ADVANCE SOCIAL SCIENCE ARCHIVE JOURNAL
Available Online: https://assajournal.com
Vol. 04 No. 02. Oct-Dec 2025.Page#.3912-3928
Print ISSN: 3006-2497 Online ISSN: 3006-2500
Platform & Workflow by: Open Journal Systems
https://doi.org/10.5281/zenodo.18505679

Embedding Sustainability in Public Educational Leadership: A Meta-Systems Thinking Approach

Muhammad Ajmal
Department of Management Science University of Gujrat, Pakistan
ajmal.hailian@gmail.com
Shaista Khalid (Corresponding Author)
Assistant Professor, Department of Education, University of Gujrat, Pakistan
shaista.anwaar@uog.edu.pk
Azmat Islam
Department of Business Administration, University of Education, Lahore, Pakistan
azmat24@gmail.com

ABSTRACT
The increasing complexity of global educational challenges ranging from resource limitations to social inequities necessitates a paradigm shift in how leadership operates within public education. This paper explores meta-systems thinking as a transformative framework for embedding sustainability into educational leadership practices in public institutions. Meta-systems thinking transcends traditional organizational boundaries, emphasizing interconnectedness, adaptability, and reflective learning as essential components of sustainable decision-making. By integrating ecological, social, and institutional dimensions, this approach enables leaders to design systems that are resilient, inclusive, and future-oriented. The study synthesizes theoretical insights and empirical evidence to propose a model of sustainable educational leadership grounded in systems integration, collaborative governance, and ethical stewardship. Findings suggest that when leaders adopt meta-systems thinking, they cultivate not only institutional sustainability but also the capacity for continuous learning and systemic innovation. Ultimately, this paper argues that embedding sustainability through meta-systems thinking is vital for advancing equitable, adaptive, and enduring public education systems.

Keywords: *Embedding Sustainability, Public Educational Leadership, Meta-Systems Thinking Approach.*

1. Introduction

In the 21st century, educational institutions face increasingly complex challenges that demand new models of leadership. Globalization, environmental change, technological disruption, and widening social inequities are reshaping how public education systems function (Ajmal, Islam & Islam,2023). In this context, educational leaders are called to not only manage institutions efficiently but also to embed sustainability—social, environmental, and institutional—into their practices. Sustainability in education leadership refers to the capacity to maintain effective learning environments while promoting ethical stewardship, social responsibility, and long-term resilience (Ahmed, Ajmal & Haq 2024). To achieve this, leaders must move beyond linear administrative models and embrace a holistic perspective that recognizes the interconnectedness of systems. Meta-systems thinking offers such a framework by integrating multiple layers of systems—educational, social, and ecological—into a unified and adaptive approach to leadership (Ajmal, Islam & Khan, 2023).

Meta-systems thinking emphasizes the ability to understand interdependencies, navigate complexity, and apply reflective learning to organizational transformation. Tammeaid, Virtanen, and Meyer (2022) argue that public sector leaders must develop *meta-skills* such as learning to learn, adaptive thinking, and reflective governance to lead effectively in complex institutional environments. Their research suggests that leadership training should enable "structural and mental boundary crossing," allowing leaders to integrate diverse knowledge systems and manage sustainability-oriented change across institutional boundaries (Tammeaid et al., 2022). This notion aligns closely with the principles of meta-systems thinking, which encourage leaders to adopt a panoramic view of organizational ecosystems rather than focusing solely on isolated processes or outcomes (Ajmal, Manzoor & Khan, 2024).

In the educational context, sustainability-oriented leadership requires cultivating *systems literacy* and *futures thinking* among both administrators and educators. Henderson et al. (2022) found that systems thinking and futures thinking significantly enhance students' sustainability-related leadership and activism, underscoring their importance in leadership development. Their study in higher education settings demonstrates that fostering an awareness of systemic interconnections prepares individuals to lead change initiatives that address long-term societal and environmental challenges (Henderson et al., 2022). This evidence suggests that sustainability in education leadership cannot be achieved without embedding systemic thinking as a core leadership competency.

Similarly, Rodríguez-Feria et al. (2023) emphasize that leadership competency frameworks must incorporate systems thinking, emotional intelligence, and cross-disciplinary collaboration to address complex global challenges. Their review of leadership frameworks in education revealed that while systems thinking is often acknowledged, it is inconsistently applied in practice (Ajmal, Islam & Islam, 2025). The integration of such competencies allows educational leaders to build adaptive institutions capable of responding to evolving societal demands (Rodríguez-Feria et al., 2023). Within public institutions, where accountability, equity, and social justice are central, meta-systems thinking provides a pathway to operationalize sustainability through multi-level governance and ethical stewardship (Ajmal, Rahat & Islam, 2024).

Public sector sustainability efforts further demonstrate the importance of integrated, system-wide leadership. O'Hare and Lyons (2023) describe the successful development of a sustainability checklist for integrated care systems within the UK's National Health Service (NHS). Their model emphasizes multi-sector collaboration, shared leadership, and data-driven decision-making as essential for achieving institutional sustainability. The initiative illustrates how meta-systems thinking—through the coordination of diverse stakeholders and the alignment of multiple governance layers—can drive sustainable transformation in large public organizations (O'Hare & Lyons, 2023).

Thus, embedding sustainability in public educational leadership demands a paradigm shift from conventional managerial approaches toward holistic, integrative, and future-oriented systems thinking. Meta-systems thinking equips leaders to understand how local actions influence broader educational ecosystems, to anticipate the consequences of institutional decisions, and to nurture adaptive learning cultures. This approach bridges policy, practice, and pedagogy—enabling leaders to guide their institutions toward long-term resilience, ethical responsibility, and societal impact. The following sections of this paper explore how meta-systems thinking can be applied as a strategic framework for sustainable educational leadership in public institutions, drawing from theory, empirical evidence, and practical models.

