesis type. The statistical population of the research comprised existing studies from 2013 to 2023. In total, the number of articles and studies related to the keywords was 1,315 (69 Persian articles and 1,246 English articles). Out of this number, 26 studies (22 English studies and 4 Persian studies) were selected for final analysis based on exclusion criteria. The research data were analyzed using Roberts' six-step synthesis model, employing three-stage coding (open, axial, and selective).

Findings: The data were identified in the form of 162 open codes, 24 axial codes, and 7 selective codes. The dimensions identified include competent leadership, organizational dimensions, technology, philosophical and epistemological systems, learning environment, learning outcomes, and evaluation systems.

Conclusion: Identifying the dimensions, indicators, and components of appropriate educational leadership for blended learning in elementary education can play a significant role in designing an appropriate model for this stage.

Keywords: *Educational leadership, blended learning, elementary education, synthesis research.*

1 Introduction

Leadership is essential for all societies and organizations to achieve fundamental desirabilities (vision, values, mission, goals). Researchers state that leadership is the ability to influence employees' attitudes, abilities, and beliefs toward achieving the fundamental desirabilities of the organization (Abella et al., 2024; Sudiarti & Saepudin, 2024; Winata, 2024). Today, schools in the country cannot reform and improve their performance

or respond to their increasing responsibilities without effective and successful leadership. Achieving the goals of schools and, consequently, the goals of the education system requires special attention to school managers, particularly their leadership role (Börü & Bellibaş, 2024; Cheng, 2024). Effective leadership in societies and organizations, including educational institutions, is a key factor in creating alignment and empathy among the organization's members (Miri, 2024).

On the other hand, electronic learning is the most important application of information technology, offered in various systems such as computer-based learning, online learning, network-based learning, and web-based instruction. This term was first introduced by Cross and refers to various methods using Internet and intranet technologies for learning. Considering that thinking about new natural education, especially virtual education, has been a bridge of hope for millions of students from elementary to higher education, and the traditional roles of educational leaders have changed during this new unfamiliar situation, virtual education leads to changes in the roles of educational leaders in terms of leadership, inspiration, and transformation (Harris, 2020). Educational leaders must adapt to this new normal starting from understanding higher educational leadership. Educational leadership has become increasingly complex as society grows at local, state, and federal levels. The role of educational leaders is significant in education for many reasons (Marshall et al., 2020).

Despite the attention to educational leadership in the last century, attention to educational leadership has increased in the early twenty-first century. The main reason for the trend toward educational leadership in recent years is the general belief that the quality of leadership significantly affects school and student outcomes (McGinity et al., 2021). From the perspective of many experts, leadership development is defined as a process of individual and collective development towards effective engagement in leader-follower interactions (Kamal et al., 2020). Effective leaders and managers, if they want to provide the best possible education for their learners, must pay sufficient attention to educational leadership and its requirements. Leadership as practice means interactions or activities involving colleagues, students, and team members, often considered followers (Yokuş, 2022). Educational leadership can create a shared vision designed to ensure the success of its stakeholders through developing educational policies and procedures. Leadership specifies commitments based on the core goals of schools made by educational members (Chavez, 2021). School leaders inspire their organization's members through words and actions and appropriately support teachers, increasing their commitment and motivation to achieve organizational goals. Therefore, school leaders indirectly stimulate student achievements by influencing teachers' behavior and morale (Kemethofer et al., 2022). In summary, the goal of school leadership actions is to enhance the essential educational activities of educational staff (Praetorius et al., 2018).

Today, the teacher or instructor is the most crucial factor in the appropriate use of media, and technology is a structure for effective and useful teaching. They even refer to the important fact that this key person (teacher) is mainly part of the teaching-learning system. In virtual education, teaching is based on the triangle of the instructor, the learner, and the interaction between these two elements. The need of developing societies to optimally use time and resources and the development of flexible education has led to a greater tendency to use electronic education. Reasons for electronic education include saving time and cost, enabling distance learning, facilitating the educational evaluation system, direct access to digital educational resources, and creating equal educational opportunities (Rezaee & Zahedi, 2018). The Iranian education system has taken steps towards providing virtual education since 2004. Interaction and communication in the classroom and school often reflect the cultural, historical, and social context. One of the social and cultural contexts that can affect teacher-student interaction is the tendency to use electronic education, which has been increasingly considered by educational agents, teachers, and educational trainers worldwide in recent years. Teacher-student interaction is not simply a two-way reaction; it is a complete exchange formed in a context of influencing factors (Karamati, 2021). Despite the significant role of virtual education in improving education, the educational structure faces numerous challenges and problems. These include incomplete coverage of information and technology networks, lack of appropriate hardware and equipment for better access for students and teachers, severe lack of suitable educational content in electronic formats, teachers' lack of knowledge and skills for virtual education and content production, parents' unfamiliarity with technological capabilities, and insufficient interaction between students and teachers. Studies on these challenges, such as Clarke & O'Donoghue (2020), have discussed that virtual education saves costs but imposes costs in Iran, which is contradictory (Clarke & O'Donoghue, 2017). Given that in the information age, traditional education models have changed and users

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E-ISSN: 3041-8992

face a wide range of knowledge and information, traditional education must adapt to new changes. There are many issues and challenges for the virtual education system.

