

The KINoS framework: social capital as the key enabler driving sustainable educational change through knowledge creation and diffusion

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Abstract

Purpose – This paper introduces the KINoS framework—an integrated theoretical model that positions knowledge creation, knowledge diffusion, and social capital as interdependent mechanisms for sustaining educational change. It responds to the need for a more dynamic and networked understanding of change, highlighting the critical role of professional collaboration, trust, and shared meaning in enabling change that is not only initiated, but embedded and sustained.

Design/methodology/approach – This conceptual paper synthesizes three complementary strands of literature: the SECI model of knowledge creation (Nonaka and Takeuchi, 1995), diffusion of innovation theory (Rogers, 2003), and social capital theory (e.g. Lin, 2009; Nahapiet and Ghoshal, 1998; Putnam, 2000). Together, they offer a relational and knowledge-based view of sustainable educational change, emphasizing the importance of professional capital and community.

Findings – The KINoS framework conceptualizes educational change as a non-linear, social learning process. It highlights how bonding, bridging, and linking forms of social capital—and their structural, relational, and cognitive dimensions—create the social conditions under which knowledge is co-constructed, negotiated, and shared across professional communities. Together, these processes support educational change that is sustained in length (over time), breadth (across people and places), and depth (in beliefs and routines).

Originality/value – The KINoS framework offers a new lens to understand how professional relationships and knowledge dynamics interact to shape lasting educational change. It contributes to the field by offering theoretically grounded and practical insights for educators, leaders, and researchers seeking to build the professional capital and collaborative conditions necessary for meaningful, scalable, and sustainable change.

Keywords Sustainable educational change, Social capital, Professional community, Networked approach, Knowledge creation, Knowledge diffusion

Paper type Conceptual paper

Introduction

Educational systems are under increasing pressure to respond to rapid societal, technological, and economic changes. Effective change is critical to ensure schools remain equitable, adaptive, and responsive to diverse learner needs (Fullan, 2015). Implementing innovation in practice is complex: it requires collaboration, trust, and the exchange of knowledge across

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diverse actors (Daly and Stoll, 2018; Ozgun *et al.*, 2022; Wang *et al.*, 2018). At its core, educational change is a social learning process, bridging disciplinary boundaries, fostering cooperation among stakeholders, and translating ideas into context-sensitive practice (Daly and Stoll, 2018; Hora and Millar, 2023).

Despite the potential benefits, many change initiatives struggle to take root, scale, or achieve lasting impact (Askill-Williams and Koh, 2020; Cohen and Mehta, 2017). This gap reflects the inherent complexity of educational change, which involves navigating uncertainty, aligning diverse perspectives, and embedding innovations in dynamic school contexts (Fidan and Balci, 2017; MacGregor *et al.*, 2025; Schaap and Vanlommel, 2024). Existing models of educational change, while insightful, often oversimplify these processes. Linear approaches neglect the dynamic interplay of knowledge, relationships, and organizational factors that drive successful change, and frameworks addressing knowledge creation (Nonaka and Takeuchi, 1995), diffusion (Rogers, 2003), or social capital (Lin, 2009; Nahapiet and Ghoshal, 1998; Putnam, 2000) are typically applied in isolation.

At the same time, an extensive body of research has examined social networks in education, showing how network structures shape learning, educational change, and knowledge use and diffusion (e.g. Daly, 2010; Froehlich *et al.*, 2020; Hubers *et al.*, 2018; Liou *et al.*, 2015; MacGregor *et al.*, 2021; Penuel *et al.*, 2012; Poortman and Brown, 2021; Van den Boom-Muilenburg *et al.*, 2022). This literature demonstrates the importance of ties, density, centrality, and brokerage for teachers' access to resources and for the spread of innovations. While these studies underscore that educational change is inherently networked, they often remain focused on structural descriptions of connections. Our contribution is to extend this perspective by integrating network insights with social capital theory and the dynamic processes of knowledge creation and diffusion, thereby offering a framework that not only maps networks but also explains how they enable or constrain sustainable change.

To address these limitations, we propose a more integrated framework that captures the complexity of educational change by combining the processes of knowledge creation and diffusion with the pivotal role of social capital. Social capital (i.e., the networks, relationships, and shared values that facilitate cooperation and knowledge exchange, Lin, 2009) serves as the connective tissue linking knowledge processes to sustainable change. Building on this, the Knowledge creation and diffusion, INnovation, and Social capital (KINoS) framework provides a holistic perspective on how educational change emerges, evolves, and becomes embedded. The term "KINoS", derived from the Greek word *kinesis* (κίνησις), evokes movement and interaction, reflecting the continuous construction, sharing, and embedding of knowledge within social and organizational networks. By integrating knowledge creation, diffusion, and social capital, KINoS aims to advance both theoretical understanding and practical guidance for fostering sustainable educational change. Drawing on established theories and their application in educational practice, the following sections develop a conceptual framework that advances theoretical understanding while providing practical guidance for fostering sustainable change.

Theoretical background

Sustaining educational change: length, breadth, and depth

Sustaining educational change extends beyond temporary initiatives or isolated improvements; it requires lasting impact over time, widespread adoption across the organization, and deep integration into both practices and underlying belief systems. We conceptualize sustaining educational change along three interrelated dimensions: length, breadth, and depth, which are reinforced through the development and evolution of organizational routines (Feldman and Pentland, 2003) and supported by a whole-systems perspective (e.g. Lanham *et al.*, 2013). Rather than viewing routines as static structures, we adopt the perspective that routines are continuously enacted and adapted by practitioners, shaping the extent to which change processes are sustained (Feldman, 2000). Sustaining educational change is therefore seen as a

constant process of embedment of the change, aimed at continuous improvement (Koh and Askeff-Williams, 2021; Prenger *et al.*, 2022). We therefore argue, in line with other authors, that sustainable educational change is not something that is either achieved or not; rather, it should be understood with regard to what aspects are achieved, along what dimensions, and in what way (cf. Van den Boom-Muilenburg *et al.*, 2023).