2. Literature Review

2.1. Embedding Sustainability in Public Educational Leadership: A Meta-Systems Thinking Approach

The concept of sustainability in educational leadership has evolved significantly over the past two decades, influenced by systems theory, sustainability science, and educational reform frameworks (Ajmal, Rahat & Islam, 2024). The emergence of meta-systems thinking—which emphasizes interconnectedness, reflexivity, and adaptive learning—has offered a new paradigm for understanding and transforming leadership practices in public education. This literature review examines current research that links systems thinking, sustainability, and leadership development within educational and public institutional contexts. It identifies major themes including (1) systems thinking as a foundation for sustainable leadership, (2) meta-competences for addressing complex challenges, (3) institutional transformation toward sustainability, and (4) barriers and enablers of embedding sustainability through leadership in education.

2.2 Systems Thinking as the Foundation for Sustainable Leadership

Systems thinking has become central to educational reform and sustainability leadership discourse. It promotes a holistic understanding of how policies, practices, and social systems interconnect, enabling leaders to manage complexity effectively. Chughtai and Blanchet (2017) highlight that systems thinking frameworks in public health evolved through interdisciplinary collaboration, blending management sciences, systems dynamics, and social policy insights to address complex social systems (Chughtai & Blanchet, 2017). This integration of systems concepts into governance and education mirrors the growing demand for adaptive and integrative leadership in public institutions

Similarly, Notarnicola et al. (2025) conducted a systematic review of systems thinking in nursing leadership, finding that a systems-oriented mindset improved resource management, decision-making, and staff collaboration (Notarnicola et al., 2025). Although the study is situated in healthcare, its implications for public educational leadership are profound: leaders capable of systems analysis can navigate institutional complexity while aligning local actions with broader sustainability goals.

Nguyen et al. (2023) further reinforce this link, demonstrating that systems thinking in public policy enhances governance and interdepartmental collaboration when applied strategically within decision-making frameworks (Nguyen et al., 2023). Their systematic review identifies cognitive and cultural shifts such as open communication, reflective practice, and integrative policymaking as essential for sustaining systems thinking in public institutions.

2.3. Meta-Competences for Addressing Complex Challenges

Meta-systems thinking intersects closely with the concept of meta-competences—skills that allow individuals to learn, adapt, and lead across dynamic and uncertain contexts. Bates et al. (2022) identified four key meta-competences—domain-specific, inter-relation, intrapersonal, and normative competence—as critical for addressing complex real-world problems and aligning educational outcomes with the Sustainable Development Goals (SDGs) (Bates et al., 2022). These meta-competences provide the foundation for meta-systems thinking, supporting leaders in recognizing the interconnected nature of institutional challenges

Tammeaid, Virtanen, and Meyer (2022) extend this argument by emphasizing meta-skills—such as reflective governance, learning to learn, and distributive leadership—as prerequisites for sustainability in public institutions (Tammeaid et al., 2022). They argue that these capacities allow public leaders to cross structural and mental boundaries, enabling adaptive strategies for institutional resilience In higher education, Henderson et al. (2022) found that systems thinking and futures thinking directly enhance sustainability-related leadership and activism, particularly

among women (Henderson et al., 2022). Their results indicate that meta-systems thinking can cultivate a sense of agency and purpose in leadership, aligning learning outcomes with sustainable transformation

2.4. Institutional Transformation Toward Sustainability

Institutional sustainability requires a shift from isolated programs to holistic, system-wide strategies. Christou et al. (2024) present a meta-study showing that higher education institutions (HEIs) often value sustainability rhetorically but fail to implement comprehensive strategies that integrate systems thinking into operations and governance (Christou et al., 2024). Their study identifies "whole-institution" approaches as best practice, emphasizing stakeholder engagement, self-assessment models, and systems-based evaluation as critical tools .Similarly, Al-khamaiseh, Bailey, and Jarvis (2024) conducted a systematic review on definitions of sustainable leadership in education, identifying three overarching themes: effectiveness and impact, systems thinking, and collaborative responsibility (Al-khamaiseh et al., 2024). They argue that sustainable leadership cannot exist without systemic integration and shared vision-building .

Hendry et al. (2025) reinforce this idea within healthcare education, showing that leadership for sustainability depends on integrating climate awareness, interdisciplinary collaboration, and advocacy into curricula (Hendry et al., 2025). Their findings emphasize the role of education in shaping leaders capable of promoting systemic resilience and climate-conscious decision-making.

2.5. Barriers and Enablers to Embedding Sustainability in Educational Leadership

Despite growing recognition of the need for sustainability, several barriers impede its integration into leadership practice. Studies by Rodr guez-Feria et al. (2023) indicate that leadership frameworks across disciplines remain fragmented, lacking consistency in addressing systems thinking and sustainability competencies (Rodr guez-Feria et al., 2023). Institutional silos, lack of cross-disciplinary dialogue, and limited faculty awareness often hinder the adoption of integrated sustainability strategies.

On the other hand, emerging frameworks demonstrate how systems-based leadership can overcome these obstacles. O Hare and Lyons (2023) illustrate this through the NHS's integrated care system model, where collective leadership and sustainability checklists improved system coherence and environmental accountability (OHare & Lyons, 2023). Such frameworks highlight the power of multi-level collaboration and reflective governance in embedding sustainability within complex institutions.

3. Conceptual Framework: Meta-Systems Thinking for Sustainable Educational Leadership

3.1. Introduction to the Framework

The conceptual framework for this study positions meta-systems thinking as an integrative paradigm for embedding sustainability within public educational leadership. It recognizes that educational institutions are complex, adaptive systems that exist within larger ecological, social, and political networks. Leadership within such systems requires a shift from linear management approaches toward adaptive, reflexive, and interconnected thinking.

Meta-systems thinking transcends traditional systems approaches by emphasizing the interactions among multiple systems—organizational, social, and environmental—and the continuous flow of feedback between them. This lens enables leaders to perceive education as a living ecosystem, interconnected with broader societal and ecological systems, rather than a closed bureaucratic structure (Chughtai & Blanchet, 2017). Through this holistic awareness, leaders can identify interdependencies, anticipate unintended consequences, and cultivate

resilience, innovation, and ethical stewardship as the foundation for sustainable educational practice.

3.2. Core Theoretical Foundations

The framework draws upon three interrelated theoretical domains: systems thinking, meta-competence development, and sustainable leadership theory.