Given that the most favorable and sensitive issue in any country's intellectual system is its education sector, and its dynamism and creativity lead to deep transformations at the national level, the education system must be transformed to educate knowledgeable, ethical, and creative individuals. Today, with the advent of new educational technologies and especially Internet access among the widespread school community and their influence by non-native global cultures, the education system is compelled to adopt new functions appropriate to the needs of the time. Additionally, with the emergence of COVID-19 in recent years, virtual education has expanded further in developing countries, including Iran. Choosing and achieving new functions necessitates a new perspective on the education system. Distance education has been common worldwide for years, but combining it with the Internet has led to a new method called electronic or virtual education. What is certain on the global dimensions of education and its necessity is that education development is a global necessity, and virtual education is one of the best solutions. The new generation, given global changes, will not be satisfied with traditional education styles. Ignoring this event means backwardness, and paying attention to it means progress. Over time, education has gradually become a vast organization and has always faced the challenge of designing an efficient structure. Accordingly, it has undergone changes in its structure and programs. One of the most important plans education faces today is the development of virtual education alongside in-person education. However, despite the importance and position of virtual education worldwide, it is still not efficient in many countries, including Iran, and its absence is clearly felt. While in many countries, virtual education has established itself and solved many educational problems alongside in-person education, it still lacks a proper position in our education system. Although the absence of practical virtual education in the country is evident, it is not yet fully implemented and has many problems and challenges that need further investigation. E-learning, as one of the modern educational methods, has evolved in recent decades and gained more importance. Given the educational inequalities in virtual education, with specific concerns regarding education for low-income families, especially in rural and remote areas where using virtual education is challenging, particularly in elementary school, a critical educational period, the concept of leadership, particularly appropriate educational leadership for the virtual education system in elementary education, gains more importance. Additionally, with the spread of COVID-19 and the importance of maintaining social distance, the need for virtual education has been felt more than ever, forcing many countries to move towards virtual education and prepare the infrastructure for quality advancement of this type of education. Many studies have addressed educational leadership, but so far, no research has examined appropriate educational leadership for the virtual-in-person education system in elementary education. Given the above, the present study seeks to identify the dimensions, components, and indicators of appropriate educational leadership for blended (virtual-in-person) education in elementary education.

2 Methods and Materials

The present study is fundamental-applied in nature and follows a qualitative approach using synthesis research. Synthesis research, sometimes equivalent to qualitative meta-analysis, involves combining specific features and factors of the research literature (Cooper & Hedges, 2009). In this study, Roberts' six-step synthesis model was used to analyze the findings. The stages and corresponding actions are detailed below. It is worth noting that the data collection method, the study population and sample, and the data analysis method are specified in this six-step process.

2.1 Identifying the need, conducting preliminary searches, and clarifying the need

Identifying the dimensions, components, and indicators of appropriate educational leadership for blended (virtual-in-person) education in elementary education has not been done before. Given that previous studies have examined this issue from relatively different perspectives, this study attempted to identify the dimensions, components, and indicators of appropriate educational leadership for blended (virtual-in-person) education in elementary education based on synthesis research and combining related studies.

2.2 Conducting research to retrieve information

This stage is dedicated to searching for sources related to the main research need. The researcher searched among Persian and English studies related to the components of appropriate educational leadership for blended (virtual-in-person) education in elementary education. Therefore, all Persian articles available in specialized journal databases,

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E-ISSN: 3041-8992

the country's journal information bank, the Iranian Scientific Information Center database, the Humanities Comprehensive Portal, and the Persian Science Searcher, and English articles available in Google Scholar, ScienceDirect, Springer, Scopus, ERIC, ProQuest, and citations of each source were identified. Subsequently, relevant sources were retained, and unrelated sources were eliminated based on the research objective. The keywords used included educational leadership, blended (virtual-in-person) education, blended education in elementary education, and educational leadership in blended education.

2.3 Selecting, refining, and organizing information

This stage involves judging the selection of studies based on research needs, requiring criteria for selecting and categorizing studies. The main criteria for including articles in this study were:

a) Articles and research that examined educational leadership for blended education in elementary education.

b) Articles and research that had a content relationship with the topic.

Among the 1,315 studies identified, 26 studies were found that met the inclusion criteria. Some studies were not suitable for final analysis and were excluded based on exclusion criteria. The exclusion criteria were:

a) Research that did not report sufficient information on the research objective, merely describing the concept of educational leadership.

b) Research published in unreliable journals or lacking appropriate methodology.