Length refers to the persistence of change, ensuring that its effects remain visible and influential beyond the initial implementation period. A change that endures despite leadership transitions or shifting policy priorities demonstrates sustainability in terms of length. Organizational routines contribute to this by embedding practices into the recurring activities of educators and administrators, reducing reliance on individual change agents (Feldman and Pentland, 2003). However, for change to remain relevant over time, routines must also be dynamic rather than rigidly institutionalized; their enactment should allow for adaptation in response to evolving needs (Feldman, 2000).

Breadth captures the extent to which change permeates different levels and areas of an organization, reaching a wide range of stakeholders. A change that remains confined to a small group of early adopters is unlikely to be sustained, whereas one that spreads across departments, disciplines, and hierarchical levels has a greater chance of becoming embedded in the organization's culture. However, effective and useful spread depends on who benefits from the change and in what context. Not every innovation needs to be universally adopted; rather, it should reach the teams and individuals for whom it is most relevant. Organizational routines play a role in this diffusion process by creating shared structures and expectations that standardize change across different teams and contexts (Feldman and Pentland, 2003). Additionally, the extent to which routines are collectively understood and enacted—their ostensive aspect—determines how widely they are adopted (Feldman, 2000).

Depth addresses the degree to which change is integrated not only into observable behaviours and formal procedures, and also into the underlying mindsets, norms, and values of an organization and the people in the organization. Superficial or compliance-driven changes may appear successful in the short term, but often fail to produce meaningful transformation. Deep change requires shifts in professional beliefs, structural adjustments, and the development of cultural routines that align with new ways of thinking and acting (Feldman and Pentland, 2003; Schaap and Vanlommel, 2024). Importantly, the performative aspect of routines—their enactment in daily practice—determines whether change is genuinely embedded or remains a formalized but unpractised policy (Feldman, 2000).

For example, consider the adoption of an inquiry-based teaching approach in a school. If this change persists over multiple years and continues to influence teaching practices despite shifts in leadership or policy priorities, it demonstrates *length*. If the approach expands beyond a few pioneering teachers and becomes a shared practice across subjects and grade levels, it illustrates *breadth*. Finally, if inquiry-based teaching is reflected in classroom practices, school policies, professional development programs, and teachers' fundamental beliefs about student learning, then the change has achieved *depth*. The integration of this approach in organizational routines, such as lesson planning structures, peer collaboration protocols, and assessment procedures, ensures that it becomes a stable and recurring feature of educational practice.

By framing sustainability along these three dimensions and highlighting the role of organizational routines, we aim to provide a comprehensive understanding of the factors that contribute to long-term, meaningful educational change. Without attention to length, breadth, and depth, innovations risk being short-lived, fragmented, or surface-level adjustments, rather than deeply embedded and institutionally supported shifts in educational practice.

Knowledge creation as the first mechanism for sustaining educational change

Achieving sustainability across length, breadth, and depth requires more than maintaining existing practices. It depends on the continuous generation of new knowledge that enables

professionals to respond to emerging challenges, adapt practices to diverse contexts, and embed change into organizational routines. Knowledge creation therefore constitutes a key mechanism for sustaining educational change. Without continual knowledge creation, change risks stagnation, superficial compliance, or eventual decline. Knowledge creation drives the development of new ideas, solutions, and practices through the generation, sharing, combining, and application of knowledge (e.g. Engeström, 1999; Landry *et al.*, 2002; Pérez-Luño *et al.*, 2011).

The SECI model (Nonaka and Takeuchi, 1995) provides a theoretical foundation for understanding how knowledge emerges, spreads, and becomes institutionalized in organization. It identifies four interrelated processes, socialization, externalization, combination, and internalization, that are particularly relevant in education, where both tacit and explicit knowledge shape teaching and institutional policies. *Socialization* involves sharing tacit knowledge through direct interactions, such as collaborative lesson planning or classroom observations, that foster professional learning. *Externalization* converts tacit insights into explicit frameworks enabling broader dissemination, as when teachers document and discuss new student-centred approaches. *Combination* integrates explicit knowledge from multiple sources — research, data, and practitioner insights — to develop instructional models or institutional policies, making knowledge actionable at scale. *Internalization* occurs when explicit knowledge becomes tacit through repeated practice, embedding new strategies into daily routines and institutional culture.

Each of these processes contributes to sustaining educational change by ensuring that knowledge is created and integrated into organizational routines. While the SECI model (Nonaka and Takeuchi, 1995) is a useful and influential framework for understanding how knowledge is generated and shared within educational organizations, the difficulty of converting tacit knowledge into explicit knowledge remains somewhat underemphasized. Tacit knowledge (e.g. intuition) is rooted in individual experiences, making it difficult and sensitive to express or share (Haldin-Herrgard, 2000). Educators are not used to articulating their intuitive reasoning (Vanlommel and Schildkamp, 2019). The SECI model almost seems to assume that an environment is always fertile for knowledge creation and that all professionals are willing and able to externalize their implicit knowledge. While the model provides some insight into the social dimension and cultural conditions that are needed, social support structures and a culture of collective inquiry are often limited during processes of educational change (Brown *et al.*, 2023).

