Navigating Complexities in Practice-Based Scholarship: A Systematic Review of Networked Participatory Scholarship (2012-2025)

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Complexity
cross-boundary collaboration
Digital Scholarship
networked participatory scholarship
practice-based scholarship

This systematic review examines the evolution and implementation of Networked Participatory Scholarship (NPS) as a model for practice-based scholarship. Analysis of 25 studies (2012-2025) demonstrates NPS has evolved from simple democratization narratives to a sophisticated understanding of systemic complexities. The review introduces a Complexity Framework that identifies four interacting dimensions (individual, institutional, technical, and social) shaping the success of collaboration between scholars in diverse roles. Rather than viewing barriers and facilitators in isolation, effective NPS results from dimensional alignment that manages inherent tensions. The framework provides strategic guidance for educational professionals implementing practice-based scholarship initiatives.

The Practice-Based Scholarship Challenge

The learning technology and design field faces a fundamental tension between academic research and educational practice. As the editors of the Journal of Applied Instructional Design's (JAID) special issue note, scholars in this field "do not have the luxury of looking inward and focusing on their own pet interests that are disconnected from the realities of educational practice" (McDonald et al., 2025, p. 1). This challenge reflects a broader concern that traditional scholarship, which emphasizes publication in peer-reviewed journals and presentations at academic conferences, often fails to engage meaningfully with practitioners who work to improve teaching and learning experiences.

This research-practice disconnect creates missed opportunities for innovation and sustainable educational improvement. While researchers develop sophisticated theories and conduct rigorous studies, practitioners struggle with immediate challenges that could benefit from scholarly insight. Conversely, practitioners develop practical wisdom and innovative solutions that seldom inform academic research or theory development. This separation undermines the field's potential to create meaningful change and reduces researchers' understanding of real-world contexts and practitioners' access to evidence-based approaches.

Contemporary educational challenges, from rapid technological change to evolving student populations to global disruptions, require collaborative approaches that bridge the research-practice divide. Neither traditional academic research conducted in isolation nor practitioner innovation without theoretical grounding proves sufficient for addressing the complex, dynamic problems currently facing educational institutions. The field requires models of practice-based scholarship that effectively connect academic expertise with practical knowledge in sustainable, mutually beneficial ways.

Networked Participatory Scholarship as a Bridge

Networked Participatory Scholarship (NPS) represents a significant approach to practice-based scholarship that leverages digital technologies to facilitate scholarly collaboration. This systematic review focuses on Veletsianos and Kimmons' (2012) foundational framework, which conceptualizes NPS as "scholars' participation in online social networks to share, reflect upon, critique, improve, validate, and otherwise develop their scholarship" (p. 766). This definition emphasizes the participatory nature of digital scholarship, moving beyond simple technology adoption to examine how online networks transform the fundamental processes of scholarly work.

While Veletsianos and Kimmons' (2012) definition centers on higher education stakeholders rather than explicitly addressing practitioners, we argue that the concept of "scholar" in NPS practice extends beyond traditional academic researchers. Empirical NPS studies have documented participants, including K-12 teachers, instructional designers, student affairs professionals, administrators, and practicing professionals pursuing advanced degrees, all of whom are engaged in systematic inquiry and knowledge development about their professional practice. When scholars network to "share, reflect upon, critique, improve, validate, and otherwise develop their scholarship," these activities characterize what reflective practitioners do when they systematically examine and improve their practice.

Our contribution lies in examining how NPS functions when these diverse scholarly roles interact. Rather than treating practitioners as passive consumers of research, this review examines the conditions that enable meaningful collaboration when practitioners engage as scholars, contributing knowledge from their practice-based insights to networked scholarly discourse. Our Complexity Framework addresses systemic factors that enable or constrain such collaboration, recognizing that effective connections between research and practice emerge when diverse participants bring complementary forms of expertise to shared scholarly inquiry.

