

Stretching Boundaries, Recalibrating Theory: Educational Leadership in the Age of Artificial Intelligence

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Abstract

Artificial intelligence (AI) transforms how K-12 schools manage learning, instruction, and enact leadership, often without comprehensive theoretical guidance. This study critically examines whether ten foundational leadership and organisational behavioural theories remain analytically viable and practically relevant in AI-mediated educational contexts. Employing a conceptual analysis grounded in critical theory and interdisciplinary AI literature, the study evaluates each theory's responsiveness to four conceptual pressures introduced by AI: epistemic disruption, relational mediation, ethical opacity, and diminished human agency. The analysis reveals that while instructional leadership and self-efficacy theories align well with AI's strengths in feedback and personalization, others—such as social justice leadership theory and trust theory—experience conceptual strain. A concentric framework is introduced to assess theoretical adaptability, followed by a five-stage model for improving leadership and organisational behavioural theory. AI is not merely a technological tool but a conceptual stress test for leadership and organisational behavioural theory. This study offers a roadmap for extending and re-contextualizing leadership models to address AI-mediated education's ethical, epistemological, and operational demands. It calls on the education leadership field to shift from theory preservation to theory evolution to remain relevant in an algorithmically governed future.

Keywords: Education leadership theory, organizational theory, behavioural theory, artificial intelligence, leadership theory development

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Introduction

Artificial intelligence (AI) is no longer a futuristic novelty; it is now deeply embedded in how societies work, govern, and learn. AI enables machines to perform tasks that once required human intelligence; learning from data, recognizing patterns, solving problems, and adapting to change (Holmes et al., 2019; Luckin et al., 2016). AI now shapes the routines of entire industries, transforming decisions, redistributing labour, and reframing the way we think about expertise. In healthcare, AI crafts treatment plans informed by medical histories and genetic profiles (Topol, 2019). In finance, credit scoring is refined by detecting patterns that are invisible to traditional models (Bahoo et al., 2024). In logistics, AI maps delivery routes, forecasts supply chain bottlenecks and orchestrates warehouse operations with clockwork efficiency (Charles et al., 2023; Wamba-Taguimdje et al., 2020). Even public governance is evolving, with AI helping to allocate resources, simulate policy effects, and build civic platforms that turn engagement into actionable feedback (Carlizzi, 2025).

In K-12 education, AI is beginning to alter the nature of teaching and learning. Although its presence may not be as visible as in hospitals or trading floors, its impact is growing, often embedded in the tools teachers and administrators already use. AI-driven tutoring systems adapt lessons to individual learning profiles, offering personalized practice, feedback, and pacing that traditional classrooms struggle to match with the technological advancements (Holmes et al., 2019; Luckin et al., 2016). Assessment platforms score written work, track progress

over time, and generate insights that inform differentiated instruction (Landauer, 2003; Williamson, 2017). Predictive analytics flags students at risk of falling behind, prompting early interventions that can redirect academic trajectories before they derail (Maraju & Aragani, 2023). Meanwhile, AI is taking root in the administrative side of schooling, automating scheduling, managing attendance and enrolment data, and facilitating communication with parents through intelligent dashboards and introducing AI-based chatbot interventions (Entenberg et al., 2023; Taye et al., 2023). School leaders are increasingly recognizing AI's transformative potential.

It is a double-edged sword, said Steve LePage, superintendent of North-western Regional School District No. 7. It is a new territory. We are trying to learn how to best navigate that, not only for our students but for our staff members, what tools can be employed to improve learning and teaching opportunities, and what can be a real detriment to having original thought, things that you are worried about as a school leader. It is scary, but it is also exciting (Sokoloff, 2025).

Similarly, Dr. Amy Reljac, a district leader in Pennsylvania, emphasized the urgency of proactive leadership: “No matter what, artificial intelligence is here. Therefore, it is incumbent upon us to know we must lead the implementation and the integration of AI into our school districts” (Doleh, 2024, p. 25). Nevertheless, amid this policy momentum and technological enthusiasm, one foundational question lingers: Are our existing leadership theories up to the task? As Platt (1964, as cited in Bhattacharjee, 2012) famously argued, a theory that cannot be mortally endangered cannot truly be said to be alive. Theories gain strength not by resisting critique but by adapting—or being replaced—in response to new evidence or phenomena. The frameworks that have long guided educational leadership—transformational leadership, instructional leadership, and distributed leadership, among others—were forged in pre-digital contexts. They presume human agency, stable hierarchies, and face-to-face interactions. However, in schools now infused with AI, those assumptions are increasingly challenged.

In this light, the rise of AI presents both a disruption and a provocation. It does not render existing leadership theories obsolete but exposes their conceptual seams. Frameworks built on face-to-face interaction, human-centred judgment, and organizational stability must now contend with systems that predict, recommend, and act—sometimes independently of human oversight. The challenge is not to abandon theory but to pass it through a stress test, interrogate its boundaries, refine its assumptions, and recalibrate its relevance for a world increasingly governed by intelligent machines. This paper undertakes that task. It critically examines ten dominant educational leadership and organisational behavioural theories through the lens of AI, identifying which propositions endure, which falter, and where theoretical renewal is most urgently required. It advances a broader aim to develop a more agile, ethically attuned, and context-responsive framework for leading schools in AI-mediated educational environments.

Conceptual Foundations

To assess whether leadership theories can withstand the demands of AI, we must first clarify what a theory is and what it is meant to do. Theory is understood as a dynamic, provisional scaffolding constructed through abstract reasoning and empirical observation (Merton, 1967). It is not merely a collection of concepts but an explanatory system addressing causality and coherence (Sutton & Staw, 1995). Its strength lies not in permanence but in adaptability—remaining useful amid changing conditions or evolving when it no longer does (Bacharach, 1989; Dubin, 1978). Robust theories balance abstraction with empirical relevance and must evolve alongside the systems they aim to explain (Modeste et al., 2022; Weick, 1995).

In educational leadership, theories shape how we understand organizational behaviour, guide decisions, and prepare leaders (Bush, 2007). They consist of constructs, propositions, and boundary conditions—assumptions about the contexts in which they apply (Bacharach, 1989). When those contexts shift, theories must adapt. AI presents precisely such a shift: it introduces algorithmic mediation, adaptive automation, and opaque decision-making that challenge foundational assumptions around transparency, trust, and agency. Most dominant leadership, organisational, and behavioural theories—transformational, instructional, and distributed leadership—emerged before the proliferation of AI in schools. These models rest on human agency, face-to-face interaction, and socially situated influence (Hallinger & Murphy, 1985; Leithwood et al., 1994; Spillane, 2006).

However, AI introduces a conceptual disruption, embedding leadership functions into algorithmic dashboards, predictive systems, and automated workflows (Williamson & Piattoeva, 2022). This shift recalibrates both how decisions are made and who—or what—makes them (Charles et al., 2023; Dieterle et al., 2024; Holmes et al., 2019). Leadership is no longer exclusively human or deliberative; it is increasingly delegated, data-driven, and opaque.