The SECI model (Nonaka and Takeuchi, 1995) also pictures a structured and sequential process; in reality, knowledge creation is often messy and non-linear (Allen and Strathern, 2005). Spontaneous or creative knowledge generation, an important aspect of innovative behaviour (Thurlings *et al.*, 2015), cannot easily be fit into the SECI cycle. In sum, while the model provides a valuable lens for understanding knowledge creation, in practice educational institutions may find knowledge creation to be more complex, iterative, and contextual than the model suggests. Much of the success of knowledge creation will depend on a supportive social texture that fosters this complex and sensitive process.

Knowledge diffusion as the second mechanism for change

While knowledge creation is essential for generating new ideas and practices, sustainable educational change depends on the collaborative construction, negotiation, and adaptation of this knowledge across the system. For change to persist, expand, and become deeply embedded, this knowledge must move beyond its initial creators. Without continuous interaction and exchange, newly developed insights risk remaining confined to small groups, limiting their broader impact and sustainability (e.g. Prenger *et al.*, 2022). Knowledge diffusion ensures that educational change extends across individuals, teams, and institutional structures, reaching a wider audience (breadth), reinforcing change over time (length), and embedding it in norms and behaviours (depth).

Rogers' (2003) diffusion of innovation theory provides a framework for understanding how new knowledge and practices spread. The framework emphasizes knowledge diffusion, recognizing that innovation is fundamentally the creation and exchange of knowledge (Nonaka and Takeuchi, 1995). As a social process, diffusion unfolds through five key stages: awareness, persuasion, decision, implementation, and confirmation. *Awareness* arises when individuals or groups first encounter new knowledge, often through professional development, research dissemination, or informal peer discussions. *Persuasion* involves evaluating the relevance and feasibility of the knowledge, shaped by trust and credibility within social networks. *Decision* marks the commitment to adoption, requiring negotiation and resource allocation. *Implementation* transitions knowledge into practice, where ongoing support structures determine its depth and consistency of the transition. *Confirmation* involves assessing the impact of the change, reinforcing or adjusting it for long-term sustainability.

Each of these stages contributes to sustaining educational change by preventing fragmentation and ensuring that knowledge moves beyond early adopters. However, Rogers' (2003) model has limitations. Although Rogers (2003) explicitly notes that adoption stages are not strictly linear and may occur in varying orders, in practice, the stage-based adoption process is frequently treated as sequential, which can oversimplify diffusion's iterative character and underplay the collective, co-constructive work required for adaptation and institutionalization (cf. Greenhalgh et al., 2004). Additionally, the model prioritizes diffusion over knowledge creation and adaptation, overlooking how change is co-constructed and modified to fit local contexts (Koh and Askeff-Williams, 2021).

Knowledge diffusion in educational change is not passive; it relies on active engagement, collaboration, and reinforcement across multiple levels of the educational system. By positioning knowledge diffusion as a core mechanism for sustaining change, this framework underscores the importance of strategies that enhance alignment, brokerage and boundary crossing, communication, and trust across networks.

Social capital as the key enabler of both knowledge creation and knowledge diffusion

While knowledge creation and diffusion what drives sustainable educational change, they cannot operate in isolation. Their effectiveness depends on the social fabric in which they are embedded, and that facilitate collaboration, trust, and shared understanding. Social capital — the resources embedded in a social structure that can be accessed and mobilized for purposive actions (Lin, 2009; Nahapiet and Ghoshal, 1998; Putnam, 2000) — acts as the key enabler of these processes. Educational change requires both the co-construction and diffusion of knowledge, and social capital strengthens both (Camps and Marques, 2014; Landry et al., 2002; Muller and Peres, 2019; Ozgun et al., 2022; Yan and Guan, 2018). It is therefore not surprising that social capital is crucial for (sustaining) educational change (Caduff et al., 2024; Daly, 2015; Prenger et al., 2022; Rechsteiner et al., 2024; Van den Boom-Muilenburg et al., 2022). Without well-developed social capital, knowledge remains siloed, diffusion is hindered, and the sustainability of change, its length, breadth, and depth, is compromised.

Social capital consists of three interrelated dimensions: *structural*, referring to the configuration of networks and access to interactions; *relational*, emphasizing trust, shared norms, and reciprocity; and *cognitive*, encompassing shared understandings and common goals that facilitate coordination (Nahapiet and Ghoshal 1998). Despite the multidimensional nature of social capital, research has largely focused on the structural dimension, often overlooking the relational and cognitive aspects (Camps and Marques, 2014).

Additionally, social capital manifests in three forms (Putnam, 2000; Szreter and Woolcock, 2004). *Bonding social capital* refers to strong, close-knit ties within homogeneous groups such as teams, fostering trust and support. *Bridging social capital* connects diverse social networks, enabling access to new ideas and opportunities. *Linking social capital* facilitates vertical relationships with institutions and authorities, providing resources and legitimacy. Together, these forms shape collaboration and resource exchange, playing a crucial role in educational change.

Integrating social capital into knowledge creation and diffusion models enhances their explanatory power and practical relevance. By explicitly incorporating the dimensions and forms of social capital, the KINoS framework offers a more nuanced understanding of the social mechanisms underpinning educational change. Without sufficient social capital, change efforts remain fragmented and lack institutional support, while intentional investment in social capital fosters trust, networks, and shared purpose; essential for sustaining meaningful transformation. The next section integrates these insights into a conceptual framework illustrating the interplay between knowledge creation and diffusion, social capital, and sustainable educational change.

The KINoS framework for driving sustainable educational change

Driving sustainable educational change requires an integrated perspective on knowledge creation, knowledge diffusion, and social capital. While knowledge creation drives new ideas and practices, knowledge diffusion ensures that these are shared, adapted, and embedded across educational systems. Yet, both processes are only effective when supported by social capital: the networks, trust, and shared understandings that enable collaboration and knowledge flow.