3.2.1 Systems Thinking as a Foundational Logic

Systems thinking provides the analytical foundation for understanding how different elements of education—policy, pedagogy, administration, and community engagement—interact and influence one another. Chughtai and Blanchet (2017) showed that systems thinking enhances organizational adaptability and promotes feedback-based learning, a principle that directly informs sustainable leadership in education. Similarly, Nguyen et al. (2023) demonstrated that applying systems thinking in public policy enhances cross-sector collaboration and long-term sustainability planning, suggesting that leaders in education can achieve similar results by integrating systemic insight into governance and decision-making.

3.2.2 Meta-Skills and Meta-Competences for Leadership

Building upon systems thinking, meta-systems thinking involves meta-skills—reflective, cognitive, and collaborative capacities that allow leaders to navigate uncertainty and learn across contexts. Tammeaid, Virtanen, and Meyer (2022) argue that developing such meta-skills is essential for leadership within complex institutions, as it enables "structural and mental boundary crossing" necessary for adaptive change.

In parallel, Bates et al. (2022) identify meta-competences—including inter-relational, intrapersonal, and normative competences—as foundational for addressing complex, real-world problems aligned with the UN Sustainable Development Goals (SDGs). These competencies promote holistic understanding and ethical decision-making, both essential for leading sustainable educational institutions.

3.2.3 Sustainable Leadership Theory

Sustainable leadership theory reinforces the need for leadership practices that are long-term, systemic, and ethically grounded. Al-khamaiseh, Bailey, and Jarvis (2024) found that sustainable educational leadership integrates three meta-themes: systems thinking, collaborative responsibility, and future orientation. These elements emphasize that sustainable leadership is not a static goal but a continuous process of balancing institutional, social, and environmental demands through systemic alignment and ethical reflection.

3.3. Dimensions of the Meta-Systems Thinking Model

The Meta-Systems Thinking for Sustainable Educational Leadership (MST-SEL) model consists of four interconnected dimensions that together form a dynamic ecosystem of learning and adaptation.

3.3.1 Cognitive-Reflective Dimension

This dimension focuses on the internal development of leaders' awareness and reflective capacity. Meta-systems thinking requires leaders to engage in *meta-learning*—learning how to learn—and to question assumptions, biases, and habitual patterns of thought (Tammeaid et al., 2022). Reflective governance supports adaptability and continuous improvement by embedding critical self-awareness into leadership processes.

3.3.2 Institutional-Structural Dimension

At the organizational level, this dimension integrates sustainability across governance systems, resource management, and policy frameworks. Systems thinking encourages coherence between institutional objectives and sustainability policies through cross-departmental collaboration and long-term planning (Nguyen et al., 2023). Christou et al. (2024) highlight that

institutions adopting whole-system sustainability approaches are better able to operationalize sustainable transformation through integrated governance mechanisms and participatory evaluation systems.

3.3.3 Social-Relational Dimension

The social dimension situates leadership within networks of relationships. Meta-systems thinking views leadership as distributed and participatory rather than hierarchical. Notarnicola et al. (2025) emphasize that systems-oriented leadership fosters collaboration, enhances decision-making, and strengthens institutional learning across teams. This aligns with O'Hare and Lyons' (2023) findings that shared leadership in public institutions promotes accountability and sustainability when guided by collective goals and system-level coordination.

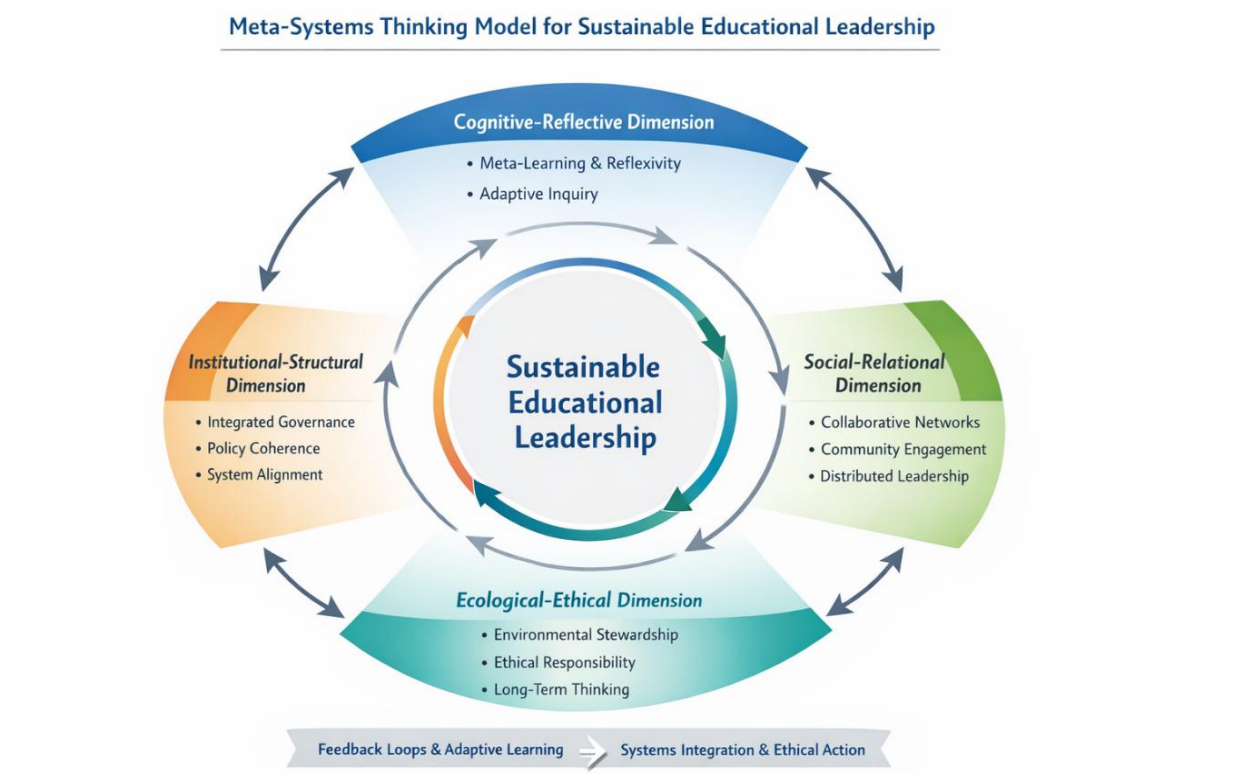
3.3.4 Ecological-Ethical Dimension

The ecological-ethical dimension embeds sustainability values and environmental consciousness into leadership. It urges leaders to integrate ecological literacy, ethical responsibility, and social justice into educational decision-making. Hendry et al. (2025) argue that sustainability leadership in education requires awareness of the moral implications of institutional actions and a commitment to intergenerational equity. This layer positions educational institutions as agents of societal transformation toward sustainability.