Veletsianos and Kimmons' own framing supports this expansive interpretation. They define scholars as "individuals who participate in teaching and/or research endeavors (e.g., doctoral students, faculty members, instructors, and researchers)" (p. 767), explicitly including diverse educational roles beyond traditional faculty positions. Their work builds on Boyer's (1990) reconceptualization of scholarship, which includes not only the scholarship of discovery but also the scholarships of integration, application, and teaching. Boyer's scholarship of application proves particularly relevant for practice-based scholarship, as it emphasizes the connection between scholarly knowledge and practical problems, and engaging with communities beyond academia. This theoretical foundation supports examining how practitioners engaged in systematic inquiry about their professional practice participate as scholars in networked environments, contributing practice-based knowledge to academic research. This framing acknowledges that we extend NPS principles to examine cross-boundary collaboration while remaining grounded in the foundational concept of scholars networking about scholarship. Our systematic review of 25 studies demonstrates how NPS has evolved in practice to encompass increasingly diverse participant roles, providing an empirical foundation for understanding the conditions under which such collaboration succeeds or fails.

The theoretical foundation of NPS draws on this broadened conception of scholarship as well as learning ecology theory (Bronfenbrenner, 1976), social learning theory (Bandura, 1977), open educational practices frameworks (Cronin & MacLaren, 2018), and critical digital pedagogy perspectives (Freire, 1970). The synthesis of these theoretical perspectives positions NPS as a complex socio-technical phenomenon that involves not only the use of technology but also fundamental changes in scholarly identity, community membership, and knowledge validation processes. This multidimensional understanding guides our analysis of how NPS has evolved from its initial conceptualization to current implementations in educational contexts.

NPS demonstrates unique advantages for addressing practice-based scholarship challenges by enabling real-time collaboration, breaking down geographic and institutional barriers, and creating spaces for authentic dialogue among scholars in diverse roles, including researchers and practitioners. NPS leverages technical platforms such as Twitter, academic social networking sites like LinkedIn, and collaborative digital tools like Google Docs as enabling infrastructure. While these platforms provide essential technical affordances, sustained collaboration requires alignment across individual competencies, institutional policies, technical capabilities, and social norms. This strategic alignment enables participants to contribute and

benefit through open, real-time collaboration across institutional and geographic boundaries, opportunities that traditional scholarship structures often fail to provide.

Systematic Review Purpose and Approach

Despite growing interest in digital scholarship and networked learning, no comprehensive review exists that tracks the evolution of NPS, both theoretically and in practice, and focuses on its potential for enabling collaboration among scholars in diverse roles. The significance of our research lies in its potential to inform evidence-based approaches to implementing NPS in educational settings amid rapid technological change. As educational institutions increasingly recognize the importance of public engagement, collaborative research, and knowledge sharing, it is crucial to understand how NPS functions in practice to develop effective policies and support systems.

This systematic review examines what NPS could look like under various circumstances (McDonald et al., 2025), adopting the facilitative approach promoted by JAID. Rather than prescribing universal solutions, we analyzed diverse implementations to understand the conditions that enable or constrain meaningful collaboration through digital networks. Our analysis suggests that successful NPS emerges not from addressing isolated barriers or leveraging individual facilitators, but from navigating and addressing complex, interacting systems of tensions.

Research Questions

This systematic review addresses five critical research questions that examine NPS as a model for practice-based scholarship:

- How has Networked Participatory Scholarship (NPS) evolved as a model for practice-based scholarship?
- How does NPS enable collaboration among scholars and practitioners through digital networks?
- What implementation patterns and connection mechanisms enable effective collaboration?
- What empirical evidence exists regarding NPS impacts on collaborative scholarly work?
- What systemic complexities accompany meaningful NPS implementation?

Through a systematic analysis of 25 studies published between 2012 and 2025, this review contributes to the theoretical understanding of NPS evolution and provides practical guidance for educational professionals and institutions seeking to implement NPS approaches that strengthen connections between research and practice in educational contexts. A key contribution is the Complexity Framework for practice-based scholarship, demonstrated through worked examples that show how systematic dimensional diagnosis reveals the root causes of implementation challenges and guides coordinated intervention strategies.