In total, 1,315 articles and studies related to the keywords were identified (69 Persian articles and 1,246 English articles). Based on inclusion criteria, 298 studies were selected for abstract review. After reviewing the abstracts, 298 articles (32 Persian articles and 266 English articles) were selected for full-text review. Out of these, 26 studies (22 English studies and 4 Persian studies) were selected for final analysis based on exclusion criteria.

2.4 Conceptual framework and fitting it with information from analysis

This stage involves a connecting framework in which the obtained information is combined. The conceptual framework formed in this study revolves around the main concept of dimensions, components, and indicators of appropriate educational leadership for blended (virtual-in-person) education in elementary education.

2.5 Processing, combining, and interpreting into tangible outputs

In this stage, the findings of selected studies were open-coded and then categorized based on common concepts through axial coding. Data analysis was conducted manually.

2.6 Presenting results

In this section, based on the synthesis research process and outputs, the dimensions and components of the appropriate educational leadership model for blended (virtual-in-person) education in elementary education were examined. Initially, descriptions of all components were open-coded. In the results section, open codes were combined, re-coded, and overlapping and semantically related codes were merged to extract components (axial codes). Selective coding categorized common concepts into a class, leading to the identification of selective codes (dimension). To ensure the validity of synthesis research results, the credibility or trustworthiness criterion was used. Credibility measures the extent to which qualitative research findings can be relied upon and trusted. In this study, all four proposed criteria were considered, and credibility was regularly assessed by the researcher. For plausibility or acceptance, the strategies of long-term involvement, continuous observation, and external observer reviews were used, and a portion of the coding was re-coded by external expert observers (2 people) with over 80% agreement, confirming the coding. Reliability, confirmability, and transferability were also reviewed in this study.

3 Findings and Results

The main research question was: What are the indicators and components of appropriate educational leadership for blended (in-person and virtual) learning in elementary education? In this section, based on Roberts' model, the fifth and sixth stages of the model are analyzed to identify the dimensions, components, and indicators of appropriate educational leadership for blended (in-person and virtual) learning in elementary education.

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E-ISSN: 3041-8992

Table 1

Documents Studied in the Field of Appropriate Educational Leadership for Blended (In-Person and Virtual) Learning in Elementary Education

Row	Author(s)	Research Method (Data Collection Tool)	Indicators and Components of Appropriate Educational Leadership for Blended (In-Person and Virtual) Learning in Elementary Education
P1	(Awais, 2023)	Systematic Review (Documentary and Library Studies)	The impact of leadership on online education and learning; educational experiences in an online leadership program; the impact of online education on the development of leadership actors in an online education environment; leadership in an online education environment, familiarity with ICT, manager motivation, coaching and mentoring, talent identification, recognition of teachers' competencies and internal needs, educational applications, necessary infrastructure, decline of traditional education.
P2	(Rios-Jones, 2022)	Qualitative: Content Analysis (Semi-Structured In-Depth Interviews)	Leaders as a key element, optimal school performance, blended learning charter, educational programs for charter school leaders, public participation, interactive programs, blended content, motivation, blended evaluations, content integration, hybrid methods.
P3	(McGinity et al., 2021)	Quantitative (Longitudinal Study)	The necessity of the twenty-first century, quality leadership, school outcomes, student motivation to learn, postmodern philosophies, post-positivism, interweaving, deconstruction, culture of creativity, inclination towards innovation, competency-based, technological adequacy, interpersonal relationships, participatory spirit.
P4	(Yokuş, 2022)	Grounded Theory (Semi-Structured Interviews)	Effective leaders and managers, best education, multitude of learners, individual differences, educational leadership requirements, face-to-face interaction, virtual reality, COVID-19, non-hierarchical systems, strategic and analytical thinking, enhancing educational activities, networking, integrating learning and practice, flexible learning environment, comprehensive learning environment, supportive learning environment, creating scientific insight, developing a creative school, improving education, curriculum alignment, extensive learning outcomes.
P5	(Azar, 2020)	Mixed (Quantitative-Qualitative) (Questionnaire-Interview)	Formal and informal leadership, the need to build mutual trust, effective leadership, quality teachers, students' knowledge and technical performance, charismatic leadership, technical competence, human competence, cognitive competence, professional identity, managers' professional commitment, learning experiences, integrated curricula, rich learning experiences, multiple learning opportunities, providing a holistic curriculum, reviewing educational methods, multi-dimensional evaluation.
P6	(Brauckmann et al., 2023)	Critical Analysis (Document Review)	The relationship between context and leadership, inclusive leadership contextual factors, contextual backgrounds and conditions, leadership facilitators, school leadership barriers, motivation and encouragement, professional development, educational equity, cultural challenges, structural challenges, resistance to technology, idealistic manager, educational leader realism, integrating theory and practice, redefining educational goals, redefining teaching-learning methods, empowering teachers.
P7	(Antonopoulou et al., 2021)	Quantitative Survey (Questionnaire)	Transformational leadership, passive and fearful leadership, greater efficiency and satisfaction, digital skills, multiple literacies, team spirit, reducing organizational costs, influencing employees, respecting individual differences, group goals, facilitating organizational goals, leadership styles, role modeling, global patterns, goal orientation, problem-solving in a novel way.
P8	(Balwant, 2016)	Qualitative (Meta-Analysis)	Transformational thinking in education, instructor-transformational leadership relationship, motivated instructor-transformational leadership, satisfaction, perception of instructor credibility, high academic performance, multi-dimensional learning, cognitive learning, emotional learning, practical and experiential learning, manager agency.
P9	(Chisholm-Burns et al., 2021)	Qualitative (Inductive Content Analysis)	Educational leadership in emergency situations, the COVID-19 pandemic, adapting to a changing environment, precise and frequent communication, the need for flexibility during crises, open and continuous communication, staying connected, turning crisis into opportunity, adaptability/flexibility and productivity in education, the need for innovative leadership in facing widespread crises, leader reliability, using virtual platforms for socialization (not just for formal school activities).
P10	(Hartman & Morris, 2019)	Qualitative Grounded Theory (Interview)	Blended educational leadership, course nature, leadership type, presented content, student interaction type with the environment, targeted teachers, content attractiveness, online course effectiveness, quality-based course design, quality evaluation standards, aligning learning objectives, activities, and evaluations; active student participation; learner support; holistic education, professional growth, improving educational skills, ensuring the highest quality teachers, employing the best teacher supervision practices, developing interpersonal knowledge and skills, facilitating teacher education situations.
P11	(Pratt, 2019)	Qualitative Phenomenology (Interview)	Understanding leadership power, the teacher as a change agent in public elementary school, blended learning in elementary school, moving from traditional to blended learning, continuous learning opportunities, inspirational, impactful, innovative and supportive, guiding challenges, creating a learning culture, dedicating a program for meaningful and authentic professional development, respecting and valuing teachers'