To conceptualize this disruption, I refer to AI as an "out-of-syllabus phenomenon"—a systemic force that lies outside the epistemic design space of traditional leadership theories. This construct draws on Kuhn's (1962) notion of anomalies—which accumulate, and precipitate paradigm shifts when dominant theories can no longer accommodate them—Beck's risk and manufactured uncertainties framing (Beck, 1992/2009), and Giddens' theory of reflexive modernity (Giddens, 1991), which emphasizes how modern systems generate and must navigate pervasive uncertainty and self-monitoring. Contemporary analyses of algorithmic governance further demonstrate how AI systems introduce epistemic opacity and displace deliberative knowledge practices (Pasquale, 2015; Williamson, 2017). Together, these frameworks suggest that technological disruptions can expose the brittleness of established theories when confronted by conditions they were never meant to explain. Thus, educational leadership theories may not be inherently broken—but they must be stress-tested and potentially reconfigured to withstand the unpredictable conditions introduced by AI systems.

This study is conceptually grounded in *the Critical Perspectives in Educational Leadership* framework (Niesche & Gowlett, 2019), which encourages interrogation of the socio-political underpinnings and normative assumptions embedded in leadership theories. Rather than accepting existing models as universally applicable, this perspective foregrounds issues of context, equity, and power—dimensions that are especially crucial in evaluating how AI reshapes educational decision-making. As such, this framework provides an essential lens for examining whether leadership theories apply in AI-infused contexts, whose values they advance, and whose interests they protect. This lens is especially vital in evaluating AI's role in shaping leadership, whether it supports transparency and equity or substantiates existing inequities under the guise of neutrality. It asks not only whether theories are technically sufficient but also whether they are normatively defensible in guiding responsible and inclusive practice.

Therefore, this analysis and theoretical framing do not discard traditional leadership and organizational behavioural theories but position them for critical renewal. It supports a differentiated analysis to examine which propositions remain robust, which are strained, and which require reimagining, considering AI's epistemological and operational logic. By integrating Bacharach's (1989) structural criteria for theory, Kuhn's (1962) model of paradigm shift, and the critical lens of Niesche and Gowlett (2019), the study situates itself at the intersection of conceptual interrogation, normative accountability, and the reimagining of leadership in the age of artificial intelligence.

Methodology

This study employs a critical-analytical methodology to examine how foundational educational leadership and organizational behavioural theories respond to the epistemological and operational disruptions introduced by AI in K-12 contexts. It interrogates the core assumptions and boundary conditions underpinning dominant leadership models. The analysis is grounded in the *Critical Perspectives in Educational Leadership* framework (Niesche & Gowlett, 2019), which foregrounds the socio-political construction of theory—interrogating whose assumptions are privileged, whose interests are protected, and how broader structures of power shape leadership knowledge. This lens is especially well-suited to evaluating how AI technologies may amplify or unsettle these dynamics, determining whose knowledge is legitimized, whose agency is elevated or diminished, and how power circulates in AI-mediated educational environments.

Selection of Theories and Critical Analysis

Ten foundational education leadership and organizational behavioural theories were selected through a structured process informed by three criteria: (1) their widespread use in empirical research and leadership preparation programs; (2) their influence on how leadership is conceptualized and practiced in schools; and (3) their prominence in comprehensive literature reviews and theoretical typologies (Bush & Glover, 2014; Hallinger,

2003; Leithwood & Duke, 1999). Recent syntheses, such as the systematic review by Gumus et al. (2018), underscore educational leadership research's continued reliance on a limited set of leadership models—many developed decades ago—and highlight the insufficient engagement with contemporary technological disruptions.

In alignment with these insights, this study critically examines ten leadership, organizational, and behavioural theories: instructional leadership (Hallinger & Murphy, 1985), transformational leadership (Leithwood et al., 1994), distributed leadership (Spillane, 2006), self-efficacy theory (Bandura, 1977), organizational learning theory (Senge, 1990), organizational commitment theory (Meyer & Allen, 1991), job satisfaction theory (Herzberg, 1966), social network theory (Borgatti & Cross, 2003), trust theory (Mayer et al., 1995), and social justice leadership (Bogotch, 2002). These models span cognitive, relational, structural, and equity-oriented traditions, broadly representing the theoretical landscape. Their conceptual diversity allows for a differentiated critique: identifying where theories remain robust, where they falter, and where they may require reinterpretation or replacement, considering AI's affordances and risks.

Theoretical Critique and Comparative Analysis

Using thematic coding guided by Bacharach's (1989) framework on theoretical structure and Sutton and Staw's (1995) focus on explanatory logic and internal coherence, each leadership theory was examined with respect to its core constructs, underlying assumptions, causal propositions, and boundary conditions. These analyses were then contrasted with the emerging logic, tensions, and affordances introduced by AI systems, particularly in relation to algorithmic decision-making, predictive feedback, relational opacity, and ethical ambiguity.

The Critical Perspectives in Educational Leadership framework provided the normative backbone of this critique, emphasizing questions of power, equity, and exclusion. Particular attention was paid to whether leadership theories engaged with the political dimensions of algorithmic governance (Pasquale, 2015; Williamson, 2017), the risks of surveillance, and the ways AI may amplify or obscure existing inequities through opaque and data-driven systems. By examining which values are embedded in both the theories and the AI systems they encounter, the study exposed technical alignments, misalignments, and ethical and epistemological tensions.

This methodology offers a dual vantage point: it evaluates leadership theories for empirical relevance and conceptual adequacy in the face of technological disruption. Rather than operationalizing theory for hypothesis testing, the approach critically interrogates theory as a contingent construct that must adapt or risk obsolescence. Through this process, the study contributes to refining educational leadership theory and designing future-ready frameworks capable of navigating AI-mediated educational environments.

AI Contextualization: Interdisciplinary Literature Mapping

I conducted an interdisciplinary literature review to develop a comprehensive understanding of how AI practices impact educational leadership. The review spanned education, management science, organizational theory, and public administration. This approach ensured that the critique was grounded not only in education-specific applications but also in broader shifts in governance, decision-making, and institutional accountability driven by AI.

Searches were conducted in ERIC, JSTOR, Scopus, and PsycINFO, targeting literature published between 2010 and 2024. This timeframe was selected to capture the period when AI moved from theoretical promise to practical adoption in institutional settings. 2010 marks the rise of scalable machine learning and big data applications in business, healthcare, and education sectors. Recent systematic reviews reveal a significant and sustained increase in academic publications on AI in education since 2010, reflecting growing technological maturity and expanding implementation across educational contexts (Mustafa et al., 2024). Extending the review through 2024 ensures inclusion of the most current scholarship amid the rapid post-pandemic acceleration of educational technologies.

Search terms included both education-focused queries (e.g., "artificial intelligence AND education leadership," "AI AND decision-making in schools," "predictive analytics AND K-12 administration") and broader

interdisciplinary terms (e.g., "algorithmic governance," "machine learning AND organizational decision-making," "AI AND leadership ethics"). This dual focus ensured the analysis was grounded in domain-specific practices and cross-sectoral developments. The resulting corpus was examined to identify how AI reshapes leadership tasks such as supervision, evaluation, resource allocation, and strategic communication, laying the foundation for a theoretically informed and contextually grounded critique.

