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The Diffusion Mechanisms of Digital Literacy Innovation in Transforming Individual Pedagogical Practices Into a Collective Learning Culture in Primary Schools

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Abstract

Digital literacy in primary education is often discussed in terms of individual teachers' competencies and the integration of digital technologies into classroom instruction. However, less attention has been given to how individual digital pedagogical innovations spread among teachers and develop into collective learning practices. This conceptual study aims to develop a process-oriented model explaining the diffusion of digital literacy innovation from individual pedagogical practices to a collective learning culture in primary schools. Employing a conceptual research design informed by an integrative literature review and theory synthesis, the study draws on diffusion of innovations theory, social learning theory, communities of practice, and organizational learning. The proposed model identifies five interconnected mechanisms: individual innovation initiation, interpersonal knowledge diffusion, collective pedagogical adaptation, collaborative pedagogical institutionalization, and collective learning culture formation. The model explains how an individual teacher's pedagogical innovation may become shared professional knowledge, undergo contextual adaptation, and gradually develop into sustained collaborative practices. It also recognizes the influence of leadership support, digital infrastructure, professional trust, teacher capabilities, and opportunities for professional interaction throughout the diffusion process. The study contributes a conceptual framework that extends the discussion of digital literacy beyond individual competence and technology integration toward collective pedagogical transformation. The model provides a theoretical basis for further empirical investigation into the development of collaborative learning cultures in primary schools.

Keywords: digital literacy innovation; diffusion of innovations; digital pedagogy; teacher collaboration; collective learning culture; primary schools.

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1. Introduction

The integration of digital technologies into primary education has reshaped how teachers design and facilitate instruction. Digital resources and interactive platforms offer engaging learning opportunities. However, their educational value depends not simply on availability or teachers' ability to operate them, but on how teachers select, evaluate, and use them to support learning and respond to diverse needs. Digital literacy therefore extends beyond technical competence. It encompasses the critical and pedagogical capacities required to integrate digital resources purposefully into teaching. Wohlfart & Wagner (2023), in their umbrella review of teachers' roles in educational digitalization, emphasize teachers' central role in technology integration and the professional capacities shaping this process. Digital literacy can thus be understood as a pedagogical capacity influencing the development of teaching practices.

Understanding digital literacy as a pedagogical capacity allows its development to be examined as educational innovation. In this study, digital literacy innovation refers to digitally supported practices that change how teachers organize activities, facilitate interaction, and engage students in knowledge construction. Such innovation may begin when an individual teacher experiments with digital resources to address needs through digital reading materials, interactive applications, collaborative writing platforms, or multimedia resources. These practices involve more than selecting technological tools; they require pedagogical decisions about learning purposes and processes. Rogers' (2003) diffusion of innovations theory provides a foundation for examining how practices extend beyond their initiators. Innovation spreads through communication channels over time within a social system. An individual

teacher's practice may therefore become known, evaluated, and potentially adopted by colleagues through interaction at school.

Nevertheless, an innovative practice does not automatically transform the wider teaching environment. A teacher may use digital resources while colleagues continue established routines, leaving the innovation isolated and dependent on personal initiative. Thus, individual adoption is not equivalent to diffusion among teachers. Diffusion involves teachers becoming aware of an innovation, observing its application, exchanging experiences, assessing its relevance, and adapting it to their contexts. Bandura's social learning theory explains how people acquire practices through observation and modeling. Wenger's communities of practice perspective emphasizes how participation and experience contribute to collective knowledge. Together, these perspectives suggest that moving from individual innovation to collective practice requires social learning, professional interaction, and contextual adaptation.