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			time, modeling advanced educational systems, trusting and believing in teachers' decisions, cognitivism, social-cultural theory, contingency theory.
P12	(McLeod & Richardson, 2014)	Qualitative (Document Analysis)	Efficiency and effectiveness of blended learning, diverse learning environments, facilitating learning, human-machine integration, better execution of educational activities, educational leaders as learning facilitators, hardware facilitator, software facilitator, enhancing teachers' work motivation, face-to-face classroom interactions, virtual identities, science identity, growth and knowledge explosion, human interest in utilizing all senses.
P13	(Morgan & Spies, 2020)	Qualitative (Document Analysis)	Flexibility in education, innovative teaching, using technology in education, adaptability to different educational situations, quality of blended content, identity and nature of elementary school, temptation of educational technology, classroom complexities, easy teaching and learning, flipped classrooms, technology as an educational supplement, digital learning experience, increased communication ability, project-based learning collaboration, ability to differentiate teaching to match cognitive and individual learning needs, professional development sessions, commitment to blended learning, manager's knowledge of blended learning, manager's level of technical and technological knowledge.
P14	(Powell et al., 2015)		Professional development, active in education and guiding educational activities, creating a collaborative environment in blended learning, electronic or transformational and transactional leadership as the most appropriate leadership styles, synchronous and asynchronous systems, human behavior and interaction with society, technology integration, organizational patterns, intellectual stimulation, integration and fusion problems, social mission, improving life, meaningful learning experiences, creating positive and inclusive spaces, promoting professional learning, developing learning, fostering a collaborative culture.
P15	(Kumar et al., 2021)	Qualitative Comparative Study (Brody Checklist)	Managing the blended educational environment, facilities, platforms, multiple competencies and qualifications, social network analysis, holistic educational systems, designing learning activities, attractive and multi-dimensional content, online support, student satisfaction, learning enthusiasm, meaningful educational environment, equal learning opportunities.
P16	(Rasheed et al., 2020)	Qualitative (Systematic Review)	Qualitative transformation, educational successes, flexible structure, blended learning, organizational structure, flexible school decision-making structure, flexible attitudes, teacher scientific competence, managerial competencies, human competencies, manager's managerial characteristics, attitude towards blended learning, centralized, decentralized, semi-centralized education, systemic view of education.
P17	(Lim & Wang, 2016)	Quantitative (Case Study)	Evaluation systems, synchronous and asynchronous learning, the necessity of blended learning (in-person and virtual), professional growth of teachers, professional growth of managers, development of professional competencies of managers and teachers, process-oriented learning, rich learning opportunities, teacher-student interaction, prior familiarity with the electronic education environment, rich teaching content, lack of IT equipment, improving social inequalities, technological challenges.
P18	(Asarta & Schmidt, 2020)	Quantitative (Quasi-Experimental) (Questionnaire)	Blended learning for project-based education, problem-centered, teacher competence, manager competence, educational staff competence, opportunities to acquire digital competence, personal adaptation to new digital technologies, self-learning, self-management in education, time management competence, online teaching experience, easy sharing of content, monitoring students and providing sufficient feedback, inadequate preparation for blended learning.
P19	(Kuo et al., 2014)	Qualitative (Phenomenology Interview)	Barriers at the school level, barriers at the teacher level, barriers at the system level, creating and training holistic students, the role of educational leaders as traditional information transmitters, the leader as facilitator, creating supportive infrastructures, lack of IT infrastructure, web tool management, advanced technologies, strong internet infrastructure, lack of professional expertise, ICT integration, professional development training, teacher support.
P20	(Mohebi, 2019)	Systematic Review (Documentary and Library Studies)	Educational leadership for the new era, digital culture, changing educational values and goals, digital culture leadership, the nature and essence of digital culture, leadership theories in digital culture, communication, understanding, role clarity, leadership attitude, communicative and interactive gap, specialized educational tools, teachers' perception of the blended teaching system, teacher agency, student community support, enhancing learning, synchronous and asynchronous e-learning styles.
P21	(LaFrance & Beck, 2014)	Qualitative (Document Analysis)	Learning opportunities for K-12 students, choosing virtual and blended learning experiences, school managers' readiness to lead online and blended learning programs for K-12, educational leadership programs, manager readiness to lead virtual K-12 schools, providing online courses for teachers, positive educational outcomes, cognitive and personal aspects of blended learning, creating creativity opportunities, creating new experiences, lack of mastery of IT, enhancing media literacy for parents and teachers, increasing information transfer speed, up-to-date knowledge and research-based, creating equality in educational opportunities.
P22	(Ribble & Miller, 2013)	Qualitative (Document Analysis)	Teachers' and managers' scientific expertise, organizational managers' support, internal and external teacher motivations and attitudes, current knowledge technology gap, lack of leadership readiness related to digital literacy for school environments, preparing for the digital future, digital citizenship, changing evaluation methods, lack of basic facilities, digital educational resources and television education, blended education skills training,