In this section, we therefore place the different dimensions (structural, relational, cognitive) and forms (bonding, bridging, linking) of social capital at the center of the analysis. Rather than treating each phase of knowledge creation and diffusion in isolation, we examine how these aspects of social capital dynamically shape, enable, and constrain knowledge processes across contexts. Building on this integration, the KINoS (Knowledge creation and diffusion, INnovation, and Social capital) framework (Figure 1) offers a structured yet dynamic lens for understanding how educational change can be sustained.

The role of structural social capital

Structural social capital provides the scaffolding through which knowledge is created, shared, and embedded in educational systems (Nahapiet and Ghoshal 1998). In the early phases of knowledge creation and diffusion (socialization and awareness), structural capital can

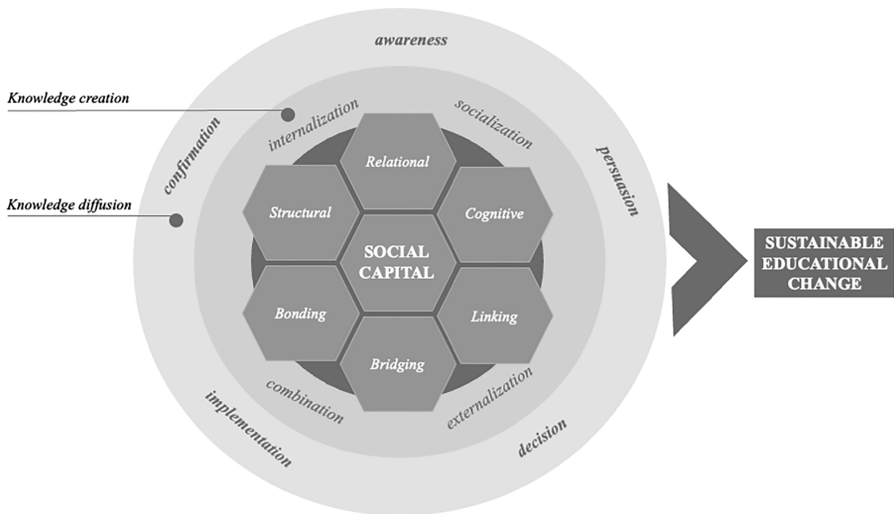


Figure 1. Visualization of the KINoS framework, illustrating social capital as the key enabler of knowledge creation and diffusion, thereby driving sustainable educational change. **Source:** Authors' own work

facilitate exposure to new ideas and the tacit sharing of practices. For example, professional networks, peer observation, or conferences can provide the necessary platforms for (informal) exchange, ensuring that novel insights are not confined to isolated individuals (e.g. [Brown et al., 2023](#); [Prenger et al., 2019](#); [Van den Boom-Muilenburg et al., 2022](#)).

As professionals move toward externalization and persuasion, structured environments, such as workshops, documentation platforms, and learning communities or networks, can help to let their network ties and thus structural capital grow as they meet new people. Thereby, it can support the articulation of tacit insights into explicit forms and create organized spaces for dialogue and critical engagement ([De Jong et al., 2022](#); [Prenger et al., 2019](#); [Stoll et al., 2006](#); [Wang et al., 2018](#)).

During the combination and decision phases, structural capital enables the systematic integration of diverse knowledge sources and supports organizational decision-making. Knowledge repositories, policies, and leadership structures provide coherence, while learning communities allow explicit knowledge to be tested and connected across contexts ([Feldman and Pentland, 2003](#); [Van den Boom-Muilenburg et al., 2022](#)). This scaffolding ensures that adoption is not dependent on individuals alone, but anchored in the organization's routines ([Fullan, 2015](#)).

Finally, in the implementation, internalization, and confirmation phases, structural capital can help sustain change by embedding new knowledge in daily practices. Professional networks or communities, mentoring systems, and continuous feedback mechanisms can create reinforcement cycles that normalize change ([Prenger et al., 2019](#); [Van den Boom-Muilenburg et al., 2022](#)). By embedding reflection and adaptation, structural social capital makes change durable, ensuring its persistence over time (length), its reach across the organization (breadth), and its embedding in shared routines (depth) ([Coburn, 2003](#); [Fullan, 2015](#)).

Thus, rather than functioning in isolated steps, structural capital operates dynamically across phases: it can open pathways for knowledge to surface, anchors decision-making in shared structures, and maintains continuity through reinforcement cycles. Without such scaffolding, innovations risk remaining ad hoc or short-lived, lacking the organizational grounding required for sustainable educational change.

The role of relational social capital

Relational social capital creates the conditions under which can be shared, trusted, and applied within educational systems ([Nahapiet and Ghoshal 1998](#)). In the early phases of knowledge creation and diffusion (socialization and awareness), relational capital fosters openness to new ideas. Trusting environments encourage professionals to share tacit experiences, uncertainties, and emerging practices that would otherwise remain unspoken ([Moolenaar and Sleegers, 2010](#)). Because knowledge is often tied to vulnerability, admitting what one does not know or experimenting with untested approaches, relationships of respect and reciprocity are essential for making this knowledge visible ([Camps and Marques, 2014](#)).

As processes move into externalization and persuasion, relational capital can allow individuals to articulate and refine their insights within safe, dialogical spaces. Feedback can then be received constructively when it comes from trusted peers, and new practices gain legitimacy when advocated by respected colleagues or leaders ([Moolenaar and Sleegers, 2010](#); [Van den Boom-Muilenburg et al., 2022](#)). In this way, relational ties transform individual insights into collectively validated knowledge, increasing the likelihood of broader acceptance.