AI Applications across Sectors and K-12 Education

AI has moved from the margins to the core of organizational life across sectors. In business, AI-based predictive analytics are transforming demand forecasting and inventory optimization within ERP systems, enhancing precision and responsiveness (Fathima et al., 2024). Intelligent systems process invoices, manage procurement, and respond to customer inquiries through real-time chatbots. Machine learning algorithms generate hyper-personalized marketing campaigns from granular behavioural data (Kumar et al., 2019).

Education, long slower to innovate at scale, is beginning to follow. In K-12 schools, AI is no longer confined to experimental pilots. It is becoming structurally embedded, both in instruction and administration. Adaptive learning platforms adjust pacing and content in real-time, offering tailored instruction that exceeds conventional classroom differentiation (Holmes et al., 2019; Luckin et al., 2016). Automated assessment tools score student work, track longitudinal growth, and generate feedback to shape teaching (Williamson, 2017). Predictive analytics flags students at academic risk based on behaviour and performance patterns, enabling early intervention (Al-Shabandar et al., 2023; Maroju et al., 2024). Administratively, AI systems manage enrolment, monitor attendance, allocate resources, and automate family communication (U.S. Department of Education, 2023).

These systems do more than improve efficiency. They shift the epistemology of leadership, replacing deliberation and relational expertise with algorithmic prioritization and statistical confidence. Leadership decisions are no longer solely human judgments; they emerge from dashboards, risk scores, and automated flags. Authority is no longer apparent—it is partially delegated to opaque systems whose reasoning may be inaccessible even to their users. Although these developments promise agility and scale, they introduce tensions that cut deeper than workflow. As AI systems become more autonomous, they grow less transparent. Trained on historical data, they may encode and reproduce systemic biases. Their interfaces often bypass dialogue, reconfiguring school relationships into prompts, outputs, and interventions (Pasquale, 2015; Selwyn, 2021; Williamson, 2017).

From this interdisciplinary and educational literature, four overarching analytical themes emerge—each reshaping how leadership must be theorized in AI-mediated contexts: 1) shifting knowledge systems: AI alters what counts as evidence. Insight becomes a product of data processing, not human deliberation, reconfiguring how decisions are justified. 2) Disrupted relationships: platforms and predictive models mediate interactions once grounded in dialogue and trust, weakening traditional relational leadership. 3) Opaque ethics: the logic of AI systems is often hidden, complicating ethical scrutiny and limiting users' ability to challenge or revise decisions. 4) Diminished human agency: decision-making increasingly originates from algorithms rather than humans, placing leaders in a reactive rather than proactive role. These themes form the conceptual scaffolding for this study's critical evaluation of educational leadership theory.

As discussed above, AI challenges the assumptions at the heart of educational leadership—about agency, accountability, transparency, and trust. However, despite this transformation, most leadership, organizational, and behavioural theories remain under-examined. Where AI is theorized, the frameworks often come from adjacent disciplines, like TPACK (Sun et al., 2023) or AI literacy (Ng et al., 2024). Rarely are dominant leadership theories, such as transformational, instructional, or distributed leadership, being used to interpret AI's systemic influence. This gap is not just academic; it is conceptual. As AI reshapes the daily mechanics of leadership, theory lags. Without frameworks that grapple with mediation, automation, and algorithmic bias, schools risk navigating AI-rich systems with outdated conceptual maps. This study responds to that lag. It calls for leadership and organizational behavioural theory that can accommodate complexity, confront opacity, and remain ethically grounded in a digitally saturated future.

Critiquing Educational Leadership Theories in the Age of AI

This section critically assesses how ten leadership and organizational behavioural theories—transformational theory, instructional theory, distributed theory, trust theory, social justice theory, organizational commitment theory, organizational learning theory, job satisfaction theory, self-efficacy theory, and social network theory—fare when evaluated against the emerging realities of AI. Collectively, the literature shows that AI does more than optimize school operations—it challenges the core dimensions of leadership itself. It shifts the epistemic foundations of decision-making, restructures relational dynamics, obscures ethical accountability, and attenuates human agency. These themes serve as critical reference points in assessing the adaptability of educational leadership theories. Each theory is analysed for its core assumptions, boundary conditions, and theoretical flexibility, particularly how AI stretches, aligns with, or challenges its conceptual foundations—about agency, accountability, transparency, and trust.

Transformational leadership, rooted in moral clarity, vision, and emotional influence (Bass, 1985; Leithwood & Jantzi, 2005), encounters tension when AI systems obscure decision-making processes. Algorithms can erode the human trust foundational to this theory, replacing transparent deliberation with opaque outputs (Pasquale, 2015). Yet, AI also complements transformational leadership's commitment to innovation and personalization (Abositta et al., 2024). Adaptive technologies support differentiated learning and enhance organizational responsiveness—an efficiency that can free leaders to focus more thoughtfully on ethical reasoning and visionary leadership (Sullivan, 2024). Instructional leadership's procedural clarity (Hallinger & Murphy, 1985) aligns well with AI's strengths in data analytics. However, its reliance on human judgment—for collecting, interpreting, and guiding instruction—is challenged when automated inferences bypass educator expertise (Luckin et al., 2016). Thus, principals must cultivate systems literacy to oversee and interpret AI tools, grounding instructional governance in ethical practice and informed decision-making—an imperative captured in Charles et al.'s (2023) analysis of AI-powered governance.

Similarly, distributed leadership maps authority across actors, artefacts, and routines (Spillane, 2006). Though structurally aligned with AI's complexity, it assumes human interpretive agency. Algorithmic opacity can shift leadership from dialogic construction to automated compliance (Pasquale, 2015). The theory must distinguish between genuinely collaborative, distributed human-machine cognition and the passive delegation of decision-making to opaque AI systems, highlighting the need for transparent, interpretable design grounded in sociotechnical systems theory (Baxter & Sommerville, 2011; Dieterle et al., 2024). This assertion becomes especially urgent as AI systems reshape educational governance and decision-making logics in ways that often bypass deliberative, human-centred leadership (Williamson & Eynon, 2020). Trust theory (Mayer et al., 1995) explains leadership legitimacy through competence, care, and ethical consistency. AI systems—lacking empathy and moral intent—challenge this interpersonal foundation. Educators may not interpret automated decisions which undermine trust. The theory must be extended to encompass institutional and technological stewardship, nurturing and ensuring confidence in people and the systems they endorse.

Social justice leadership emphasizes equity, voice, and resistance to oppression (Bogotch, 2002). Its dialogic, human-centred ethic is strained by AI's abstract logic and potential to entrench biases if unchecked (O'Neil, 2017). Nevertheless, AI can be leveraged for equity through disaggregated data analysis (Gall, 2022). The theory must evolve to critique AI design, advocate for participatory governance, and distinguish equity processes from equity outcomes. Self-efficacy theory (Bandura, 1977) retains adaptability in AI contexts. AI technologies can reinforce efficacy by providing feedback and simulating mastery. Yet, opaque systems may produce superficial confidence that is disconnected from authentic agency. Educators must develop epistemic literacy—understanding how AI constructs feedback—to maintain genuine self-belief. The theory needs to expand into sociotechnical territory, examining how tools shape confidence.