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E-ISSN: 3041-8992

			teaching and education skills in the blended environment, blended learning equipment and infrastructure.
P23	(Zeinabadi & Mohammadvand, 2016)	Qualitative (Grounded Theory, Semi-Structured Interview)	Knowledge of technology use, belief in technology use, manager action on technology use, technology goals and expectations setting, technology planning, creating a culture of technology use, strengthening the culture of technology use, empowering teachers to use technology, encouraging and motivating teachers to use technology, evaluating teachers' technology performance, enhancing technology knowledge sharing, technology support, technology capability, reducing learning limitations, lack of trust in technology, leaders as change facilitators, professional efficiency and performance, support, management, and operations, judgment based on professional growth, technological application, encouragement and stimulation.
P24	(Karamati, 2021)	Qualitative (Thematic Analysis, Semi-Structured Interview)	Virtual education space, understanding course convergence, attention to individual differences in this learning style, increasing student interaction and participation, deeper learning, more lasting and memorable learning, thinking, questioning, critical analysis, unified science structure, learners' understanding of the convergence and coherence of sciences, participatory activities, entrepreneurship, blended learning experience, compensating for the damaged space during the pandemic, improving education quality, making educational content tangible for students, making learning content practical, variety in content presentation methods, making content tangible.
P25	(Al Barzi, 2024)	Qualitative (Thematic Analysis, Semi-Structured Interview)	Challenges of shifting from traditional to virtual education, the emergence and spread of COVID-19, changing lifestyles, non-constructive challenges, organizing themes, teaching and education skills in virtual space, virtual space equipment and infrastructure, teachers' communication with families, attitudes towards using virtual space, support activities, modern teaching tools, modeling educational systems, constructive challenges, organizing themes, identifying educational opportunities, identifying psychological opportunities.
P26	(Saghafi, 2015)	Qualitative (Grounded Theory, Semi-Structured Interview)	Constructivism in learning and teaching, problem-solving, optimal combination of a blended environment, creating maximum learning context, flexibility, 24/7 access to web-based workshops, internet technical issues, limited virtual participation, new and flexible learning models, lack of belonging to the learning environment, knowledge sharing, desire for informal environments, personal, flexible, and social spaces, collective presence advantage, how to combine virtual and in-person education, technical and human infrastructures, solutions for blending in-person and virtual education.

In the next stage of the synthesis research process, the extraction of components was carried out as follows: Initially, all component descriptions were identified through open coding. In the synthesis research output section, as the goal of synthesis research is to combine all scientific findings on a specific topic to achieve a unified coherence, the qualitative analysis of open codes was placed side by side, and by re-coding, overlapping and semantically related items were combined to extract components (axial codes). Finally, to categorize the dimensions and components of appropriate educational leadership for blended learning based on a common concept, axial coding was performed, leading to the identification of six main dimensions (selective codes) for appropriate educational leadership for blended learning in elementary education, as shown in Table 2.