Research acknowledges the relational and collaborative dimensions of teachers' digital practices. Wohlfart & Wagner (2023) show that educational digitalization involves interconnected individual, pedagogical, and organizational considerations. Wider et al. (2026), in a systematic review of digital literacy in collaborative teaching, highlight its relevance to instructional co-design, professional interaction, and reflective practice. Although these studies illuminate the relationship between digital competence, technology integration, and teacher collaboration, they provide less explicit explanation of how an individual teacher's digital pedagogical innovation develops into a sustained collective practice within a school. This study addresses this conceptual gap by proposing a process-oriented model that traces five interconnected mechanisms: individual innovation initiation, interpersonal knowledge diffusion, collective pedagogical adaptation, collaborative pedagogical institutionalization, and collective learning culture formation. Through these mechanisms, an innovation initially developed by one teacher can become visible to colleagues, shared through professional interaction, adapted to different instructional contexts, incorporated into collaborative routines, and eventually reproduced as part of the school's professional culture. The model therefore contributes a clearer explanation of how individual digital literacy innovation may extend beyond classroom-level practice to support collective pedagogical learning. Rather than assuming that technology adoption automatically produces collaboration, it identifies the social, pedagogical, and organizational processes through which such transformation may occur.

To address this concern, this study develops a conceptual model of digital literacy innovation diffusion in primary schools. Drawing primarily on Rogers' diffusion of innovations theory, it integrates perspectives on social learning, communities of practice, and organizational learning. The model identifies five interconnected mechanisms: individual innovation initiation, interpersonal knowledge diffusion, collective pedagogical adaptation, collaborative pedagogical institutionalization, and collective learning culture formation. These mechanisms explain how digitally supported practices may move beyond individual experimentation through communication, observation, knowledge sharing, contextual modification, and shared professional routines. The model does not assume a uniform or strictly linear sequence. Teachers may adopt, modify, reinterpret, resist, or discontinue innovations according to pedagogical needs and institutional circumstances. Collective adaptation is central; adoption alone is not the final outcome.

This study aims to explain how digital literacy innovations can transform individual pedagogical practices into a collective learning culture in primary schools. It examines the relationships among innovation initiation, interpersonal diffusion, collective adaptation, institutionalization, and culture formation. Its theoretical contribution lies in extending diffusion of innovations beyond individual adoption decisions to collective pedagogical transformation. Its pedagogical contribution is to position teachers' digital literacy practices as potential sources of shared professional learning and collaborative instructional development. The proposed model provides a basis for empirical research into how

individual digital pedagogical initiatives become sustained collective practices in primary school communities.

2. Methodology

2.1 Research Design

This study adopted a conceptual research design combining an integrative literature review and theory synthesis to develop a process-oriented model of digital literacy innovation diffusion in primary schools. Rather than examining technology implementation through primary data, it synthesized existing theories and research findings to explain how individual digital pedagogical innovations may spread among teachers and contribute to a collective learning culture. The design followed Jaakkola (2020) model-oriented approach, which integrates existing knowledge to construct an explanatory framework. An integrative review connected insights from different research streams (Snyder, 2019; Torraco, 2016).

The analysis initially approached digital literacy as a form of pedagogical innovation rather than solely as individual technical competence. The five mechanisms were not established as fixed analytical categories before the literature examination. Instead, they were progressively developed through the iterative process of reviewing, comparing, and synthesizing relevant theoretical and empirical literature. Particular attention was given to how individual innovations are communicated among teachers, adapted to different instructional contexts, incorporated into organizational practices, and sustained through shared professional values. The synthesis gradually identified five interconnected mechanisms: individual innovation initiation, interpersonal knowledge diffusion, collective pedagogical adaptation, collaborative pedagogical institutionalization, and collective learning culture formation. These mechanisms therefore represent the conceptual outcomes of the literature synthesis rather than predetermined categories imposed on the reviewed studies.