Methodology

This systematic review employed a dual-method search strategy that combined traditional and innovative approaches. We conducted comprehensive database searches using established methods and employed Elicit, an emerging AI-assisted systematic review tool, to expand coverage and test new methodological approaches. The traditional search strategy employed comprehensive database searches across Academic Search Complete (5 results), Education Source (7 results), and Google Scholar (19 results) using the phrase "networked participatory scholarship.” The AI-assisted approach employed Elicit to match our research questions to approximately 500 papers in the Semantic Scholar corpus, rating each according to predefined criteria and yielding 21 suitable results. After deduplication of the traditional search results and Elicit recommendations, we selected 41 sources for full-article review. We evaluated the sources using the following inclusion criteria:

- Focus: Examined NPS or closely related digital scholarly practices within educational contexts*
- Study type: Either empirical research (qualitative, quantitative, or mixed methods) or theoretical papers with substantial NPS conceptual development
- Scope: Addressed academic social networks and digital scholarly communication within educational/academic settings
- Depth: Focused on scholarly practices and participation beyond technical aspects or general social media use
- Implementation focus: Provided detailed NPS implementation analysis through case studies or systematic analysis
- Timeline: Published in 2012 or later** in peer-reviewed English-language sources, beginning with Veletsianos and Kimmons' foundational articulation of NPS
- Foundation: Had a clear theoretical or empirical foundation beyond opinion pieces or editorials

*We included studies examining the conceptual substance of networked scholarly participation even when authors used varied terminology (e.g., "social scholarship," "digital scholarly practices").

** The 2012 starting point was selected to capture the evolution of NPS from Veletsianos and Kimmons' (2012) foundational conceptualization through current implementations, enabling analysis of both theoretical development and practical applications over the subsequent decade.

After full-text review by both authors, 23 studies met all inclusion criteria. We identified eight additional articles through citation chaining and reviewed their full texts using the established inclusion criteria. We selected two for inclusion, forming a final analysis corpus of 25 sources. This dual approach ensured comprehensive coverage while allowing us to compare traditional and emerging systematic review methodologies.

Comparative Analysis: Traditional vs. AI-Assisted Search Approaches

While our primary focus was on the systematic review and the research questions, our dual-method approach offers secondary methodological insights relevant to educational professionals conducting systematic reviews. The dual approach revealed complementary strengths. Traditional database searches using the exact phrase "networked participatory scholarship" identified highly relevant sources but required extensive manual screening. Elicit's AI-assisted approach matched our research questions to broader conceptual themes rather than exact terminology. This semantic matching identified papers that traditional searches missed because they used related terms (e.g., "social scholarship," "digital scholarly practices") without explicitly mentioning "networked participatory scholarship."

The AI-assisted tool offered two key search advantages: semantic understanding of conceptually relevant papers, regardless of the terminology used, and identification of recent publications that were not yet fully indexed in traditional databases. However, important limitations emerged. The AI-assisted search missed several foundational papers that traditional searches identified, automated relevance ratings required manual validation as they sometimes misclassified peripheral papers, and Elicit's reliance on the Semantic Scholar corpus underrepresented some specialized education databases. Effective use of AI tools also requires substantial domain expertise to formulate appropriate research questions and critically evaluate automated recommendations.

Our experience suggests that hybrid approaches that combine traditional database searches with AI-assisted semantic search provide the most comprehensive coverage. We estimate that the dual approach identified approximately 20% more relevant sources than either method alone. Using Elicit required roughly the same time and effort as the traditional process, due to the need to review and correct the tool’s outputs and the inability to provide corrective feedback to the tool during data extraction and analysis. This exploratory comparison demonstrates the potential of AI-assisted methods while highlighting the continued importance of traditional approaches and human expertise in systematic reviews.

Data Extraction and Analysis

Data extraction captured study characteristics, including research design, participant demographics, institutional settings, specific NPS approaches implemented, and key findings related to barriers, facilitators, and impacts on collaboration. Table 1 provides an overview of the final study corpus characteristics.