Table 2

Dimensions, Components, and Indicators of Appropriate Educational Leadership for Blended Learning in Elementary Education

Selective Code (Dimensions)	Axial Code (Components)	Subcategories (Open Codes) / Sources
Competent Leadership	Leadership Styles	Coaching and mentoring (P1, P3, P8, P5, P14), Formal and informal leadership (P3, P7, P8), Charismatic leadership (P23, P18), Electronic leadership (P21), Blended educational leadership (P10), Transformational leadership (P14, P19), Transformational and transactional leadership styles (P10, P11).
	Features of Appropriate Leadership for Blended Learning	Manager motivation (P1), High interpersonal relationships (P3, P13, P9), Participatory spirit (P3, P18), Trust-building (P5), Influence on subordinates (P5, P25, P7), Educational leader realism (P6), Transformational change (P7, P23, P2), Manager agency (P8), Respect for individual differences (P7), Motivation and encouragement (P6, P10), Transformational thinking in education (P8), Creating and training holistic students (P19, P5, P2), Teacher support (P19).
	Required Competencies for Educational Leadership	Talent identification (P1), Recognizing teachers' competencies and internal needs (P1, P3, P22), Technical competence (P5, P9, P11), Human competence (P5, P9, P11, P10, P21), Cognitive competence (P23, P5, P9, P11), Holistic competence (P3, P7, P21), Managing the blended educational environment (P15), Leading K-12 online and blended learning programs (P21), Time management competence (P11, P8, P23), Facilitator (P19, P7), Student community support (P20).
	Professional Identity of Educational Leaders	Managers' professional commitment (P5), Transformational instructor-leadership relationship (P8), Change facilitators (P23), Continuous monitoring (P5, P8), Creating a learning culture (P11), Dedicating a program for meaningful professional development (P11, P7), Better execution of educational activities (P12, P3), Enhancing media literacy for parents and teachers (P21).

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Organizational Factors	Organizational Structure	Flexible structure (P16), Dynamic and science-oriented organizational structure (P18, P16), Semi-centralized education (P3, P16, P9).
	Organizational Barriers	School-level barriers (P19), Lack of organizational managers' support (P3, P11, P21), Emphasis on centralization (P16, P9, P2).
	Organizational Facilitators	Reducing organizational costs (P7), Decentralization (P16, P3, P10).
Technology and Innovation	Technological and Innovative Knowledge	Familiarity with ICT (P1, P2, P19), Familiarity with educational applications (P3, P9), Familiarity with global patterns (P7, P11), Prior familiarity with electronic education environments (P17), Familiarity with advanced technologies (P19, P3), Familiarity with specialized educational tools (P1, P13, P20), Teachers' digital literacy (P22, P5).
	Technological Attitude (Acceptance)	Non-resistance to technology (P6), Trust in technology as a complement to education (P11, P13), Personal adaptation to new digital technologies (P18, P13), Belief in digital culture (P20), Belief in the digital future (P24), Belief in the capability of technology in education (P23, P19, P8), Trust-building in technology (P23), Belief in a changing world and speed of information transfer (P21).
	Technological Skills	Technological adequacy in education (P3, P14), Teachers' digital skills (P7), Skills in using virtual platforms (P18, P9), Digital culture leadership skills (P20), Manager action on technology use (P23), Teaching and education skills in virtual space (P25, P1, P10).
	Technological and Innovative Infrastructures	Necessary technological infrastructures (P1), Hardware and software facilitators (P12), Digital learning experience (P13, P4, P17), Manager's technical and technological knowledge level (P13), Online support (P15), Digital educational resources and television education (P22), Web tool management (P19), Blended learning equipment and infrastructure (P22), Empowering teachers to use technology (P23, P3, P12), Enhancing technology knowledge sharing (P23, P11).
Philosophical and Epistemological Systems	Systemic and Holistic Attitude	Necessity of twenty-first century integration (P3), Emergence of modern and postmodern philosophies (P13), Holistic education (P10, P15), Unified science identity (P12), Epistemological flexibility (P9, P13), Science cornerstone (P24), Problem-centered and problem-solving (P26).
	Acceptance of Multiple Literacies	New psychological theories (P7, P19), Cognitivism (P11), Human interest in utilizing all senses (P12, P11), Teachers' perception of the blended teaching system (P20), Critical analysis (P24).
	Rhizomatic Knowledge	Constructivism in learning and teaching (P26), Relational thinking (P24), Knowledge sharing (P26), Knowledge growth and explosion (P12), Strategic and analytical thinking (P4, P11), Networking (P25, P9, P4), Virtual reality (P4).
Learning Environment	Learning Opportunities	Interactive programs (P2), Diversity and multiplicity of learners (P4), Individual differences (P4, P9, P23, P26), Flexible learning environment (P4, P11), Comprehensive learning environment (P4, P9), Multiple learning opportunities (P5), Holistic and integrated learning opportunities (P6, P11, P21), Creating a participatory, attractive, and diverse learning environment (P3, P9), Rich learning opportunities (P17), Variety in content presentation methods (P24).
	Learning Activities	Problem-centered (P24, P9, P18), Content integration (P2), Face-to-face interaction (P4), Multi-dimensional learning activities (P4, P10), Project-based learning collaboration (P13).
	Learning Experiences	Creating teacher experiences (P21, P29), Choosing virtual and blended learning experiences (P21), Online teaching experience (P18), Improving social inequalities (P17), Rich, meaningful, and sustainable learning experiences (P5, P14, P24, P3, P15, P21), Hybrid methods (P2), Educational experiences in an online leadership program (P1), Practical learning experiences (P24).
Learning Outcomes	Academic and Educational Outcomes	Student participation in learning (P24), Deeper and more lasting learning (P2, P5, P18, P20), Growth of creativity culture (P3), Enhancing educational activities (P3, P7, P23), Improving the educational process (P4), Curriculum alignment (P4), Improving and enhancing academic performance (P5, P8), Improving educational skills (P10), Efficiency and effectiveness of blended learning (P11), Reducing learning limitations (P23).
	Social and Cultural Outcomes	Increasing the sense of interaction and participation (P24), Educational equity (P6).
	Individual Outcomes	Professional growth and development (P6, P14, P10, P17), Personal growth and development (P6, P9, P24), Teacher empowerment (P6), Improving life (P14).
	Psychological Outcomes	Students' learning enthusiasm and motivation (P3, P17), Attention to individual differences in this learning style (P24, P7), Developing interpersonal knowledge and skills (P10), Enhancing teachers' work motivation (P4, P19), Increasing communication ability (P13, P10, P21), Creating positive and inclusive spaces (P14), Student satisfaction (P15).
	Organizational Outcomes	Optimal school performance (P2, P14), Qualitative school learning outcomes (P22, P3), Creating scientific insight and perspective in school (P4, P20), Developing a creative school (P4, P8), Professional development (P2, P23), Greater efficiency and satisfaction (P7, P9), Facilitating organizational goals (P7), Productivity in education (P23, P9), Managers' professional growth (P17), Developing professional competencies of managers and teachers (P17).
Evaluation System	Evaluation Type	Blended evaluations (P2), Process-oriented evaluation (P9, P3, P22), Synchronous and asynchronous learning evaluation (P17), Learning process evaluation (P17, P9).
	Evaluation Criteria	Quality evaluation standards (P3), Alignment of learning objectives, activities, and evaluations (P10, P21), Monitoring students and providing sufficient feedback (P10, P23), Changing evaluation methods (P22), Judgment based on professional growth (P23).