Organizational learning theory views schools as adaptive systems that reflect, iterate, and correct (Senge, 1990). While AI accelerates feedback, it risks bypassing inquiry and deliberation. Automated recommendations may narrow the space for collective sensemaking, shifting school culture toward compliance (Selwyn, 2021). Leaders must interrogate how AI structures knowledge, ensuring that institutional learning remains dialogic, collaborative, and reflective. Organizational commitment theory (Meyer & Allen, 1991) explores emotional, ethical, and rational ties to institutions. AI's rise alters the interpersonal rituals that sustain these bonds. When performance reviews or schedules are algorithmically driven, schools may feel less relational, weakening

affective and normative commitment. The theory should integrate ethical technology use and recognize trust in tools as a new commitment dimension. Job satisfaction theory (Herzberg, 1966) explains well-being through intrinsic motivators and extrinsic conditions. While AI may streamline tasks and support personalization, it risks making recognition transactional and reducing teaching to metrics. Satisfaction now depends on whether AI systems honour educators' values and provide autonomy, fairness, and contextual nuance. Leadership must ensure that efficiency gains do not come at the cost of human fulfilment. Social network theory redefines leadership as relational positioning rather than hierarchy (Moolenaar, 2012). AI enables large-scale mapping of digital interactions but risks confusing frequency with influence. Moreover, algorithmically filtered communication may obscure informal support structures critical to school culture. The theory must integrate AI's role in shaping visibility and voice, emphasizing hybrid human-machine networks.

In sum, while AI introduces profound challenges to established educational leadership and organizational behavioural theories, it also opens pathways for extending their relevance. The presence of AI in schools demands more than a technical response; it calls for theoretical frameworks that can grapple with shifting epistemologies, altered power relations, and new ethical frontiers. Existing models are not obsolete, but they are incomplete, primarily developed for contexts where decision-making was transparent, human-centered, and relational. To remain conceptually relevant and operationally sound in algorithmically mediated schools, these theories must be recalibrated, incorporating principles of transparency, systems literacy, and sociotechnical stewardship. In doing so, these theories can evolve from merely describing practice to actively shaping equitable, responsible, and future-ready approaches to educational governance.

Findings from the Conceptual Analysis

Assumptions Lack Roadmap for Fragile Human Agency

Most foundational educational leadership and organizational behavioural theories are grounded in the belief that leadership is a distinctly human enterprise rooted in intentional action, moral judgment, and interpersonal engagement. Leaders, in this view, interpret context, engage in dialogue, and navigate competing values to make decisions. Nevertheless, artificial intelligence increasingly automates or mediates these processes. AI systems analyse data, generate recommendations, and sometimes trigger actions—often without human initiation or explanation—creating a conceptual strain for theories like transformational leadership, trust theory, and social justice. These theories rely heavily on empathy, transparency, and moral intentionality. These humanistic constructs are fundamentally misaligned with the opaque, efficiency-driven logic governing many AI tools. As a result, these theories demonstrate fragility when applied in AI-mediated environments. Nonetheless, if these theories expand to include oversight of technological systems as part of responsible leadership, they may find renewed strength through stewardship rather than resistance.

Need to Address Displacement of Human Judgement by Data Driven Decision-making

Some leadership theories already integrate data use into their core practices. Instructional leadership, self-efficacy theory, and organizational learning theory benefit from AI's ability to deliver granular, timely, and predictive data. These tools can support evidence-based decision-making, personalized learning, and feedback-rich environments. However, this alignment is not unconditional. When AI outputs are difficult to interpret or deploy without a guiding pedagogical framework, they risk displacing, rather than supporting, human judgment. Decision-making may devolve into compliance with metrics rather than engagement with meaning. These theories remain viable only if data are interpreted through reflective, context-sensitive lenses. Their success depends on whether AI systems are positioned as supplements to human insight rather than substitutes.

Guidance Required for Displacement of Relational Dimensions of Leadership

Theories grounded in relationships—such as distributed leadership, trust theory, and job satisfaction theory—assume interpersonal exchange, mutual recognition, and communicative transparency. AI complicates these assumptions by inserting non-human systems into core relational spaces. Performance evaluations may be algorithmically generated; collaboration may occur through automated platforms rather than dialogue. These shifts risk eroding trust, displacing empathy, and weakening the sense of shared purpose. Moreover, ethical

concerns intensify when AI systems make consequential decisions about staffing, discipline, or resource allocation without human oversight or explainability. The human textures of leadership risk being flattened by technical logic. Nonetheless, if designed with participatory input and transparent governance, AI systems could be calibrated to support, not supplant, relational leadership values.

Reassessment of Theoretical Boundaries Needed

Specific theories require an expanded conceptual vocabulary as AI reconfigures influence, transparency, and visibility. Organizational commitment and social network theory must adapt to environments where algorithmic processes govern how professionals interact, access information, and understand their roles. More profoundly, social justice leadership must evolve from focusing on interpersonal equity to including structural critiques of digital infrastructure. Algorithmic bias, systemic opacity, and technological gatekeeping demand theoretical extension and, in some cases, conceptual restructuring. Leadership must interrogate power and make justice and equity accessible within AI-mediated systems. These theories could become even more robust and urgent in guiding future leadership if reframed to include digital equity, ethical data governance, and inclusive design. Not all theories are equally equipped to respond to the epistemic and operational shifts introduced by AI. Theories are categorized into layers according to their level of flexibility, responsiveness to AI and the extent of theoretical expansion they demand. Their adaptability can be clustered into three tiers as adaptable, partially adaptable, and conceptually strained.

Adaptable Theories:

Instructional leadership, self-efficacy theory, organizational commitment theory, job satisfaction theory, and social network theory align well with AI's data-centric capabilities. These models require targeted updates—not wholesale reinvention—to preserve their integrity while employing AI. When implemented with reflective oversight, they can become exemplars of theory-technology integration.

Partially Adaptable Theories:

Transformational leadership, distributed leadership, and organizational learning theories possess the flexibility to evolve but need substantive reframing. Their constructs must accommodate shared agency, interpretive opacity, and AI-influenced patterns of influence. They can thrive if leaders remain central interpreters and facilitators of meaning, even as systems scale data driven information.

Conceptually Strained Theories:

Trust theory and social justice leadership face foundational tensions. These models depend on constructs—like moral intentionality, emotional resonance, and human recognition—that cannot meaningfully replicate in AI systems. Their survival in AI-mediated contexts depends on deep theoretical revision, not superficial updates. However, by positioning leaders as curators of technological ethics and advocates for systemic integrity, these models can reposition their moral core as a guiding compass in digital environments. Table (1) shows a summary of the findings.

Table 1

Condensed Findings

Category Theories	Notes
Adaptable	
Instructional Leadership, Self-Efficacy Theory, Organizational Commitment, Job Satisfaction, Social Network Theory	These theories are well-aligned with AI's data and feedback strengths; require targeted updates.
Partially Adaptable	
Transformational Leadership, Distributed Leadership, Organizational Learning	These theories are flexible but need reframing for transparency, hybrid agency, and algorithmic co-influence.
Conceptually Strained	
Trust Theory, Social Justice Leadership Theory	These theories, which depend on empathy, moral intentionality, and human recognition, are challenged by algorithmic opacity and require deep revision.