3.4. Dynamic Interconnections within the Framework

The four dimensions of the framework—cognitive, institutional, social, and ecological—operate through reciprocal feedback loops that form an adaptive leadership ecosystem. Reflective cognition informs institutional strategy; institutional learning supports collaborative networks; and social collaboration reinforces ethical and ecological responsibility. These cyclical interactions embody the principles of self-organization and resilience, ensuring that leadership evolves with changing contexts rather than adhering to rigid hierarchies or static objectives (Bates et al., 2022; Tammeaid et al., 2022).

The framework thus transforms educational leadership into a meta-learning system, where feedback, reflection, and ethical recalibration drive sustainable growth. Leaders become facilitators of learning across all levels of the institution—students, staff, and communities—thereby embedding sustainability into the organizational culture itself.



4. Explanation of the Meta-Systems Thinking Model for Sustainable Educational Leadership (MST-SEL)

The Meta-Systems Thinking Model for Sustainable Educational Leadership (MST-SEL) conceptualizes leadership in public educational institutions as a dynamic, adaptive, and integrative system that connects cognitive, structural, social, and ethical dimensions of sustainability. The model provides a holistic framework for understanding how educational leaders can operate within and across multiple systems to foster long-term institutional and societal sustainability. Its design is based on the premise that sustainable leadership requires continuous feedback, reflection, and ethical integration across all levels of organizational and social activity.

At the center of the model is Sustainable Educational Leadership, which functions as the unifying core. This leadership form is defined by its capacity to balance institutional goals, social responsibility, and environmental ethics through adaptive learning and meta-cognitive awareness (Tammeaid, Virtanen, & Meyer, 2022). The model's four interrelated dimensions—Cognitive-Reflective, Institutional-Structural, Social-Relational, and Ecological-Ethical—work synergistically through feedback loops that enable continuous organizational learning, ethical decision-making, and system alignment.

4.1. Cognitive-Reflective Dimension

The Cognitive-Reflective Dimension represents the mental and reflective capacities that enable leaders to think beyond immediate institutional boundaries. It emphasizes meta-learning, which involves learning about learning itself, and adaptive inquiry, where leaders engage in reflective processes to identify underlying assumptions, biases, and systemic patterns in their organizations.

Tammeaid et al. (2022) argue that public sector leaders require meta-skills—including reflective governance, learning to learn, and boundary-crossing—to effectively navigate the complexity of modern institutions. Through reflective practice, leaders develop a higher-order awareness of how their decisions affect the broader educational ecosystem. Henderson et al. (2022)

further demonstrate that cultivating systems and futures thinking enhances sustainability leadership and activism among educational leaders and students alike, as it fosters a long-term, anticipatory mindset.

This dimension essentially transforms leadership from a procedural role into a reflective and cognitive practice, grounded in critical self-awareness and continuous learning.

4.2. Institutional-Structural Dimension

The Institutional-Structural Dimension focuses on aligning governance systems, policy frameworks, and institutional processes with sustainability goals. Meta-systems thinking encourages leaders to view their organizations as interconnected subsystems that collectively influence broader educational outcomes. This dimension involves integrated governance, policy coherence, and system alignment, ensuring that sustainability becomes a strategic and operational priority rather than a peripheral concern.

Nguyen et al. (2023) showed that applying systems thinking in public policy enhances interdepartmental collaboration, informed decision-making, and sustainable governance structures. Similarly, Christou et al. (2024) highlight the importance of adopting whole-institution approaches, where sustainability principles are embedded into every aspect of institutional operations, from curriculum design to financial management. These approaches ensure that leadership decisions are guided by long-term sustainability metrics rather than short-term performance goals.

Thus, the institutional-structural layer transforms sustainability into an organizational system property rather than an isolated initiative, reinforcing alignment across multiple levels of educational governance.

4.3. Social-Relational Dimension

The Social-Relational Dimension positions leadership as a collective and distributed function. In this view, leadership emerges from networks of collaboration among teachers, administrators, policymakers, students, and communities. This dimension highlights participatory governance, collaborative networks, and distributed leadership as key processes that sustain institutional transformation.

Notarnicola et al. (2025) found that systems-oriented leadership enhances collaboration, resource optimization, and decision-making effectiveness within complex organizational environments. Similarly, O'Hare and Lyons (2023) demonstrated that shared leadership frameworks in public institutions promote accountability and long-term sustainability when leaders operate collectively under shared values and goals.

Through the social-relational dimension, meta-systems thinking reframes leadership as a shared social process rather than an individual act of authority. This approach allows leaders to co-create sustainable solutions that reflect the diverse needs and knowledge systems of all stakeholders involved in the educational process.

4.4. Ecological-Ethical Dimension

The Ecological-Ethical Dimension anchors the model in principles of environmental stewardship, social justice, and ethical responsibility. It recognizes that education is not only a societal function but also an ecological one—deeply interconnected with the well-being of the planet. Leaders who integrate ecological and ethical awareness into decision-making foster institutional cultures that value intergenerational equity and environmental consciousness.

According to Hendry et al. (2025), sustainability education must include a moral and ecological perspective that prepares learners and leaders to act as agents of change within global sustainability transitions. Al-khamaiseh, Bailey, and Jarvis (2024) similarly identify future orientation and ethical responsibility as core themes in sustainable leadership, emphasizing

that true sustainability depends on leaders' ability to align institutional missions with moral accountability and long-term environmental goals.

This dimension ensures that sustainability leadership transcends operational efficiency and becomes a moral commitment to future generations and planetary well-being.