2.2 Literature Search Strategy

The literature search was conducted on 6 November 2026 through targeted searches of the ERIC database and publisher platforms, including SpringerLink, Taylor & Francis, and ScienceDirect, supplemented by web-based searches to identify relevant publications and bibliographic information. The search combined terms related to digital literacy, pedagogical innovation, innovation diffusion, and teacher collaboration. One example of the search string was: ("digital literacy" OR "digital pedagogical practices") AND ("diffusion of innovation" OR "educational innovation") AND ("primary school teachers" OR "elementary school teachers"). The search primarily targeted publications from 2020 to 2026, while foundational theoretical works were considered regardless of publication year. Relevant publications were identified based on their conceptual or empirical contributions to digital pedagogical practices, interpersonal knowledge sharing, teacher collaboration, organizational learning, and collective learning culture.

2.3 Literature Selection Criteria

Selection was guided by relevance to four areas: digital literacy as pedagogical capacity or educational innovation; diffusion, adoption, or adaptation of innovations among teachers; social learning, knowledge sharing, or professional collaboration; and collective learning, communities of practice, or organizational learning in education.

Peer-reviewed journal articles formed the primary contemporary sources, while foundational books and theoretical publications were included when conceptually essential. A total of 19 sources were incorporated into the conceptual synthesis. Studies focused exclusively on technical skills without

a pedagogical connection, or lacking sufficient conceptual relevance, were excluded. The review was not restricted to primary education; studies from other educational contexts were included when they offered relevant theoretical insights. For example, Frei-Landau et al. (2022) examined mobile-learning adoption in teacher education during the COVID-19 pandemic. Although their study was not conducted in primary schools, it was included because its application of Diffusion of Innovations theory provides insights into how educational innovations are communicated and adopted within professional learning contexts. Its theoretical relevance was considered separately from the transferability of its findings to primary school settings. This distinction ensured that the synthesis drew on relevant theoretical contributions without assuming that findings from different educational contexts were directly interchangeable.

2.4 Data Extraction and Analytical Synthesis

The literature was examined through structured conceptual extraction. Information was organized by publication characteristics, research focus, theoretical perspective, key concepts, principal findings, and relevance to the transition from individual to collective pedagogical practices. Particular attention was paid to how teachers initiate, communicate, observe, adopt, modify, and sustain digital innovations.

Synthesis involved four procedures. First, conceptual identification located recurring constructs and explanatory elements across the selected literature. Second, theoretical categorization distinguished the contributions of relevant perspectives, including innovation diffusion, social learning, communities of practice, and organizational learning. Third, relational synthesis examined connections among concepts and the processes through which individual innovations become shared pedagogical practices. For example, Rodríguez-Triana et al. (2020) demonstrated that sharing and co-creating instructional designs within an online teacher community were associated with higher classroom implementation rates than individual creation alone. The study's emphasis on knowledge sharing, co-creation, and collaborative refinement informed the development of the collective pedagogical adaptation mechanism. Specifically, it suggested that teachers do not simply reproduce an innovation introduced by a colleague; they can collaboratively refine and reconstruct it before implementing it in their own instructional contexts. Fourth, explanatory integration combined these relationships to develop a process-oriented explanation of how individual digital pedagogical innovations may develop into collective professional practices. The five mechanisms were formulated through this synthesis rather than directly adopted from any single study.

Rogers' (2003) diffusion of innovations theory provided the primary framework for understanding how innovations move within a social system. Bandura's (1977) social learning theory informed the analysis of observational learning; Wenger's (1998) communities of practice perspective explained shared professional practices; and Argyris and Schön's (1978) organizational learning perspective informed the analysis of learning embedded in organizational routines.

2.5 Conceptual Model Development

The model integrated the identified constructs and relationships into a process-oriented framework. Development involved identifying the principal diffusion mechanisms, examining their interrelationships, and organizing them into an explanation of pedagogical transformation. The five mechanisms were individual innovation initiation, interpersonal knowledge diffusion, collective pedagogical adaptation, collaborative pedagogical institutionalization, and collective learning culture formation.