Figure (1) below categorizes ten foundational educational leadership theories based on (1) their responsiveness to AI-enabled practices and (2) the degree of theoretical expansion required to maintain relevance. The theories are categorized into three layers according to their responsiveness to AI and the extent of theoretical expansion they demand.

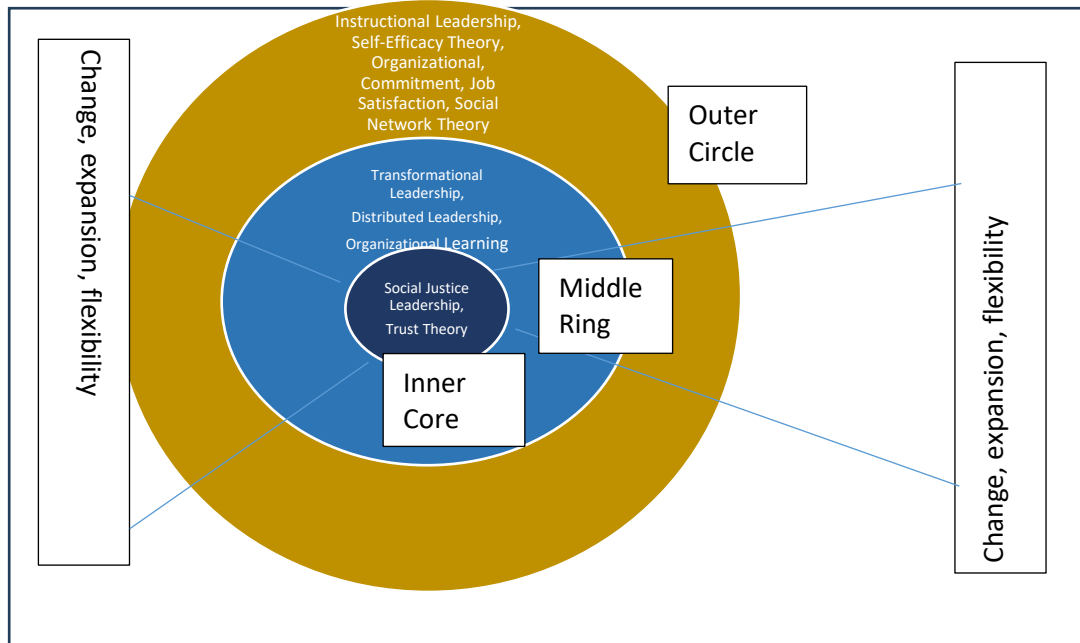


Figure 1. AI Responsiveness and Theoretical Flexibility in Educational Leadership: A Concentric Mapping

This concentric mapping classifies ten foundational educational leadership, organizational, and behavioural theories according to two dimensions: AI responsiveness—the extent to which a theory's constructs align with change, expansion, and flexibility specifically in the context of AI-enabled practices (e.g., personalization, automation, predictive analytics); and need for theoretical expansion—the degree of revision or reconceptualization required for a theory to remain analytically viable and practically relevant in AI-mediated educational environments. In the concentric mapping, the theories are positioned across three zones:

Inner Core—Rigid Theories, Require High Expansion:

At the centre lie social justice leadership and trust theory. These paradigms are grounded in human ethics, moral intentionality, and culturally responsive practice. Their assumptions—about transparency, empathy, and interpersonal accountability—clash with AI systems that often operate without context, explanation, or human reasoning. These theories face fundamental tensions in algorithmic environments and require substantial theoretical reframing to engage issues of bias, opacity, and non-human agency.

Middle Ring – Moderately Adaptable Theories, Need Intermediate Expansion:

Transformational leadership, distributed leadership, and organizational learning are positioned in the middle. These models are conceptually open to change, emphasizing innovation, shared agency, and adaptive feedback. However, their foundational assumptions—human-led influence, interpretive transparency, and collaborative sensemaking—must be recalibrated for contexts where leadership is increasingly shared with autonomous systems and algorithmic logic.

Outer Circle – Flexible Theories, Need Minimal Expansion:

The outermost zone includes instructional leadership, self-efficacy theory, organizational commitment, job satisfaction theory, and social network theory. These theories already resonate with AI-enabled practices such as data-driven feedback, performance monitoring, and workplace analytics. While not free from critique, they

require only targeted adaptations to remain relevant, especially in how they interpret AI's impact on professional motivation, organizational structure, and information flow. This framework is not prescriptive or static. It offers a dynamic representation of the theory-AI alignment, illustrating how AI operates as both a technological enabler and a theoretical provocateur. The positioning of theories reflects their current proximity to AI integration, but this can shift depending on how AI is designed, governed, and interpreted in practice. The model invites leadership theorists to treat AI not merely as a contextual factor but as a conceptual force that demands new forms of engagement, critique, and imagination.

A Framework for Theoretical Expansion in AI-Mediated Educational Leadership

To translate the study's findings into a practical tool for theory development, this section introduces a forward-looking framework. This framework guides the evaluation and reworking of educational leadership theories in response to AI. The framework offers a structured, adaptable process that supports both conceptual rigor and contextual responsiveness.

The model (Figure 2) unfolds across five interconnected stages. It begins with a theory assessment, identifying a theory's foundational assumptions and boundary conditions, such as views on agency, decision-making, ethical accountability, or relational dynamics. These serve as the baseline for evaluating theoretical responsiveness to AI.

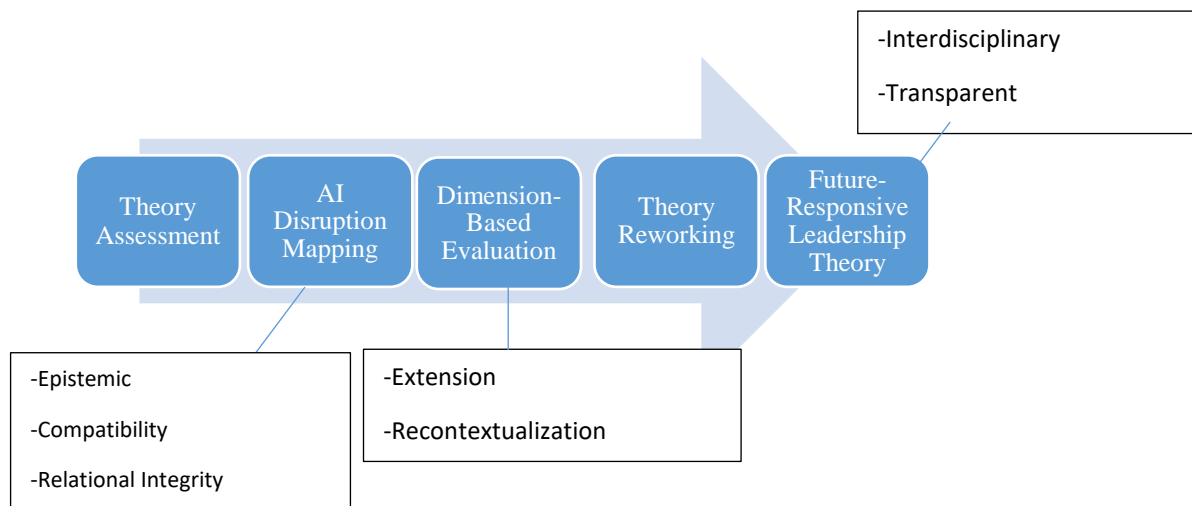


Figure 2. A Framework for Theoretical Expansion in AI-Mediated Educational Leadership