4.5. Dynamic Feedback Loops and Systemic Integration

The MST-SEL model is not linear but cyclical and adaptive. Feedback loops connect the four dimensions, creating a self-organizing learning system. Reflection (Cognitive Dimension) informs institutional reform (Structural Dimension); policy coherence fosters collaboration (Social Dimension); and collective learning reinforces ethical and ecological awareness (Ethical Dimension). These continuous feedback processes embody the core mechanism of meta-systems thinking, which thrives on learning, adaptation, and systemic coherence.

Bates et al. (2022) describe this integrative capacity as the "meta-competence of interrelation," referring to the ability to perceive and act upon relationships within complex systems. In this model, feedback mechanisms not only sustain institutional performance but also strengthen the ethical and social fabric of public education. The model thus represents leadership as a living, evolving ecosystem, capable of regenerating itself through learning and ethical reflection.

5.Discussion

The findings and conceptual synthesis presented in this paper highlight that meta-systems thinking provides a robust and transformative framework for embedding sustainability into public educational leadership. It moves beyond traditional managerial or systems-based approaches by emphasizing *meta-level cognition*, *reflective governance*, and *systemic alignment*. Through the integration of cognitive, institutional, social, and ethical dimensions, the model promotes a holistic understanding of leadership as both an adaptive learning process and a moral responsibility.

This discussion explores three key areas: (1) how meta-systems thinking enhances leadership capability for sustainability, (2) the systemic and ethical implications of embedding sustainability in public institutions, and (3) the challenges and opportunities for implementing this framework in real-world educational contexts.

5.1. Meta-Systems Thinking as an Advanced Leadership Paradigm

The conceptual framework positions meta-systems thinking as an evolution of conventional systems thinking, adding a higher-order layer of reflection and self-awareness. Unlike traditional systems models, which often focus on structural or process optimization, meta-systems thinking encompasses *how systems themselves learn, adapt, and evolve*. In educational leadership, this translates to a capacity for *meta-learning*—leaders who learn how to learn within complex and unpredictable institutional ecosystems (Tammeaid, Virtanen, & Meyer, 2022).

By engaging in meta-learning, leaders cultivate adaptive intelligence—the ability to respond dynamically to emerging challenges rather than relying on prescriptive solutions. This mirrors Bates et al.'s (2022) identification of *meta-competences*—such as interrelation, normative, and intrapersonal competences—as essential to managing complex, real-world problems. Within public education, these competences manifest as the ability to recognize patterns of interdependence among governance, pedagogy, and community engagement.

Henderson et al. (2022) demonstrated that developing systems and futures thinking in higher education environments enhances leadership and activism around sustainability issues. Their findings reinforce that meta-systems thinking not only builds intellectual capacity but also shapes leaders' moral and civic orientation toward long-term, planetary well-being. Thus, the

MST-SEL framework deepens leadership development by merging cognitive reflection, emotional intelligence, and ethical foresight.

5.2. Systemic Integration and Ethical Leadership

One of the most significant contributions of the MST-SEL framework is its emphasis on systemic integration and ethical coherence. In public educational institutions, leadership often operates across fragmented administrative silos and conflicting policy agendas. Meta-systems thinking provides a means to overcome this fragmentation by fostering *integrated governance*—a mode of decision-making that aligns educational, social, and environmental priorities through cross-sector collaboration (Nguyen et al., 2023).

The Institutional-Structural Dimension of the model stresses the necessity of linking policy coherence with long-term sustainability planning. Christou et al. (2024) found that higher education institutions that adopted *whole-system approaches* were significantly more successful in achieving sustainable transformations compared to those implementing isolated initiatives. This suggests that sustainability must become a systemic property of educational institutions—embedded within their governance architecture, not treated as an external program or add-on.

Furthermore, ethical leadership lies at the core of sustainability integration. Al-khamaiseh, Bailey, and Jarvis (2024) emphasized that sustainable leadership requires future-oriented responsibility, moral integrity, and collective accountability. This ethical foundation aligns with Hendry et al.'s (2025) findings that effective sustainability education must cultivate moral consciousness and ecological stewardship. In practice, ethical leadership involves recognizing education's societal purpose not merely as a driver of economic productivity but as a means of nurturing global citizenship, social justice, and environmental consciousness.

Hence, the MST-SEL model reframes leadership as an ethical system of action, where decision-making processes are guided not only by efficiency and performance but by sustainability principles that ensure equity, resilience, and moral legitimacy.

5.3. Collaborative and Distributed Leadership for Sustainability

The Social-Relational Dimension of the model underscores the idea that sustainability cannot be achieved through individual leadership alone—it must be co-created through collective intelligence and participatory governance. Notarnicola et al. (2025) found that systems-oriented leadership fosters stronger team collaboration, resource optimization, and decision-making effectiveness. This aligns with O'Hare and Lyons (2023), who argue that distributed leadership in complex organizations strengthens sustainability initiatives by leveraging collective expertise and shared accountability.

In public educational institutions, distributed leadership ensures that sustainability goals are sustained even amid leadership transitions or policy changes. It also democratizes leadership, enabling teachers, students, and communities to become active participants in shaping institutional transformation. Such collaboration builds what Tammeaid et al. (2022) describe as *learning communities*, where feedback and dialogue serve as mechanisms for organizational learning and systemic evolution.

Moreover, this collective approach fosters relational resilience—a form of institutional robustness built on trust, inclusivity, and mutual learning. Through the MST-SEL lens, collaboration becomes not just a managerial strategy but a moral and cultural commitment to shared sustainability outcomes.

5.4. Navigating the Ecological-Ethical Dimension

The Ecological-Ethical Dimension introduces a vital moral and environmental layer to educational leadership. It urges institutions to align their mission with planetary health and

intergenerational justice. Hendry et al. (2025) emphasized that sustainability in education is deeply linked to ecological literacy and ethical responsibility. By embedding these values into curricula, governance, and institutional culture, educational leaders can foster transformative change that extends beyond the classroom to the broader community.