Each mechanism was examined in relation to its theoretical foundations, characteristics, and contribution to the process. Their relationships were expressed through conceptual propositions explaining how innovations may be communicated, observed, adopted, adapted, and incorporated into shared practices. The model also considered leadership, digital infrastructure, professional trust,

teachers' digital pedagogical capabilities, and opportunities for professional interaction as conditions that may facilitate or constrain diffusion.

The model was assessed through an author-led conceptual examination. The authors independently reviewed each proposed mechanism against the theoretical perspectives underpinning the study, particularly diffusion of innovations, social learning, communities of practice, and organizational learning. Three aspects were examined: theoretical consistency, to determine whether each mechanism aligned with its supporting theoretical concepts; conceptual coherence, to assess whether the five mechanisms formed a logically connected process; and explanatory contribution, to evaluate whether the model clarified how individual innovations could develop into collective pedagogical practices. The examination also considered recursive interactions, contextual adaptation, and variations in adoption to avoid presenting diffusion as a strictly linear or uniform process. This assessment was conducted as a theoretical examination rather than an external expert validation or empirical test. The resulting framework explains how individual digital literacy innovations may contribute to a sustainable collective learning culture in primary schools.

3. Results

3.1 Conceptualizing Digital Literacy Innovation

Digital literacy in education extends beyond teachers' abilities to operate digital technologies. It also involves making pedagogically informed decisions about selecting, evaluating, and using digital resources to achieve learning objectives and address students' needs. Wohlfart & Wagner (2023) emphasize the importance of understanding teachers' digital literacy within broader technology integration frameworks, including Technological Pedagogical Content Knowledge (TPACK). Similarly, Wider et al. (2026) highlight its contribution to instructional co-design, interaction, and reflective teaching.

Building on this perspective, this study introduces digital literacy innovation as the purposeful application of digital knowledge, resources, and strategies to develop or improve teaching practices. Unlike digital competence, which concerns teachers' capabilities, digital literacy innovation emphasizes the pedagogical practices emerging from those capabilities. For example, a Grade IV teacher may introduce digital reading materials with audio features to support students' reading comprehension and pronunciation. After implementing the materials, the teacher shares the experience, instructional strategies, and students' responses with colleagues. Other teachers may then explore the materials, adapt them to their respective subjects or classrooms, and collaboratively evaluate their instructional value. As the practice becomes part of regular collaborative planning and professional exchange, it may gradually contribute to a shared culture of pedagogical learning. This example illustrates how an individual digital literacy innovation can develop into a collective practice through communication, adaptation, institutionalization, and sustained professional learning.

Drawing on Rogers (2003), innovation is understood as a practice perceived as new or meaningfully different within a particular social context. Accordingly, digital literacy innovation is defined as an individually initiated pedagogical practice that can be communicated, observed, adopted, and adapted by other teachers. This definition establishes innovation diffusion as a social and pedagogical process through which individual practices may become shared professional practices.

3.2 Individual Innovation Initiation

Individual innovation initiation marks the beginning of the diffusion process, occurring when a teacher develops a digital pedagogical practice in response to an instructional need or opportunity. This

process involves recognizing learning challenges and identifying how digital resources can improve student engagement, participation, collaboration, or access to learning materials.

Innovation requires more than selecting technological tools. Through the Technological Pedagogical Content Knowledge (TPACK) framework, teachers connect technological possibilities with pedagogical strategies and subject content (Mishra & Koehler, 2006). Burke et al. (2025) emphasize that digital innovation creates meaningful learning experiences through personalization, authenticity, and co-creation. Similarly, Frei-Landau et al. (2022) highlight teachers' perceptions and decisions in mobile-learning adoption.

Within this model, initiation involves three activities: pedagogical problem recognition**,** identifying instructional challenges; digital-pedagogical design**,** selecting resources aligned with learning objectives; and initial pedagogical enactment and reflection, implementing and evaluating the practice. However, individual innovation does not guarantee wider adoption. Its diffusion depends on visibility, perceived relevance, and compatibility with colleagues' practices (Rogers, 2003). Thus, this mechanism establishes an initial pedagogical innovation that can subsequently be communicated, observed, and evaluated through interpersonal professional interactions.