During the combination and decision phases, relational capital strengthens collaboration across teams and departments. When trust underpins professional interactions, colleagues willingly share information and support each other's decision-making, reducing hesitation and reinforcing confidence in adopting new approaches ([Cole and Weinbaum, 2010](#); [Moolenaar and Sleegers, 2010](#)). Importantly, the optimal level of relational interaction may vary across

phases: [Leenders et al. \(2003\)](#) show that moderate tie strength tends to be most conducive to creativity, while [Damanpour \(1991\)](#) highlights that looser interactions are beneficial during idea generation, whereas closer ties are especially valuable in the implementation phase. This suggests that the role of relational capital is not static but shifts in intensity and function throughout the change process.

Finally, in the implementation, internalization, and confirmation phases, relational capital sustains commitment by nurturing ongoing peer support, mentoring, and collegial encouragement. These relationships provide the reinforcement and motivation needed to continue experimenting, adapting, and embedding new practices into daily routines. Over time, trust deepens the normalization of innovation and ensures that change does not remain superficial but becomes part of the professional culture ([Camps and Marques, 2014](#); [Moolenaar and Slegers, 2010](#)).

Thus, relational social capital operates dynamically across phases: it enables vulnerable sharing in early stages, legitimizes new practices through trusted voices, supports collaborative decision-making, and sustains long-term commitment through ongoing relationships. Without trust and mutual respect, knowledge remains contested or ignored, and educational change risks faltering before it becomes embedded.

The role of cognitive social capital

Cognitive social capital provides the foundation for knowledge to be meaningfully interpreted, integrated, and applied within professional communities ([Nahapiet and Ghoshal 1998](#)). In the early phases of knowledge creation and diffusion (socialization and awareness), cognitive capital ensures that tacit knowledge is meaningful and contextually relevant. Shared norms and values can guide professionals in recognizing which insights are important, reducing ambiguity and enhancing the perceived significance of emerging ideas ([Camps and Marques, 2014](#); [Doten-Snitker et al., 2021](#)). By fostering a common understanding, cognitive social capital makes it easier for individuals to interpret new knowledge in ways that resonate with organizational goals.

As knowledge moves into externalization and persuasion, cognitive social capital supports the translation of tacit insights into structured concepts, documents, or training materials. A shared language and conceptual framework might allow professionals to articulate their ideas clearly, reducing misunderstandings and increasing the credibility of proposed practices ([Vanlommel et al., 2023](#)). Knowledge is more readily accepted when it aligns with the mental models and values already shared across the community ([Frank et al., 2004](#)).

During the combination and decision-making phases, cognitive social capital enables professionals to synthesize diverse knowledge inputs and evaluate them against organizational priorities. By providing a coherent framework for sense-making, it can ensure that decisions are informed by collectively understood standards and strategic objectives. Individuals gain confidence in adopting new approaches because they see how the knowledge fits within the broader organizational context ([Doten-Snitker et al., 2021](#); [Vanlommel et al., 2023](#)).

Finally, in the implementation, internalization, and confirmation phases, cognitive social capital sustains the integration of knowledge into practice. Shared mental models, organizational learning cultures, and collective values can help internalize new knowledge and embed it in daily routines. Professionals are more likely to embrace, adapt, and maintain innovative practices when these practices align with the community's established norms and conceptual frameworks ([Doten-Snitker et al., 2021](#); [Vanlommel et al., 2023](#)). Over time, this alignment strengthens organizational coherence and ensures that change becomes durable rather than superficial.

Thus, cognitive social capital operates dynamically across phases: it provides meaning to tacit knowledge in early stages, facilitates the articulation of insights through shared frameworks, supports coherent decision-making, and sustains the long-term integration of innovation. Without these shared cognitive foundations, knowledge risks being

misinterpreted, underutilized, or disconnected from organizational goals, limiting its potential impact.

The role of bonding social capital

Bonding social capital provides the foundation for trust, mutual support, and sustained engagement (Putnam, 2000; Szreter and Woolcock, 2004). In the early phases of knowledge creation and diffusion (socialization and awareness), bonding capital can foster deep conversations and sustained engagement within tight-knit professional communities (Claridge, 2018). By creating environments of trust and familiarity, it encourages members to share experiences, insights, and uncertainties that might otherwise remain unspoken (Camps and Marques, 2014; Van den Boom-Muilenburg *et al.*, 2022). Informal exchanges within these networks can make knowledge immediately relevant and reinforce its credibility.

As knowledge moves into externalization and persuasion, bonding social capital supports the co-construction of explicit knowledge within trusted teams. Professionals can articulate ideas, refine practices, and validate new approaches collaboratively, knowing that feedback comes from peers who understand their context. Safe, familiar spaces can reduce the perceived risk of experimentation and foster collective endorsement of emerging practices (Camps and Marques, 2014).

During the combination and decision-making phases, bonding social capital enhances the consistency and reliability of knowledge-sharing practices across departments. Within cohesive networks, members coordinate efforts, align strategies, and reinforce shared standards, providing confidence that decisions are grounded in collective understanding (Frank *et al.*, 2004). Peer discussions within these communities further strengthen commitment to action by offering social validation.

Finally, in the implementation, internalization, and confirmation phases, bonding social capital sustains adoption and consolidation of new practices. Teams and departments can provide ongoing support, mentoring, and role modelling, ensuring that individuals persist in applying innovations (Vanlommel *et al.*, 2023). When peers demonstrate successful integration of change, these examples can become benchmarks, reinforcing both the relevance and durability of new practices. Over time, bonding capital transforms short-term adoption into lasting, culturally embedded routines.