The second stage, AI disruption mapping, examines how AI systems reinforce or destabilize those assumptions through automation, predictive analytics, or algorithmic opacity. This stage reveals where a theory is stretched or misaligned with contemporary digital realities. In the third stage, the analysis is organized around four key dimensions: epistemic compatibility (whether the theory accommodates AI's probabilistic, data-driven logic); relational integrity (how trust and interpersonal dynamics are affected by AI mediation); ethical transparency (whether the theory can guide leadership in the face of algorithmic opacity and potential bias); and agency and authority (how leadership is conceptualized when influence is shared with non-human systems). Based on this evaluation, the fourth stage—reworking—offers three pathways. A theory may be extended by adding new constructs, re-contextualized by reframing its foundational premises, or recomposed by redesigning its conceptual architecture to reflect the emerging logic of AI-mediated leadership. The fifth and final stage aims to generate future-responsive theories that are interdisciplinary in scope, transparent in design, and attuned to the sociotechnical systems that now shape educational practice.

While Figure (1) maps the current theory's responsiveness to AI and the degree of expansion required, Figure (2) introduces a future-facing framework for theoretical reworking. It illustrates a developmental arc through five stages—beginning with theory assessment and culminating in the generation of future-responsive leadership models. This process supports structured adaptation by identifying where existing theories align or conflict with AI practices and by guiding the extension, re-contextualization, or re-composition of their core assumptions. The framework is designed to support leadership theories that are interdisciplinary, transparent, and attuned to the sociotechnical systems shaping educational practice.

Building on this process, Table (2) operationalizes the theoretical expansion framework by summarizing the analysis of ten foundational educational leadership, organizational, and behavioural theories. Positioned directly after the developmental model in Figure 2, the table provides a conceptual synthesis and empirical grounding. It captures the criteria used to assess each theory's responsiveness to AI, such as epistemic compatibility, relational Integrity, ethical transparency, and agency, and distils the main insights from the critiques. For each theory, it also offers forward-facing suggestions for extension, re-contextualization, or re-composition. Rather than serving as a static typology, the table is designed as a dynamic guide for theory expansion. It supports leadership scholars in moving from critique to construction, ensuring that the field remains responsive to the ethical, operational, and epistemological realities of artificial intelligence in schools.

Table 2

Analysis of Educational Leadership Theories in Relation to AI-Mediated Contexts

Criteria for AI Analysis	Current Alignment and Tensions	Theoretical Reworking Pathways
Transformational Leadership		
-AI-supported vision-setting and personalization -Challenges to moral agency and relational transparency	Moderately aligned; supports personalization but is strained by opacity and influence of non-human decisions.	Needs to re-contextualize leadership agency to include algorithmic co-influence; model ethical AI-human visioning.
Instructional Leadership		
-AI for instructional improvement, monitoring, and feedback -Data-informed leadership	Strongly aligned; AI enhances core instructional functions	Needs to extend to integrate AI dashboards; address interpretability and data ethics in instructional decision-making
Distributed Leadership Theory		
-AI as a co-agent in leadership -Impact on distributed decision-making and interaction patterns	Conceptually flexible but challenged by a lack of deliberative agency in AI	Needs to re-contextualize distributed agency; examine AI-human hybrid roles and influence pathways
Trust Theory		
-Transparency and explainability of AI systems -Relational and systemic trust implications	Conceptually strained, opacity erodes interpersonal and institutional trust.	Needs to recompose to emphasize transparent AI design; develop trust-building protocols in algorithm-mediated contexts.
Social Justice Leadership		
-Addressing algorithmic bias and equity implications -Ethical use of AI in marginalization contexts	Deeply challenged, ethical commitments are vital but underdeveloped for AI governance.	Needs to recompose around algorithmic ethics, community accountability, and equity-centred AI design.
Self-Efficacy Theory		
-AI-driven personalized feedback - Motivation via performance tracking	Strongly aligned; AI enhances perceived competence through adaptive support.	Needs to extend to include analysis of machine-mediated efficacy cues; evaluate effects of opaque feedback loops.
Organizational Commitment		
-AI's influence on engagement, value alignment, and oversight	Moderately strained; surveillance risks weakening affective and normative ties	Needs to re-contextualize commitment as value-aligned human-machine governance; support transparent feedback systems

Job Satisfaction Theory

-AI's effect on autonomy, recognition, and work stress	Strained, risks of depersonalized evaluation, and performance pressure	Needs to reframe satisfaction via human-centred AI integration; balance metric use with well-being support
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Organizational Learning

-AI in feedback loops, adaptation, and reflective practice	Moderately aligned; supports adaptation but risks uncritical compliance with opaque outputs	Needs to extend to include inquiry into AI's epistemology; foster double-loop learning through algorithmic critique
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Social Network Theory

-AI-enhanced mapping and interaction flow - Professional relationship dynamics	Compatible but underdeveloped, AI can distort or amplify relational networks without context	Needs to extend to include algorithmic visibility and network ethics; monitor inclusion and influence patterns
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Note. Summary of the analysis of the leadership theories against AI-mediated challenges

Discussion

This study examined whether dominant educational leadership theories are conceptually equipped to respond to the transformations introduced by artificial intelligence in K–12 education. A conceptual analysis of ten foundational models—spanning instructional, transformational, distributed, and relational paradigms—revealed that while many offer entry points, none remain fully intact under AI's epistemic, ethical, and operational pressures. Most theories assume leadership is grounded in human agency (Leithwood et al., 1994), relational transparency (Hallinger & Murphy, 1985), and institutional continuity (Spillane, 2006). AI challenges each of these assumptions by introducing non-human agents into decision-making (Holmes et al., 2019), obscuring rationale through algorithmic opacity (Pasquale, 2015) and accelerating change beyond the pace of deliberation (Dieterle et al., 2024).

In this sense, AI operates as what I describe as an out-of-syllabus phenomenon—a systemic force emerging beyond the conceptual bounds of legacy leadership frameworks. This framing draws on Kuhn's (1962) account of anomalies that precipitate paradigm shifts, Beck's (1992/2009) framing of manufactured uncertainties, and Giddens' (1991) theory of reflexive modernity, which emphasizes the self-monitoring demands of modern systems. These disruptions do not render theory obsolete, but they expose unexamined edges, particularly assumptions about time, authority, and ethical reasoning (Bacharach, 1989). AI can be viewed as a conceptual stress test (Sutton & Staw, 1995), revealing which theories stretch, falter, or require reconstruction. It demands reconsidering leadership practice and meaning when decision-making is increasingly shared with machines (Williamson, 2017).

Some theories, like instructional leadership (Hallinger & Murphy, 1985) and self-efficacy theory (Bandura, 1977), align well with AI's strengths in feedback and personalization (Luckin et al., 2016). Others—such as transformational leadership (Leithwood et al., 1994) and distributed leadership (Spillane, 2006)—offer conceptual flexibility but require reframing to address issues of transparency and hybrid agency (Baxter & Sommerville, 2011; Williamson & Eynon, 2020). By contrast, theories like trust theory (Mayer et al., 1995), social justice leadership (Bogotch, 2002), and job satisfaction (Herzberg, 1966) face deeper strain. Their emphasis on empathy, moral intent, and human recognition is difficult to reconcile with algorithmic systems that lack relational depth and human intentionality.