3.3 Interpersonal Knowledge Diffusion

Interpersonal knowledge diffusion explains how an individual teacher's digital pedagogical innovation becomes accessible to colleagues through professional interactions. Drawing on Rogers (2003), diffusion occurs through communication channels within a social system. In schools, these channels include teacher meetings, workshops, classroom observations, informal discussions, and digital communication platforms.

Rodríguez-Triana et al. (2020) demonstrate how teachers' interactions, knowledge sharing, and collaborative design contribute to pedagogical innovation. Similarly, Liu et al. (2024) highlight the relationship between professional learning communities and digital instructional integration. These findings emphasize that diffusion involves communicating pedagogical purposes and experiences, rather than simply distributing technological resources.

This mechanism involves three processes: innovation visibility and awareness, through demonstrations and shared materials; pedagogical explanation and knowledge exchange, through discussions of instructional purposes, procedures, and potential benefits; and professional discussion and preliminary evaluation, through which teachers assess an innovation's relevance to their contexts. However, awareness does not necessarily lead to adoption. Teachers may interpret innovations differently depending on their needs, experiences, and available resources. Therefore, interpersonal knowledge diffusion creates professional awareness and opportunities for evaluation, preparing the innovation for subsequent collective pedagogical adaptation.

3.4 Collective Pedagogical Adaptation

Collective pedagogical adaptation explains how teachers move from awareness of an innovation toward its adoption and contextual modification. Rather than reproducing an original practice, teachers reinterpret it according to instructional objectives, students' needs, subject content, and available resources.

Rogers' (2003) concept of reinvention explains how users modify innovations during adoption. The TPACK framework (Mishra & Koehler, 2006) further highlights the integration of technological, pedagogical, and content knowledge in adapting digital practices. Bandura's (1977) social learning theory explains how teachers acquire instructional ideas through observation, while Wenger's (1998) communities of practice perspective emphasizes shared participation and negotiation of professional knowledge.

This mechanism involves three processes: contextual adoption, whereby teachers experiment with an innovation; pedagogical reinterpretation and modification, through which they adjust instructional procedures and digital resources; and collaborative refinement, involving feedback and shared evaluation. For example, after a Grade IV teacher introduces digital reading materials with audio features, a Grade III teacher may adopt the same approach but select shorter texts and slower audio playback to accommodate students' reading abilities. Meanwhile, a Grade V teacher may use more complex texts and add comprehension questions after the listening activity to encourage deeper understanding. These adjustments illustrate how teachers modify an innovation according to their students' learning needs, grade levels, and instructional objectives. Through collaborative discussion, they can exchange feedback, compare students' responses, and further refine their teaching strategies. These processes allow innovations to develop through collective experimentation rather than exact imitation. However, adaptation does not guarantee institutionalization. Some practices may remain temporary or be discontinued. Nevertheless, collectively refined innovations provide a foundation for collaborative pedagogical institutionalization, where shared practices become increasingly embedded in school routines.

3.5 Collaborative Pedagogical Institutionalization

Collaborative pedagogical institutionalization explains how adapted digital pedagogical practices become embedded in a school's professional routines and organizational arrangements. Drawing on Argyris and Schön (1978), individual learning becomes organizational learning when knowledge is incorporated into shared actions, routines, and practices. Admiraal et al. (2021) similarly emphasize collaborative learning, shared visions, and leadership in sustaining school-based professional development.

This mechanism involves three processes: integration into collaborative planning, whereby teachers incorporate adapted innovations into shared lesson designs and instructional discussions; formalization of professional learning routines, through recurring activities such as peer observation, mentoring, and professional learning communities; and organizational support and shared accountability, involving leadership, collaboration time, digital infrastructure, and professional development opportunities. Liu et al. (2022) further demonstrate the relevance of professional learning communities to teacher innovation.