Thus, bonding social capital operates dynamically across phases: it fosters deep knowledge sharing in early stages, enables collaborative refinement of insights, reinforces collective decision-making, and sustains long-term adoption through continuous peer support. Without these strong intra-group ties, knowledge risks being inconsistently applied or abandoned, limiting its potential impact on professional practice.

The role of bridging social capital

Bridging social capital provides access to diverse perspectives, knowledge, and resources beyond one's immediate network (Putnam, 2000; Szreter and Woolcock, 2004). It enables individuals and teams to integrate external insights, fostering innovation and cross-boundary learning. In the early phases of knowledge creation and diffusion (socialization and awareness), bridging capital introduces fresh perspectives by connecting individuals across different departments, disciplines, or organizations (Claridge, 2018). Exposure to diverse experiences encourages professionals to recognize alternative practices, expand their understanding, and identify opportunities for improvement that might remain invisible within tightly knit networks (e.g. Leenders *et al.*, 2003; Liu *et al.*, 2022; Rechsteiner *et al.*, 2024).

As knowledge moves into externalization and persuasion, bridging social capital facilitates the synthesis of insights from multiple disciplines or organizational contexts. By translating tacit knowledge into explicit forms collaboratively, teams can ensure that new practices are credible, widely relevant, and informed by a range of viewpoints. Cross-boundary dialogue

strengthens both the legitimacy and applicability of emerging knowledge (Burt, 2005; Rechsteiner *et al.*, 2024).

During the combination and decision-making phases, bridging social capital promotes interdisciplinary collaboration and the integration of diverse knowledge inputs. Connections across units and organizations support innovative problem-solving (Liu *et al.*, 2022), reinforce alignment with broader strategic goals, and provide alternative approaches that enhance decision confidence (Camps and Marques, 2014). Access to multiple perspectives mitigates the risks of narrow or insular decision-making (Burt, 2005; Rechsteiner *et al.*, 2024).

Finally, in the implementation, internalization, and confirmation phases, bridging social capital can help best practices and lessons learned get shared across teams, departments, and organizations. This connectivity reduces isolated implementation efforts and allows innovations to evolve in response to ongoing feedback from broader professional networks (Burt, 2005). Over time, bridging capital sustains the relevance and adaptability of change by keeping practices informed by external developments and collective learning.

Thus, bridging social capital operates dynamically across phases: it introduces novel perspectives in early stages, enables collaborative synthesis across boundaries, strengthens decision-making through broader insights, and supports sustained, adaptive implementation by maintaining connections with external communities. Without these bridging ties, innovations risk remaining localized, limiting their impact and scalability.

The role of linking social capital

Linking social capital provides access to resources, validation, and policy alignment that extend beyond the immediate professional network (Putnam, 2000; Szreter and Woolcock, 2004). It allows knowledge and innovations to be embedded into formal structures, gaining legitimacy and long-term sustainability. In the early phases of knowledge creation (socialization and awareness), linking social capital exposes individuals and teams to external experts, policymakers, or researchers. These connections bring novel insights, elevate the visibility of emerging ideas, and ensure that knowledge is not confined to localized pockets within the organization (Szreter and Woolcock, 2004). By connecting practitioners with influential actors, linking social capital increases the likelihood that new ideas will gain attention and traction at higher organizational or systemic levels (Brown and Flood, 2019).

During externalization and persuasion, linking social capital becomes critical for validation and endorsement. Engagement with leaders and policymakers can help make newly articulated knowledge get recognized as legitimate and relevant (Bellei *et al.*, 2020; Prenger *et al.*, 2022). These ties then can reinforce credibility, enhance acceptance, and provide a bridge between local practices and broader educational or organizational priorities (Claridge, 2018).

In the combination and decision-making phases, linking social capital supports alignment between synthesized knowledge and formal frameworks, policies, or accreditation standards. Connections with leadership and external stakeholders strengthen confidence in decision-making, enabling practitioners to commit to adopting innovations knowing they are supported and sustainable within the larger system (Arena and Uhl-Bien, 2016; Claridge, 2018).

Finally, in implementation, internalization, and confirmation, linking social capital can help secure resources, leadership support, and policy reinforcement. By embedding change at organizational and systemic levels, it can help ensure that innovations are sustained, refined, and embedded over time (Prenger *et al.*, 2022). Without these linking ties, even effective practices risk being discontinued due to lack of systemic support or shifting organizational priorities.

Thus, linking social capital operates dynamically across phases: it provides early access to external expertise and policy guidance, facilitates the embedding of knowledge into formal structures during development, reinforces decision-making through leadership endorsement, and sustains long-term implementation by securing resources and systemic support. Without

these linking ties, innovations risk lacking legitimacy, visibility, and organizational backing, reducing their likelihood of being adopted and maintained at scale.

Bringing it all together: the KINoS framework

The KINoS framework conceptualizes educational change as a continuous and networked process, rather than a linear sequence of individual steps. Knowledge creation and diffusion are not self-sufficient; their effectiveness depends on the presence of social capital, which enables ideas to be generated, translated, and embedded across contexts.

Structural social capital provides the scaffolding and communication infrastructures that make collaboration possible. Relational social capital sustains trust and reciprocity, encouraging actors to take the risk of sharing and adopting new practices. Cognitive social capital creates shared meaning and alignment with institutional goals. Together, bonding, bridging, and linking forms of social capital expand and connect these dynamics: deepening collaboration within communities, fostering exchange across groups, and anchoring innovation in wider organizational and policy environments.