This stress test does not call for discarding existing theories but for stretching their boundaries. Refinement must be transformative rather than merely additive, incorporating concepts such as algorithmic accountability (Pasquale, 2015), human-in-the-loop oversight (Dieterle et al., 2024), and procedural transparency (Williamson, 2017). To support this shift, the study proposes a forward-looking framework for theoretical reworking—a structured process for evaluating, reframing, and rebuilding educational leadership models to reflect the

algorithmic logic increasingly shaping schooling. Today's leadership challenges extend beyond adopting new tools to navigating epistemological adaptations (Modeste et al., 2022). Theories must evolve not only to describe leadership actions but also to capture how leadership itself is being redefined in an AI-mediated world.

Conclusion and Implications

This study has critically examined whether educational leadership and organizational behavioural theories are equipped to address the conceptual and practical challenges introduced by AI in K-12 education. Drawing on a theoretical framework grounded in critical perspectives and interdisciplinary AI literature, the analysis scrutinized ten foundational theories for how they respond to AI's epistemological, relational, ethical, and agentic shifts. The findings confirm that while these theories offer valuable constructs, many rest on assumptions about human-centred decision-making, visible accountability, and relational trust that are relatively strained and rarely interrogated in algorithmically mediated environments.

The critique presented here does not discard these theories. Instead, it treats them as living frameworks now due for recalibration in AI mediated sociotechnical conditions. By introducing the notion of AI as an "out-of-syllabus phenomenon," this study calls attention to how emerging technologies test the boundaries of established knowledge. The concentric classification model and forward-looking framework developed herein provide a structured pathway for rethinking leadership theory, not as a fixed doctrine but as an adaptable architecture. Finally, the implications of this work are both theoretical and practical, encompassing theory development, leadership preparation, and policy and governance.

Theory Development

The education field must now shift from theory preservation to theory evolution. The analysis identifies four critical dimensions—epistemic compatibility, relational Integrity, ethical transparency, and human agency—as criteria for assessing and extending theories considering AI. These dimensions, drawn from the interdisciplinary spread of AI, offer a coherent lens through which future scholarship can rework theoretical foundations to meet contemporary realities.

Leadership Preparation

Theories must also inform how leaders are trained. Leadership preparation programs should integrate AI literacy as a technical competence and a conceptual toolkit for navigating algorithmic influence, predictive systems, and data ethics. Educational leaders must learn to interpret and question AI outputs in their implementation, and balance machine logic with human values and contextual complexities.

Policy and Governance

At the policy level, the implications are no less urgent. As AI systems mediate decisions on staffing, student interventions, and performance evaluation, leadership must remain a site of human discretion, ethical reasoning, and democratic oversight. Leadership theories must provide the normative grounding for policy frameworks that confront AI's opacity, mitigate its biases, and uphold equitable outcomes.

All in all, AI in education is not just a technical evolution but a theoretical provocation. It stretches the boundaries of what leadership theories assume, expect, and explain. If the field of educational leadership is to remain intellectually rigorous and practically relevant, it must not only accommodate this stretch—it must lead it. This study provides a foundational framework for this endeavour and encourages scholars, practitioners, and policymakers to engage in further developing, challenging, and enhancing the work. The goal is not merely to catch up with AI but to shape the intellectual, ethical, and institutional terrain on which it unfolds.

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References

- Abositta, A., Adedokun, M. W., & Berberoğlu, A. (2024). Influence of artificial intelligence on engineering management decision-making with mediating role of transformational leadership. *Systems, 12*(12), 570.
- Al-Shabandar, R., Hussain, A. J., Liatsis, P., & Keight, R. (2019). Detecting at-risk students with early interventions using machine learning techniques. *IEEE Access, 7*, 149464–149478.
- Bacharach, S. B. (1989). Organizational theories: Some criteria for evaluation. *Academy of Management Review, 14*(4), 496–515.
- Bahoo, S., Cucculelli, M., Goga, X., & Mondolo, J. (2024). Artificial intelligence in Finance: a comprehensive review through bibliometric and content analysis. *SN Business & Economics, 4*(2), 23.
- Bandura, A. (1977). Self-efficacy: Toward a unifying theory of behavioral change. *Psychological Review, 84*(2), 191–215.
- Bass, B. M. (1985). *Leadership and performance beyond expectations*. Free Press.
- Baxter, G., & Sommerville, I. (2011). Sociotechnical systems: From design methods to systems engineering. *Interacting with Computers, 23*(1), 4-17.
- Beck, U. (2009). *World at risk* (C. Jones, Trans.; original work published 1992). Polity Press.
- Bhattacharjee, A. (2012). *Social science research: Principles, methods, and practices*. University of South Florida.
- Bogotch, I. (2002). Educational leadership and social justice: Practice into theory. *Journal of School Leadership, 12*(2), 138–156.
- Borgatti, S. P., & Cross, R. (2003). A relational view of information seeking and learning in social networks. *Management Science, 49*(4), 432–445.
- Bush, T. (2007). Educational leadership and management: Theory, policy, and practice. *South African Journal of Education, 27*(3), 391–406.
- Bush, T., & Glover, D. (2014). School leadership models: What do we know? *School Leadership & Management, 34*(5), 553–571.
- Carlizzi, D. N. (2025). *Public administration reengineered applying AI models towards precision*. Generative Artificial Intelligence and Fifth Industrial Revolution, 880, 61.
- Charles, V., Emrouznejad, A., & Gherman, T. (2023). A critical analysis of the integration of blockchain and artificial intelligence for supply chain. *Annals of Operations Research, 327*(1), 7-47.
- Dieterle, E., Dede, C., & Walker, M. (2024). The cyclical ethical effects of using artificial intelligence in education. *AI & Society, 39*(2), 633-643.
- Doleh, J. (2024, August 6). What Do School and District Leaders Need to Know About AI?
The Wallace Foundation. <https://wallacefoundation.org/resource/article/what-do-school-and-district-leaders-need-know-about-ai>
- Dubin, R. (1978). *Theory building* (2nd ed.). Free Press.
- Entenberg, G. A., Mizrahi, S., Walker, H., Aghakhani, S., Mostovoy, K., Carre, N., ... & Bunge, E. L. (2023). AI-based chatbot micro-intervention for parents: Meaningful engagement, learning, and efficacy. *Frontiers in Psychiatry, 14*, 1080770.
- Fathima, F., Inparaj, R., Thuvarakan, D., Wickramarachchi, R., & Fernando, I. (2024, April). Impact of AI-based predictive analytics on demand forecasting in ERP systems: A systematic literature review. *In Proceedings of the 2024 International Research Conference on Smart Computing and Systems Engineering (SCSE)* (Vol. 7, pp. 1–6). IEEE.