Importantly, institutionalization does not require identical digital tools or teaching procedures. It establishes sustainable collaborative structures while preserving teachers' professional autonomy to adapt practices. Moreover, formal meetings alone do not guarantee meaningful collaboration; sustained pedagogical reflection remains essential. Thus, institutionalization reduces dependence on individual initiatives and provides an organizational foundation for collective learning culture formation.

3.6 Collective Learning Culture Formation

Collective learning culture formation represents the fifth and final mechanism in the proposed model. It explains how collaborative pedagogical practices become enduring patterns of shared learning within a school community. At this stage, knowledge sharing, instructional experimentation, and reflective dialogue become recognized professional norms rather than activities dependent on individual teachers or temporary projects.

Drawing on Wenger's (1998) concept of communities of practice, collective learning develops through sustained participation, shared meaning, and the creation of common professional resources. In primary schools, teachers gradually recognize that instructional challenges can be addressed collectively and that pedagogical knowledge should be shared across classrooms.

This mechanism differs from institutionalization. While institutionalization embeds collaboration in organizational structures and routines, culture formation involves internalizing shared values and

expectations that shape everyday professional behavior. For example, a school may formally schedule regular meetings for teachers to discuss the use of digital reading materials with audio features. This represents institutionalization because collaboration has become part of the school's established routine. However, a collective learning culture becomes evident when teachers voluntarily share their classroom experiences, discuss students' responses, exchange modified reading materials, and seek colleagues' feedback, even beyond scheduled meetings. In this situation, collaboration is no longer driven solely by formal requirements but has become part of teachers' shared professional values and everyday practices. Zhang et al. (2022) demonstrate that meaningful professional learning communities depend not merely on regular meetings but also on shared vision, substantive collaboration, supportive leadership, and an innovative learning orientation. Similarly, Babichenko et al. (2024) emphasize dialogue and social interaction in collaborative teacher inquiry.

Three interconnected processes characterize this mechanism: internalizing collaborative learning values, reproducing shared inquiry practices, and developing collective ownership of pedagogical improvement. Importantly, collective learning does not require identical technologies or teaching procedures. Rather, it reflects a shared commitment to learning from colleagues, evaluating instructional practices, and continuously improving teaching. Thus, collective learning culture represents the broader organizational outcome of sustained digital pedagogical innovation diffusion.

3.7 Integrative Conceptual Model and Theoretical Propositions

The proposed model integrates five mechanisms explaining how individual digital pedagogical innovation may contribute to a collective learning culture: individual innovation initiation, interpersonal knowledge diffusion, collective pedagogical adaptation, collaborative pedagogical institutionalization, and collective learning culture formation.

Individual innovation initiation begins when a teacher identifies an instructional need and develops a digital pedagogical practice. However, classroom-level innovation does not automatically produce wider change; diffusion depends on visibility and professional communication (Rogers, 2003). Interpersonal knowledge diffusion allows colleagues to observe, discuss, and evaluate the practice. Awareness is distinct from adoption. Collective pedagogical adaptation occurs when teachers experiment with an innovation and modify it to suit their contexts. Rogers' (2003) concept of reinvention and Bandura's (1977) observational learning explain this movement from exposure to reconstruction.

Adapted practices may become sustainable through collaborative pedagogical institutionalization. Collaborative planning, professional learning activities, and organizational support can embed practices in school routines, connecting professional interaction with organizational learning (Argyris & Schön, 1978). However, formal structures alone do not establish a collective learning culture. This outcome emerges when knowledge exchange, experimentation, reflection, and improvement become shared professional values and everyday behaviors. Wenger's (1998) communities of practice perspective explains how sustained participation develops shared meanings and professional repertoires. Such a culture does not require uniform technologies or procedures.