By integrating these mechanisms, the KINoS framework shows that sustaining change is not about isolated phases but about the dynamic interplay of networks, trust, and shared meaning that continuously drive knowledge creation and diffusion. This interplay provides the foundation for educational change that is long-lasting, expansive, and deeply embedded. In doing so, KINoS reframes sustainability as the outcome of connected systems of people and knowledge: where innovation persists over time (length), scales across individuals and organizations (breadth), and becomes deeply embedded in practices and mindsets (depth).

Conclusion and discussion

Educational change is inherently complex and dynamic, shaped by unpredictable factors, evolving contexts, and the knowledge, emotions, and perspectives of those involved (Hargreaves, 2005; Schaap and Vanlommel, 2024). Traditional phase-based models fall short in capturing this complexity, necessitating a more flexible, networked approach. Change requires continuous feedforward and feedback loops, as well as social capital to facilitate the co-creation, exchange, and integration of knowledge across individuals and organizations.

The KINoS framework addresses this need by integrating knowledge creation, knowledge diffusion, and social capital into a holistic perspective. By positioning social capital as the key enabler, it ensures that knowledge is generated, shared, and embedded within educational systems. Rather than treating change as a series of discrete steps, this framework highlights the ongoing adaptation, collaboration, and organizational learning necessary for sustainable impact. The following sections discuss the theoretical and practical implications of this approach and directions it suggests for future research.

Theoretical implications

The KINoS framework provides several theoretical contributions to the study of sustainable educational change. By integrating knowledge creation, knowledge diffusion, and social capital, it offers a dynamic, networked perspective. First, this framework reconceptualizes educational change as a networked and iterative process because of the continuous and recursive nature of knowledge flows within educational systems. Recent attention to the complexity of educational change, which is influenced by many interrelated factors (Hargreaves, 2005; Hora and Millar, 2023), have asked for more complex and adaptive approaches (Lanham *et al.*, 2013). In line with this, the KINoS framework highlights that sustainable change does not follow a fixed trajectory but emerges from the ongoing interaction between knowledge creation, knowledge diffusion, and social capital.

Second, the framework extends theories of knowledge creation and diffusion by explicitly linking these processes within a social and relational context. While the knowledge creation

model (Nonaka and Takeuchi, 1995) provides insights into how knowledge is generated within organizations, and Rogers' diffusion theory (2003) explains how educational change spread, these models have mainly been studied in isolation. The KINoS framework integrates them, demonstrating that knowledge is created within organizations, and must also be meaningfully disseminated and embedded in practice. This integration highlights the need for future research to explore the interplay between tacit and explicit knowledge and the mechanisms that facilitate or hinder its diffusion across educational systems.

Third, this framework positions social capital as a key enabler of change. While previous studies have acknowledged the importance of social capital in knowledge sharing and professional collaboration, its active role in sustaining educational change has often been under-theorized. The KINoS framework highlights how bonding, bridging, and linking social capital, along with their structural, relational, and cognitive dimensions, shape the success of both knowledge creation and knowledge diffusion. This theoretical contribution underscores the importance of studying social capital not merely as a background condition, but as a central mechanism that actively drives educational change.

Finally, the framework contributes to the study of sustainable educational change by explicitly linking social capital with the dimensions of length, breadth, and depth of such change. Prior research has often focused on the initial adoption of change rather than sustaining it. The KINoS framework suggests that different forms of social capital play distinct roles in both knowledge creation and knowledge diffusion, ensuring that change endures over time (length), expands across different levels of an organization (breadth), and becomes embedded in practices, routines, and organizational culture (depth). This perspective highlights the need for longitudinal research to examine how social capital evolves throughout the lifecycle of educational change and how it can be intentionally cultivated to support sustainability.

Practical implications

The KINoS framework provides practical guidance for educators, leaders, and policymakers aiming to foster sustainable educational change. Consider a higher education institution introducing AI-supported assessment tools. Using the KINoS framework, leaders can identify whether challenges lie primarily in knowledge creation (e.g. insufficient shared understanding of pedagogical affordances), knowledge diffusion (e.g. insights remain within small project teams rather than reaching curriculum committees), or in a lack of social capital (e.g. weak bridging ties with IT specialists or external partners). By mapping these dynamics, practitioners can target interventions (such as cross-departmental workshops or boundary-spanning professional learning networks) that strengthen both knowledge flows and relational trust, thereby increasing the likelihood that the innovation becomes sustainably embedded across the organization.

By explicitly linking knowledge creation, diffusion, and social capital, it highlights leverage points where collaboration, trust, and learning processes can be strengthened. In practice, KINoS can serve both as a design and a diagnostic tool, supporting the creation of learning networks, cross-team exchanges, or external partnerships, while also helping organizations identify network gaps that hinder the spread of innovations. It can also help educational professionals to reflect on the interplay between knowledge and networks, to identify barriers and enablers, and to take small but deliberate steps that increase the likelihood of long-term, embedded change. We like to stress that, although KINoS provides a useful lens for thinking about educational change, its practical application still requires empirical testing and refinement in real-world settings.

Directions for future research

While the KINoS framework provides a comprehensive perspective on sustaining educational change, further research is needed to refine and empirically validate its components. Future

studies should focus on deepening our understanding of how social capital, knowledge creation, and knowledge diffusion interact in various educational contexts, as well as on developing practical interventions to strengthen these mechanisms. Several key research directions emerge from this framework.