4 Discussion and Conclusion

The aim of this study was to identify the dimensions, indicators, and components of appropriate educational

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leadership for blended (in-person and virtual) learning in elementary education. By reviewing and analyzing the existing research literature, these dimensions, components, and indicators were examined and integrated. The results identified seven overall dimensions of appropriate educational leadership for blended (in-person and virtual) learning: competent leadership, organizational dimensions, technology and innovation, philosophical and epistemological systems, learning environment, learning outcomes, and evaluation systems.

In the dimension of competent leadership, components such as leadership styles, features of appropriate leadership for blended learning, required competencies for educational leadership, and the professional identity of educational leaders emerged. The appropriate leadership model for blended (in-person and virtual) learning in elementary education emphasizes specific leadership styles: charismatic leadership, electronic leadership, transformational, and transactional leadership. These findings align with the prior research (Awais, 2023; Azar, 2020; Yokuş, 2022). According to the research findings, an appropriate leadership model for blended learning should possess certain features: the educational leader should be motivated, have high interpersonal relationships, be realistic, act according to their words, support teachers, and possess a spirit of transformational and collaborative work. In line with Awais (2023), educational leaders with a transformational spirit succeed in creating desirable changes in the educational environment, particularly in technological transformations (Awais, 2023). Regarding the competencies required for educational leadership in blended learning, the manager and educational leader should possess multiple human, cognitive, and technical skills to be successful. Hartman & Morris (2019) also suggest these multiple skills for blended educational leadership, considering them essential for success in blended learning (Hartman & Morris, 2019). Another component within the human dimension is the professional identity of educational leaders. Educational leaders for blended learning should be aware of their professional identity and strive to develop and enhance their professional identity and competence.

Another dimension of appropriate educational leadership for blended (in-person and virtual) learning in elementary education is the organizational dimension, which includes organizational structure, organizational barriers, and organizational facilitators. The findings indicate that appropriate educational leadership for blended learning in elementary education requires a dynamic and decentralized organizational structure. Centralization and lack of managerial support can hinder the implementation of appropriate educational leadership for blended (in-person and virtual) learning. Removing these barriers can facilitate the design and implementation of this type of education. These findings align with prior studies (Brauckmann et al., 2023; Powell et al., 2015; Rasheed et al., 2020; Saghafi, 2015).