Development is shaped by leadership, digital infrastructure, professional trust, teachers' digital pedagogical capabilities, interaction opportunities, and organizational culture. These contextual influences operate throughout the entire diffusion process. The process is dynamic rather than strictly linear: teachers may revise or discontinue practices, while collective experience may stimulate new initiatives. For example, feedback from colleagues who adapt digital reading materials with audio features for their own classrooms may encourage the original Grade IV teacher to revise the materials, adjust audio playback, or introduce additional comprehension activities. This feedback loop illustrates how collective experience can return to the initial innovation stage, generating further pedagogical improvement.

The model generates five theoretical propositions:

P1. The visibility and communicability of individual digital pedagogical innovations enable their transition from isolated classroom practices into shared professional knowledge.

P2. Interpersonal knowledge diffusion creates opportunities for evaluation and experimentation, while contextual adaptation enables innovations to inform diverse instructional practices.

P3. Collaborative refinement of adapted practices increases the likelihood that they become embedded in recurring professional routines and organizational arrangements.

P4. Sustained collaborative routines, supported by shared values and meaningful teacher participation, enable collective learning culture formation.

P5. Leadership, infrastructure, professional trust, teacher capabilities, interaction opportunities, and organizational culture shape all five mechanisms.

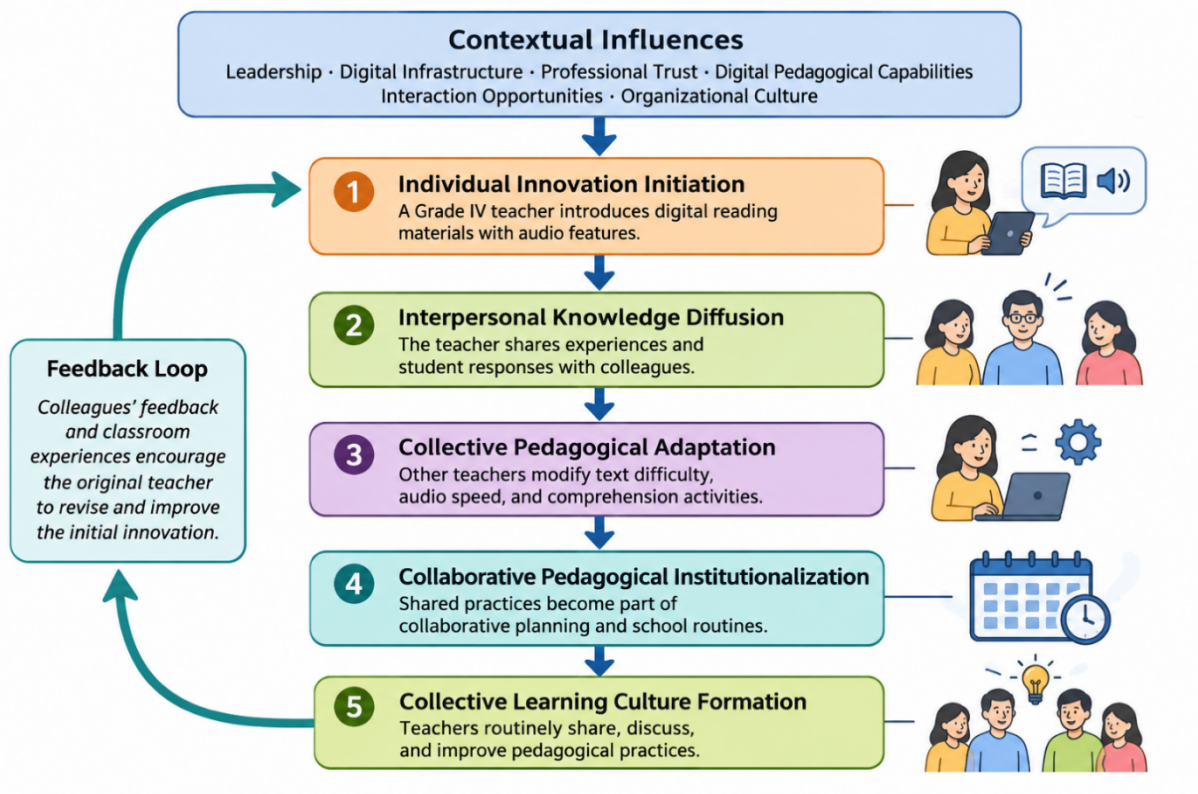

Figure 1
Proposed Model of Digital Literacy Innovation Diffusion

Therefore, the model extends digital literacy beyond individual competence and technology use by explaining how pedagogical innovation develops into sustained professional learning. It connects diffusion theory with social learning, organizational learning, and communities of practice.

4. Discussion

The proposed model extends Rogers' (2003) Diffusion of Innovations theory by explaining what may happen beyond the adoption of an innovation. While Rogers provides a theoretical account of how innovations spread through communication channels within a social system over time, the proposed model further explains how adopted practices can develop into sustained collective pedagogical routines. In this process, adoption does not simply involve individual teachers deciding to use an innovation; it also involves sharing experiences, adapting practices through collaboration, and incorporating collectively refined approaches into school activities. For example, when teachers adopt and modify digital reading materials with audio features, their collaborative experiences may lead to

regular discussions, shared instructional planning, and continuous evaluation of their classroom practices. Over time, these activities may become established professional routines and reflect shared values of collaboration and pedagogical improvement. Thus, the model contributes a more explicit explanation of the transition from individual innovation adoption to collective pedagogical institutionalization and learning culture formation, while recognizing that this development depends on social interaction and organizational conditions rather than occurring automatically.