First, future research should empirically examine how different forms and dimensions of social capital facilitate knowledge creation and diffusion in various educational settings. Prior work in educational network research has convincingly shown that structures such as density, centrality, and brokerage influence teachers' access to knowledge, the diffusion of innovations, and the coordination of educational change (e.g. [Daly, 2010](#); [Rechsteiner et al., 2024](#); [Van den Boom-Muilenburg et al., 2022](#)). Yet much of this work has remained descriptive, focusing on mapping ties rather than investigating the underlying processes of knowledge creation, sharing, and embedding. The KINoS framework builds on this tradition by offering a processual, theory-driven lens that explains how network structures and relational dynamics enable or constrain sustainable educational change. To advance this agenda, future research should explore how the structural, relational, and cognitive dimensions of social capital actively support the transformation of tacit knowledge into explicit knowledge and its subsequent dissemination. Longitudinal, mixed-method approaches — for example, combining interviews, focus groups, and social network analysis (cf. [Froehlich et al., 2020](#)) — can offer valuable insights into how bonding, bridging, and linking social capital shape knowledge processes in educational change. Additionally, integrating trust measures into social capital assessments can help uncover the role of relational dynamics in sustaining educational change. Additionally, integrating trust measures into social capital assessments can help uncover the role of relational dynamics in sustaining knowledge exchange. Wearable technologies such as sociometric badges and digital interaction tracking present opportunities to capture real-time collaboration patterns and the evolution of professional networks. Explicitly mapping social capital related to educational change, by asking participants, for example, “Whom do you talk to about [this change]?”, “Whom do you seek advice from?”, and “What are your conversations about?” (cf. [Cole and Weinbaum, 2010](#)), combined with trust metrics, can yield deeper insights into the mechanisms that enable or hinder knowledge flows. By employing case studies, ethnographic research, and network analysis over time, future studies can further illuminate the evolving interplay between social capital and sustainable educational change.

Second, research should explore the conditions under which social capital enhances or constrains knowledge creation and diffusion. Cultural and organizational contexts likely moderate the relationship between social capital and knowledge processes (e.g. [Brown et al., 2024](#); [Liou and Daly, 2023](#)), affecting the effectiveness of bonding, bridging, and linking social capital. Comparative case studies across different educational systems can illuminate how variations in leadership structures, professional cultures, and policy environments impact the role of social capital in sustaining change.

A third avenue for research involves developing and testing interventions that strengthen social capital to enhance knowledge creation and diffusion. Professional learning networks, structured mentoring programs, and cross-organizational partnerships could be examined to assess their impact on fostering effective knowledge-sharing. This might include professional development programs aimed at fostering cognitive alignment among stakeholders or initiatives to strengthen bridging and linking social capital through partnerships with external organizations. This has been done for social capital related to professional development (cf. [Van Waes et al., 2018](#)) and implementing curriculum ([Sinnema et al., 2023](#)), but it appears that it has not been done in the light of sustaining educational change. Tools such as network analysis could be used to identify gaps in existing social capital and measure the impact of targeted interventions over time, providing actionable insights for improving change outcomes in educational settings. Moreover, studies could investigate how different forms of social capital contribute to the successful adoption and adaptation of educational change, as well as the long-term sustainability of these changes.

Fourth, future studies should investigate how social capital sustains educational change, while previous research has explored social capital's role in collaboration, less is known about how its different forms support or inhibit the length, breadth, and depth of change. For example, how does linking social capital facilitate policy alignment and long-term support? How does bridging social capital enable cross-organizational learning and knowledge diffusion? Achieving depth of sustainable change requires disrupting deeply embedded cultural routines, a process in which using evidence in the change process plays a crucial role. A recent review (Vanlommel and Van den Boom-Muilenburg 2024) highlighted that integrating scientific research, organizational knowledge, and experiential insights can help break established patterns that may otherwise hinder meaningful change. However, how social capital facilitates or constrains the use of evidence in educational decision-making remains underexplored. Future research should examine how different forms of social capital influence the integration of evidence, particularly in overcoming resistance and fostering long-term institutional adoption.

Fifth, while our framework emphasizes the positive role of social capital in knowledge creation and diffusion, we acknowledge that social capital can also generate unintended constraints. For instance, strong bonding ties among teachers in a school or professional learning communities may promote trust and collaboration but can simultaneously lead to groupthink, reinforce existing practices, and reduce receptivity to innovative approaches from other schools or disciplines (Burt, 2005; Putnam, 2000). Similarly, tightly knit networks may inadvertently exclude peripheral actors, limiting the diversity of perspectives and slowing the diffusion of novel educational practices (Tekansi and Chesmore, 2003), and central actors can "hoard and distort" knowledge creation and diffusion (Rechsteiner et al., 2024). Future research could investigate how schools and school teams navigate these tensions, balancing the benefits of cohesive relationships with the need for bridging and linking connections that foster sustaining educational change.

Finally, research should focus on practical applications of the KINoS framework to help educators and policymakers operationalize its principles. Developing tools such as network analysis techniques, implementation guides, and decision-making frameworks could support practitioners in strengthening social capital and fostering sustainable change.

By addressing these research directions, scholars can expand the theoretical and empirical support for the KINoS framework, providing valuable insights into how knowledge processes and social capital interact to sustain educational change. Future research has the potential to generate actionable strategies for strengthening collaboration, enhancing knowledge diffusion, and ensuring that educational change is not only initiated, but truly sustained over time.

Conclusion

In rethinking the foundations of sustainable educational change, the KINoS framework brings together knowledge creation, diffusion, and social capital into a unified and dynamic perspective. By emphasizing their continuous and relational interplay, it shifts the focus from fragmented change efforts toward a more systemic, socially embedded, and collaborative approach. Sustaining change is not merely about generating new knowledge, but about ensuring that it is co-constructed, shared, and meaningfully embedded across all levels of the educational system. The framework highlights the pivotal role of professional relationships, collective learning, and trust-based networks. Ultimately, fostering sustainable educational change requires an ongoing investment in the forms and dimensions of social capital that allow professional communities to grow and thrive.

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