The MST-SEL model situates this ecological awareness as both a lens and a praxis—a way of perceiving interdependence and a mode of acting responsibly within it. This aligns with global calls for reorienting education toward the United Nations Sustainable Development Goals (SDGs), particularly SDG 4 (Quality Education) and SDG 13 (Climate Action). Thus, sustainability leadership becomes a practice of ecological citizenship, grounded in empathy, responsibility, and a long-term view of human development.

5.5. Challenges and Future Directions

While the model provides a comprehensive framework, its practical implementation presents several challenges. First, embedding meta-systems thinking in educational institutions requires cultural transformation—a shift from hierarchical, compliance-based structures toward adaptive and collaborative learning organizations. This change demands investment in leadership development programs that cultivate meta-competences and reflective practice (Bates et al., 2022).

Second, institutional inertia, policy fragmentation, and limited resources often hinder systemic integration. Nguyen et al. (2023) noted that even in advanced governance systems, applying systems thinking faces resistance due to entrenched organizational silos. Overcoming this requires strong institutional will and continuous advocacy for sustainability as a core institutional value.

Finally, further empirical research is needed to validate and operationalize the MST-SEL model. Longitudinal studies could explore how feedback loops between cognitive, structural, and ethical dimensions influence long-term institutional sustainability. Such research would strengthen the theoretical underpinnings of meta-systems thinking and its applicability across diverse educational and cultural contexts.

6.Theoretical Implications

The theoretical implications of this study extend across three interconnected domains — educational leadership theory, systems thinking and meta-systems theory, and sustainability science. By integrating these traditions, the proposed Meta-Systems Thinking Model for Sustainable Educational Leadership (MST-SEL) advances a new conceptual framework that redefines how leadership can be theorized, developed, and enacted in complex public education systems. This section outlines how the model contributes to existing theoretical understandings, expands conceptual boundaries, and provides an integrative lens for future research.

6.1. Advancing Educational Leadership Theory through Meta-Systemic Integration

The first major theoretical contribution lies in expanding the scope of educational leadership theory beyond the traditional focus on managerial efficiency and instructional leadership toward adaptive, systemic, and sustainability-oriented paradigms. Conventional leadership models—such as transformational or transactional leadership—tend to emphasize individual agency, charisma, or goal achievement within bounded institutional settings. However, public education today operates within highly complex ecosystems shaped by interdependent social, political, economic, and ecological forces.

The MST-SEL model situates leadership within a meta-systemic context, where leaders are viewed as *inter-systemic actors* who operate across multiple layers of governance and learning (Tammeaid, Virtanen, & Meyer, 2022). This reframing aligns with calls by Al-khamaiseh, Bailey,

and Jarvis (2024) for a leadership paradigm grounded in *future-oriented, ethical, and systems-based thinking*. The model thus contributes to leadership theory by conceptualizing leadership not as a set of individual competencies but as a dynamic system of cognition, collaboration, and moral responsibility that evolves through feedback and reflection.

Furthermore, the inclusion of meta-learning and reflective cognition as theoretical constructs enriches leadership models with a cognitive-developmental dimension. It aligns with Mezirow's transformative learning theory and Argyris & Schön's double-loop learning framework, emphasizing the need for leaders to question the assumptions underlying their decisions. By integrating these meta-cognitive processes, the MST-SEL model broadens the theoretical foundation of sustainable educational leadership to encompass reflexivity, adaptability, and systemic awareness.

6.2. Extending Systems Thinking into Meta-Systems Theory in Educational Contexts

A second theoretical implication arises from the model's integration of systems thinking and meta-systems theory. Systems thinking has long been recognized as a powerful lens for understanding complexity and interdependence in education (Nguyen et al., 2023; Christou et al., 2024). However, the MST-SEL framework moves a step further by embedding a meta-systems perspective, which not only examines relationships within a system but also how multiple systems interact, co-evolve, and self-organize over time.

This theoretical shift from systems to meta-systems thinking represents an evolution toward understanding education as a *complex adaptive ecosystem* (Chughtai & Blanchet, 2017). It provides a conceptual foundation for analyzing how learning, policy, culture, and environment form nested hierarchies that influence institutional sustainability. Through meta-systems thinking, educational leadership theory gains the capacity to explain how leaders manage systemic change under conditions of uncertainty—a challenge that traditional hierarchical or linear models fail to adequately address.

Nguyen et al. (2023) found that systems thinking in governance fosters more resilient institutions capable of adaptive learning. The MST-SEL model extends this insight theoretically by proposing feedback loops among cognitive, structural, social, and ethical subsystems, thereby positioning leadership as a multi-level learning process. In doing so, it bridges the theoretical gap between individual-level leadership behavior and system-wide transformation processes, offering a unified conceptual vocabulary for both.

6.3. Bridging Sustainability Science and Leadership Theory

A third theoretical implication lies in the intersection between sustainability science and educational leadership. Sustainability has often been examined from ecological, economic, or policy perspectives, yet it has remained conceptually underdeveloped within leadership theory. The MST-SEL framework fills this theoretical void by embedding sustainability principles—such as resilience, ethical stewardship, and intergenerational equity—into the very structure of leadership models (Hendry et al., 2025; Bates et al., 2022).

By doing so, the framework reframes leadership as a *sustainability practice*, where decision-making, governance, and learning are oriented toward long-term ecological and social well-being. It aligns with the emerging paradigm of sustainability leadership proposed by Al-khamaiseh et al. (2024), who identified systems thinking and ethical responsibility as defining features of sustainable leadership. The MST-SEL model extends this paradigm theoretically by demonstrating that sustainability is not an external goal but an *internal organizing principle* that guides how leaders think, act, and learn within institutional systems.

This conceptual alignment also supports the moral and ecological turn in educational theory, recognizing that leadership in education must grapple not only with institutional performance

but also with planetary survival. Hendry et al. (2025) emphasize that sustainability-oriented education must cultivate ethical and ecological literacy; the MST-SEL model operationalizes this insight by embedding it within leadership development and decision-making theory.

6.4. Theoretical Integration of Ethics, Systems, and Learning

A distinguishing theoretical feature of the MST-SEL model is its integration of ethics, systems theory, and learning theory into a single conceptual structure. Previous theoretical approaches often treated these domains as separate: systems thinking focused on structure, ethics on values, and learning on process. The MST-SEL framework unifies them under a meta-systems paradigm that recognizes their interdependence.