- Gall, A. (2022). Moving from Harm Mitigation to Affirmative Discrimination Mitigation: The Untapped Potential of Artificial Intelligence to Fight School Segregation and Other Forms of Racial Discrimination. *Cath. UJL & Tech*, 31, 145.
- Guechairi, S. (2024). Mapping altmetrics: A bibliometric analysis using Scopus (2012-2024). *Journal of Science and Knowledge Horizons*, 4(1), 172-192.
- Giddens, A. (1991). *Modernity and self-identity: Self and society in the late modern age*. Stanford University Press.
- Gumus, S., Bellibas, M. S., Esen, M., & Gumus, E. (2018). A systematic review of studies on leadership models in educational research from 1980 to 2014. *Educational Management Administration & Leadership*, 46(1), 25-48.
- Hallinger, P. (2003). Leading educational change: Reflections on the practice of instructional and transformational Leadership. *Cambridge Journal of Education*, 33(3), 329-352.
- Hallinger, P., & Murphy, J. (1985). Assessing the instructional management behavior of principals. *Elementary School Journal*, 86(2), 217-247.
- Herzberg, F. (1966). *Work and the nature of man*. World Publishing Company.
- Holmes, W., Bialik, M., & Fadel, C. (2019). *Artificial intelligence in education: Promises and implications for teaching and learning*. Center for Curriculum Redesign.
- Kuhn, T. S. (1962). *The structure of scientific revolutions*. University of Chicago Press.
- Kumar, V., Rajan, B., Venkatesan, R., & Lecinski, J. (2019). Understanding the role of artificial intelligence in personalized engagement marketing. *California Management Review*, 61(4), 135-155.
- Landauer, T. K. (2003). Automated essay scoring with e-rater® V.2. *Journal of Technology, Learning, and Assessment*, 1(3).
- Leithwood, K., & Duke, D. L. (1999). A century's quest to understand school leadership. In J. Murphy & K. S. Louis (Eds.), *Handbook of research on educational administration* (2nd ed., pp. 45-72). Jossey-Bass.
- Leithwood, K., & Jantzi, D. (2005). A review of transformational school leadership research 1996-2005. *Leadership and policy in schools*, 4(3), 177-199.
- Leithwood, K., Jantzi, D., & Steinbach, R. (1994). Transformational school leadership. In K. Leithwood et al. (Eds.), *Educational administration, policy, and reform* (pp. 8-27). Elsevier Science.
- Luckin, R., Holmes, W., Griffiths, M., & Forcier, L. B. (2016). *Intelligence Unleashed: An argument for AI in education*. Pearson Education.
- Maroju, P. K., & Aragani, V. M. (2025). Predictive Analytics in Education: Early Intervention and Proactive Support with Gen AI Cloud. In *Smart Education and Sustainable Learning Environments in Smart Cities* (pp. 317-332). IGI Global Scientific Publishing.
- Mayer, R. C., Davis, J. H., & Schoorman, F. D. (1995). An integrative model of organizational trust. *Academy of Management Review*, 20(3), 709-734.
- Merton, R. K. (1967). *On theoretical sociology: Five essays, old and new*. Free Press.
- Meyer, J. P., & Allen, N. J. (1991). A three-component conceptualization of organizational commitment. *Human Resource Management Review*, 1(1), 61-89.
- Modeste, M. E., Pavlakis, A. E., & Nguyen, C. (2022). Theory amid policy and practice: A typology of theory use in educational leadership scholarship. *Journal of Research on Leadership Education*, 17(1), 55-89.
- Moolenaar, N. M. (2012). A social network perspective on teacher collaboration in schools: Theory, methodology, and applications. *American Journal of Education*, 119(1), 7-39.

- Mustafa, M. Y., Tlili, A., Lampropoulos, G., Huang, R., Jandrić, P., Zhao, J., ... & Saqr, M. (2024). A systematic review of literature reviews on artificial intelligence in education (AIED): a roadmap to a future research agenda. *Smart Learning Environments*, 11(1), 59.
- Ng, D. T. K., Su, J., Leung, J. K. L., & Chu, S. K. W. (2024). Artificial intelligence (AI) literacy education in secondary schools: a review. *Interactive Learning Environments*, 32(10), 6204-6224.
- Niesche, R., & Gowlett, C. (2019). *Social, critical and political theories for educational leadership*. Singapore: Springer Singapore.
- O'Neil, C. (2017). *Weapons of math destruction: How big data increases inequality and threatens democracy*. Crown.
- Pasquale, F. (2015). *The black box society: The secret algorithms that control money and information*. Harvard University Press.
- Platt, J. R. (1964). Strong Inference: Certain systematic methods of scientific thinking may produce much more rapid progress than others. *Science*, 146(3642), 347-353.
- Selwyn, N. (2021). *Should robots replace teachers? AI and the future of education*. Polity Press.
- Senge, P. M. (1990). *The fifth discipline: The art and practice of the learning organization*. Doubleday.
- Sokoloff, N. (2025, May 4). AI is already here: Why some Connecticut school districts are embracing AI in the classroom. *CT Insider*. <https://www.ctinsider.com/news/education/article/ai-education-ct-schools-east-hartford-lebanon-tech-20302119.php>
- Spillane, J. P. (2006). Distributed Leadership. In *the educational forum* (Vol. 69, No. 2, pp. 143–150). Taylor & Francis Group.
- Sullivan, D., Hall, V. P., & Morrison, J. (2024). Navigating the future: Artificial Intelligence's impact on transformational nurse leadership. *Teaching and Learning in Nursing*, 19(3), 298–300.
- Sun, J., Ma, H., Zeng, Y., Han, D., & Jin, Y. (2023). Promoting the AI teaching competency of K-12 computer science teachers: A TPACK-based professional development approach. *Education and Information Technologies*, 28(2), 1509-1533.
- Sutton, R. I., & Staw, B. M. (1995). What theory is not? *Administrative Science Quarterly*, 40(3), 371–384.
- Taye, G., Sharma, S., Shah, P., & Nuriye, Y. G. (2023, October). Exploring the role of Artificial Intelligence in class scheduling and management: A comprehensive survey and review. In *2023 International Conference on Computer Science and Emerging Technologies (CSET)* (pp. 1-11). IEEE.
- Topol, E. J. (2019). High-performance medicine: the convergence of human and artificial intelligence. *Nature medicine*, 25(1), 44-56.
- U.S. Department of Education. (2023). *Artificial intelligence and the future of teaching and learning: Insights and recommendations*. U.S. Department of Education. <https://files.eric.ed.gov/fulltext/ED661924.pdf>
- Wamba-Taguimdje, S. L., Fosso Wamba, S., Kala Kamdjoug, J. R., & Tchatchouang Wanko, C. E. (2020). Influence of artificial intelligence on firm performance: A systematic literature review. *Journal of Enterprise Information Management*, 33(1), 213–237.
- Weick, K. E. (1995). *Sensemaking in organizations*. Sage.
- Williamson, B. (2017). *Big data in education: The digital future of learning, policy and practice*. Sage.
- Williamson, B., & Piattoeva, N. (2022). Education governance and datafication. *Education and Information Technologies*, 27, 3515-3531.
- Williamson, B., & Eynon, R. (2020). Historical threads, missing links, and future directions in AI in education. *Learning, Media and Technology*, 45(3), 223-235.