The model also demonstrates the complementary roles of social learning and professional collaboration. Bandura's (1977) social learning theory explains how teachers may learn through observing and modeling colleagues' practices, while Wenger's (1998) communities of practice framework clarifies how shared participation and professional interaction contribute to the development of collective knowledge. Furthermore, Argyris and Schön's (1978) organizational learning perspective helps explain how collaborative practices can become embedded in school routines and contribute to longer-term cultural change.

Practically, the model suggests that schools should create opportunities for teachers to demonstrate, discuss, adapt, and reflect on digital pedagogical innovations. Leadership support, professional trust, adequate infrastructure, and opportunities for collaboration are important conditions for sustaining this process. However, the proposed mechanisms should not be interpreted as a fixed sequence. Innovation diffusion may involve different adoption rates, contextual adaptations, resistance, or discontinuation. This study also has a contextual limitation: although the model focuses on primary schools, some of the literature informing its development comes from other educational levels. Therefore, the relevance of these theoretical insights to primary school settings, where students' developmental characteristics and instructional needs may differ, requires further investigation. Since this study develops a conceptual model through literature synthesis rather than empirical testing, its explanatory propositions and applicability to primary school contexts require examination through future empirical research.

5. Conclusion

This study proposes a conceptual model explaining how individual digital literacy innovations can diffuse into collective pedagogical practices and contribute to the development of a collective learning culture in primary schools. The model identifies five interconnected mechanisms: individual innovation initiation, interpersonal knowledge diffusion, collective pedagogical adaptation, collaborative pedagogical institutionalization, and collective learning culture formation. These mechanisms illustrate that the transformation of pedagogical practices depends not only on individual teachers' digital capabilities but also on communication, social learning, professional collaboration, and organizational support.

The main contribution of this study is its extension of digital literacy discourse from individual teacher competence toward collective pedagogical transformation. By integrating diffusion of innovations theory with perspectives on social learning, communities of practice, and organizational learning, the proposed model offers a framework for understanding how individual pedagogical initiatives may develop into shared and sustainable professional practices. Nevertheless, the model remains conceptual and has not yet been empirically validated. Future research should examine its applicability in primary schools by investigating how the proposed mechanisms operate across different institutional and pedagogical contexts.

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