In this synthesis, ethical reasoning functions as the *moral compass* of systemic decision-making, while learning provides the *adaptive mechanism* through which systems evolve. As Bates et al. (2022) note, meta-competences such as normative reasoning and inter-relational understanding are essential for navigating the ethical complexity of real-world systems. This theoretical convergence offers a more holistic and human-centered foundation for leadership studies—one capable of addressing the "wicked problems" of modern education, such as inequality, climate change, and social fragmentation.

6.5. A New Theoretical Lens for Public Educational Institutions

The MST-SEL framework contributes a new theoretical lens for understanding leadership in public educational systems as meta-adaptive ecosystems. It positions institutions as *learning systems* that co-evolve with their social and ecological environments. Notarnicola et al. (2025) and O'Hare and Lyons (2023) provide empirical support for this conceptualization, showing that distributed leadership and systemic collaboration enhance institutional sustainability and resilience.

Theoretically, this implies that educational leadership must be conceptualized as a networked process—fluid, distributed, and adaptive—rather than as a static hierarchy. By embedding feedback, ethics, and collective intelligence within leadership structures, the MST-SEL model challenges the traditional individual-centric and control-based paradigms that dominate educational theory. It thus offers a foundation for developing a new ecology of leadership—one that is reflexive, systemic, and sustainability-driven.

7.Practical Implications

The practical implications of the Meta-Systems Thinking Model for Sustainable Educational Leadership (MST-SEL) extend across institutional governance, leadership development, curriculum design, and community engagement. The model provides a framework for transforming educational institutions into *adaptive learning ecosystems*—entities capable of evolving in response to social, ecological, and technological change. Applying this model in practice enables leaders to operationalize sustainability principles through reflective governance, integrated systems management, and ethical stewardship.

The following subsections outline key areas where the MST-SEL model can be implemented to enhance the sustainability and effectiveness of public educational institutions.

7.1. Leadership Development and Capacity Building

A primary implication of the MST-SEL model is the need to redesign leadership development programs around meta-systems competences. Conventional leadership training often focuses on managerial efficiency, compliance, and administrative control. In contrast, the MST-SEL model emphasizes meta-skills such as reflective governance, adaptive learning, and systemic awareness (Tammeaid, Virtanen, & Meyer, 2022).

Public education systems can integrate meta-systems thinking into professional development frameworks by:

- Incorporating *systems literacy* and *futures thinking* into leadership training modules (Henderson et al., 2022).
- Facilitating *reflective practice* workshops where leaders examine organizational assumptions, feedback loops, and institutional interdependencies.
- Using *simulation-based learning* and scenario planning to help leaders anticipate systemic consequences of decisions and policies (Nguyen et al., 2023).

By embedding these approaches, educational institutions can develop leaders who are not only administrators but *adaptive strategists*—capable of steering systems through uncertainty while maintaining ethical and sustainability commitments.

7.2. Institutional Governance and Systems Integration

The MST-SEL framework offers actionable strategies for improving institutional governance through *integrated systems management*. Educational institutions often operate within siloed structures where administrative, academic, and community functions are poorly coordinated. Applying meta-systems thinking allows leaders to align governance processes with sustainability goals through cross-sectoral collaboration and feedback-informed decision-making (Christou et al., 2024).

Practical strategies include:

- Establishing *sustainability governance committees* that integrate representatives from policy, pedagogy, and operations.
- Developing *whole-institution sustainability plans* that align financial planning, resource management, and curriculum objectives.
- Using *data analytics and system mapping tools* to visualize interdependencies across departments and identify leverage points for sustainable change.

Nguyen et al. (2023) showed that adopting systems thinking in governance leads to improved policy coherence and institutional adaptability. In education, this means that meta-systems-informed governance can enhance decision-making transparency, reduce resource duplication, and promote long-term institutional resilience.

7.3. Curriculum Innovation and Pedagogical Transformation

At the educational practice level, the MST-SEL model encourages curriculum innovation that nurtures systems thinking, sustainability values, and ethical reasoning among learners. Henderson et al. (2022) found that integrating systems and futures thinking into educational programs enhances students' capacity for sustainability-related leadership.

To operationalize this, institutions should:

- Embed *meta-competence development*—such as critical reflection, systems analysis, and ethical reasoning—into curriculum outcomes (Bates et al., 2022).
- Foster *interdisciplinary learning environments* that connect ecological, social, and economic issues within the curriculum.
- Encourage project-based learning focused on *real-world sustainability challenges*, enabling students to apply systems thinking to community-based solutions.

Such pedagogical transformations not only prepare future leaders but also cultivate *sustainability literacy* across all levels of education. This aligns with global educational reforms guided by the UN Sustainable Development Goal 4 (Quality Education), which emphasizes lifelong learning for sustainable development.

7.4. Distributed Leadership and Collaborative Networks

The MST-SEL model underscores the importance of distributed leadership as a driver of sustainability. Effective sustainability leadership emerges from *collaborative networks* rather than hierarchical authority structures (Notarnicola et al., 2025).

Practical implementation involves:

- Creating *multi-stakeholder leadership teams* involving teachers, administrators, students, and community partners to co-design and monitor sustainability initiatives.
- Adopting *participatory decision-making processes* that ensure diverse voices contribute to institutional strategies.
- Encouraging *peer-learning communities* and *professional learning networks* where educators exchange ideas, reflect collectively, and scale successful practices (O'Hare & Lyons, 2023).

Distributed leadership fosters what Tammeaid et al. (2022) call "structural and mental boundary crossing," promoting inclusive, adaptive, and co-creative systems. This collaborative ethos not only enhances institutional capacity but also deepens the collective ownership of sustainability outcomes.

7.5. Ethical and Ecological Governance

A distinctive feature of the MST-SEL model is its integration of ethical and ecological consciousnes**s** into leadership practice. Sustainability cannot be achieved through operational changes alone—it requires a shift in institutional values and decision-making ethics. Leaders must act as *ethical stewards* who balance human development with environmental preservation (Hendry et al., 2025).