The technological and innovative dimension is another aspect of appropriate educational leadership for blended (in-person and virtual) learning in elementary education. This type of education requires a technological infrastructure, including both hardware and software, and educational leaders and teachers need to have technological knowledge, skills, and attitudes. Often, the educational leader is a barrier to the success and implementation of blended learning, showing resistance to technology. These findings are consistent with previous studies (Brauckmann et al., 2023; Powell et al., 2015; Ribble & Miller, 2013) regarding the lack of technological literacy among educational leaders; LaFrance & Beck (2014) on the lack of IT proficiency among teachers and school staff (LaFrance & Beck, 2014); and Asarta & Schmidt (2020) on the absence of a digital culture within the organization and lack of digital skills among staff as technological dimensions of blended learning (Asarta & Schmidt, 2020).

Another dimension of appropriate educational leadership for blended (in-person and virtual) learning in elementary education is the philosophical and epistemological system. Components such as a systemic and holistic attitude, acceptance of multiple literacies, and rhizomatic knowledge can play a role. These findings are consistent with previous studies (Asarta & Schmidt, 2020; Karamati, 2021; Kumar et al., 2021; Rasheed et al., 2020; Saghafi, 2015), which emphasize the role of epistemological knowledge in blended learning. Given that blended learning is based on a unified epistemological foundation, educational leaders need to adopt a systemic and holistic attitude, considering the educational system and blended learning as a whole. Rhizomatic epistemology, which is among the latest types of knowledge emphasizing networked and relational learning, can play a significant role. Rhizomatic epistemology opens new horizons in education and particularly in blended learning, emphasizing principles such as connectivity and heterogeneity, plurality, and multidimensional communications(Raminnia, 2015; Sajadi et al., 2018). Modern learning theories believe that literacy comes in different forms and types, and humans must utilize their

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E-ISSN: 3041-8992

entire epistemological system and cognitive resources, which is particularly crucial for blended learning.

Another dimension of appropriate educational leadership for blended (in-person and virtual) learning in elementary education is the learning environment, which is discussed through three components: learning opportunities, learning activities, and learning experiences. These findings are consistent with previous studies (Asarta & Schmidt, 2020; Awais, 2023; Azar, 2020; Karamati, 2021; Kumar et al., 2021; Lim & Wang, 2016; McGinity et al., 2021; Raouf, 2010; Saghafi, 2015), which highlight the role of the learning environment and its characteristics for blended (in-person and virtual) learning. The learning environment for this type of education should provide appropriate and rich learning opportunities so that students can engage in learning activities and gain learning experiences. According to Eisner (1985), there is a fundamental difference between these three concepts. Learning opportunities are the inputs of the learning system, learning activities are the processes, and learning experiences are the outputs of the learning system (Eisner, 1985).

Appropriate educational leadership for blended (in-person and virtual) learning in elementary education can yield various learning outcomes, including academic and educational outcomes, social and cultural outcomes, individual outcomes, psychological outcomes, and organizational outcomes. These findings align with previous studies (Hartman & Morris, 2019; Karamati, 2021; Kumar et al., 2021; LaFrance & Beck, 2014; Lim & Wang, 2016; Pratt, 2019; Saghafi, 2015). According to Brookman, blended learning, by utilizing various human dimensions and students' cognitive resources, can significantly enhance the quality of students' education and learning, making the learning environment more enjoyable and increasing the sense of social participation. Hartman and Morris (2019) suggest that blended learning, with its strong philosophical and epistemological foundations, can enhance students' self-esteem and self-realization, benefiting both students and teachers (Hartman & Morris, 2019). McGinity, Heffernan, & Courtney (2022) point out that blended learning can transform schools into attractive and dynamic environments, making the organizational space more flexible (McGinity et al., 2021).

Finally, the last dimension of appropriate educational leadership for blended (in-person and virtual) learning in elementary education is the evaluation system. The success of this type of education requires an appropriate evaluation system. In blended learning, solely emphasizing criterion-referenced evaluation is not logical. Based on the conducted research, integrated and process-oriented evaluations are of particular importance, and changing the evaluation system and methods from traditional approaches is emphasized. This aligns with the prior findings (Lim & Wang, 2016; McGinity et al., 2021; Rios-Jones, 2022), which point out the appropriateness of integrated and process-oriented evaluations.

Given the above, identifying the dimensions, indicators, and components of appropriate educational leadership for blended (in-person and virtual) learning in elementary education can play a significant role in designing an appropriate model for this stage.

Authors' Contributions

All authors have contributed significantly to the research process and the development of the manuscript.

Declaration

In order to correct and improve the academic writing of our paper, we have used the language model ChatGPT.

Transparency Statement

Data are available for research purposes upon reasonable request to the corresponding author.

Acknowledgments

We would like to express our gratitude to all individuals helped us to do the project.

Declaration of Interest

The authors report no conflict of interest.

Funding

According to the authors, this article has no financial support.

Ethical Considerations

In this research, ethical standards including obtaining informed consent, ensuring privacy and confidentiality were observed.

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E-ISSN: 3041-8992