Practical steps include:

- Developing *ethical leadership guidelines* that frame decision-making through sustainability principles and social justice.
- Implementing *institutional sustainability audits* that evaluate decisions against ecological and equity indicators.
- Promoting *eco-centric leadership practices*—such as reducing carbon footprints, fostering climate literacy, and embedding environmental ethics in teacher education (Al-khamaiseh, Bailey, & Jarvis, 2024).

By embedding ethical governance in institutional culture, public educational institutions can model responsible citizenship and contribute meaningfully to global sustainability agendas.

7.6. Policy and Strategic Planning Implications

At the policy level, adopting the MST-SEL framework requires systemic policy alignment across educational sectors and government bodies. Policymakers should support sustainability leadership by:

- Integrating *meta-systems thinking* into national education leadership standards and accreditation frameworks.
- Allocating funding for *sustainability capacity building* and inter-institutional collaboration.
- Embedding sustainability metrics in institutional evaluation and accountability systems.

Nguyen et al. (2023) and Christou et al. (2024) emphasize that systemic policy coherence ensures continuity of sustainability efforts beyond political cycles. By grounding policies in meta-systems principles, governments can ensure that public educational institutions function as *long-term social infrastructures* for sustainable development.

7.7. Implementation Challenges and Recommendations

Despite its potential, the practical adoption of meta-systems thinking in education faces challenges such as institutional inertia, limited resources, and fragmented policy environments. To overcome these, the following steps are recommended:

1. **Leadership advocacy:** Senior leaders must champion sustainability as a strategic priority.

2. **Capacity building:** Ongoing professional learning should be institutionalized through mentoring and collaborative reflection.
3. **Feedback culture:** Institutions should establish continuous improvement systems to track progress and refine strategies.
4. **Research integration:** Partnerships with universities and research centers can help evaluate the impact of meta-systems leadership practices.

By implementing these measures, educational systems can transition from isolated sustainability initiatives toward self-organizing, learning-based institutions capable of sustaining change over time.

8.References

Ajmal, M., Islam, Z., & Islam, A. (2023). Exploring the Impact of Servitization on Chinese Manufacturing Firm Performance: An Analysis of the Role of Management Capabilities and Competitive Strategy. *Journal of Asia-Pacific Business*, *24*(2), 121-144.

Ahmed, T., Ajmal, M., & Haq, M. A. U. (2024b). Knowledge-oriented leadership and innovative performance: role of creative self-efficacy and organizational climate in the software industry of Pakistan. *International Journal of Knowledge and Learning*, *17*(2), 119-138

Ajmal, M., Islam, A., & Khan, I. (2023). Investigating the impact of benevolent leadership on idiosyncratic deals: mediating mechanisms of psychological contracts and role breadth self-efficacy. *International Journal of Islamic Business, Administration and Social Sciences (JIBAS)*, *3*(4), 31-56

Ajmal, M., Manzoor, W., & Khan, I. (2024). Exploring the nexus between servant leadership, affective commitment, psychological empowerment, and employer feedback environment. *Habibia Islamicus (The International Journal of Arabic and Islamic Research)*, *8*(2), 1-20.

Ajmal, M., Rahat, W., & Islam, A. (2024). Enhancing affective commitment through transcendental leadership: unveiling the influence of altruistic mindset and intrinsic motivation in higher education. *International Journal of Leadership in Education*, 1-27.

Ajmal, M., Islam, Z., & Islam, A. (2025). Enhancing organizational performance in higher education through knowledge-centered culture and absorptive capacity: the mediating role of the knowledge creation process. *The Learning Organization*. 32 (5): 733–756

Al-khamaiseh, R. A. M., Bailey, R., & Jarvis, A. (2024). *Definitions of sustainable leadership in education: A systematic review and analysis. Journal of Research on Leadership Education, 20*(3), 280–297. https://doi.org/10.1177/19427751241283029

Bates, R., Brenner, B., Schmid, E., Steiner, G., & Vogel, S. (2022). *Towards meta–competences in higher education for tackling complex real–world problems – a cross disciplinary review. International Journal of Sustainability in Higher Education.* https://doi.org/10.1108/ijshe-06-2021-0243

Christou, O., Manou, D., Armenia, S., Franco, E., Blouchoutzi, A., & Papathanasiou, J. (2024). *Fostering a whole-institution approach to sustainability through systems thinking. Sustainability.* https://doi.org/10.3390/su16062508

Henderson, T., Michel, J., Bryan, A., Canosa, E., Gamalski, C., Jones, K., & Moghtader, J. (2022). *An exploration of the relationship between sustainability-related involvement and learning in higher education. Sustainability.* https://doi.org/10.3390/su14095506

Hendry, M., Helfer, T., Eissler, C., & Burr, C. (2025). *The relevance of sustainability and the climate crisis to the nursing profession and nursing education: A literature review. Journal of Nursing Scholarship, 57*(6), 967–980. https://doi.org/10.1111/jnu.70045

Nguyen, L., Kumar, C., Jiang, B., & Zimmermann, N. (2023). *Implementation of systems thinking in public policy: A systematic review. Systems, 11*(2), 64. https://doi.org/10.3390/systems11020064

Notarnicola, I., Duka, B., Grosha, E., Gioiello, G., Rocco, G., & Stievano, A. (2025). *Exploring the role of nurse leadership through a systems thinking lens: A systematic review of conceptual and empirical evidence. Journal of Advanced Nursing.* https://doi.org/10.1111/jan.70047

O'Hare, A., & Lyons, T. (2023). *Integrated care system (ICS) pharmacy medicines optimisation and sustainability checklist for NHS green plans. Abstracts.* https://doi.org/10.1136/leader-2023-fmlm.32

Rodríguez-Feria, P., Czabanowska, K., Babich, S., Rodríguez-Sánchez, D., Carreño Hernández, F. L., & Hernández Florez, L. J. (2023). *Divergence and convergence of the public health leadership competency framework against others in undergraduate medical education: A scoping review. Public Health Reviews.* https://doi.org/10.3389/phrs.2023.1605806

Tammeaid, M., Virtanen, P., & Meyer, J. (2022). *Leadership meta-skills in public institutions. SN Business & Economics, 2*(1), 1–16. https://doi.org/10.1007/s43546-022-00262-x