Table 1

Characteristics of Included Studies (n=25)

Study Characteristic	Category	Count and Percentage
Study Design	Theoretical/Conceptual	9 (36%)
	Qualitative	8 (32%)
	Mixed Methods	5 (20%)
	Quantitative	3 (12%)
Educational Context	Higher Education only	24 (96%)
	Higher Education + K-12	1 (4%)
Geographical Scope	North America	11 (44%)
	International/Global	8 (32%)
	Europe/UK	4 (16%)
	Multiple Regions	6 (24%)
Primary Platform Focus	Twitter	11 (44%)
	Multiple Platforms	6 (24%)
	Academic Social Networks	3 (12%)
	Platform Agnostic	5 (20%)
Research Approach	Theoretical	9 (36%)
	Interviews/Thematic Analysis	4 (25%)
	Social Network Analysis	3 (19%)
	Surveys	3 (19%)

	Ethnography	2 (13%)
	Data Mining	2 (13%)
	Other	2 (13%)

Table 2 provides an overview of the primary theoretical focus of each paper.

Table 2

Categorizing Papers by Their Primary Theoretical Focus

Category	Papers	Key Focus
Digital Scholarship Frameworks	Glass (2015)	Analysis of digital platforms and tools for scholarly work
	Kimmons (2015)	Four emergent forms of technology-influenced scholarship, including digital scholarship
	Manca (2017)	Socio-technical analysis of ResearchGate and Academia.edu platforms
Open Educational Practices	Cronin & MacLaren (2018)	Comprehensive review of OEP theory and relationship to NPS
Critical Digital Pedagogy/Power & Equity	Stewart (2016)	Vulnerability and power dynamics in academic Twitter
	Koseoglu & Bozkurt (2018)	Critical perspectives on power and pedagogy in #DigPed networks
	Greenhow et al. (2019)	Equity issues, harassment, and digital divides in social scholarship
Learning Ecology Theory	Greenhow et al. (2019)	Twitter backchannels as expansion of learning ecologies
NPS Foundational/Theoretical	Kimmons & Veletsianos (2016)	NPS in conference contexts
	Veletsianos & Kimmons (2016)	Original NPS framework application
	Semingson et al. (2018)	Social scholarship and networked scholar development
	Belikov & Kimmons (2019)	Scholarly identity in digital contexts

Identity & Professional Development	Veletsianos & Stewart (2016)	Intentional self-disclosure in networked scholarship
	Jordan & Weller (2018)	Benefits/problems of academic social networking
	Jordan (2020)	Academic identity fragments across platforms
	Pasquini & Eaton (2021)	Professional online identity development
Community Building & Implementation	Vigurs (2016)	Twitter for doctoral student community participation
	Shah & Cox (2017)	Academic Twitter use and community formation
	Eutsler et al. (2023)	Institutional hashtag community building
Empirical NPS Studies	Stewart (2015)	Ethnographic study of networked scholarly practices
	Paiva & Quintas-Mendes (2024)	Participatory culture among educators
	Romero-Hall et al. (2024)	Survey of higher education scholars' social media use
	Ebersole et al. (2025)	#TPACK network analysis
Practice Integration	Cooper & Condie (2016)	Digital publishing as NPS implementation
	Smith & Buchanan (2019)	Curriculum integration of social media

Thematic analysis employed an iterative approach that alternated between individual study findings and cross-study patterns, utilizing qualitative synthesis methods adapted from Sandelowski & Barroso (2007) to interpret findings across studies. Initial coding focused on identifying how each study addressed the four research questions, followed by the identification of patterns across studies to understand NPS evolution, implementation variations, and systemic complexities. We incorporated methodological refinements suggested by Herber & Barroso (2020), particularly their emphasis on iterative thematic analysis. We paid particular attention to contradictions and contextual factors that influenced outcomes, consistent with McDonald et al.'s (2025) facilitative approach.

Results

This section addresses Research Questions 1-3 by examining how NPS has evolved theoretically (RQ1), how different platforms and affordances enable collaboration (RQ2), and what implementation patterns have emerged across contexts (RQ3).

Theoretical Evolution Timeline

The theoretical understanding of Networked Participatory Scholarship has evolved significantly since Veletsianos and Kimmons' (2012) foundational framework, moving from simple democratization narratives to sophisticated analyses of power, identity, and systemic complexity. This evolution reflects the maturation of NPS practices and a deeper empirical understanding of how networked technologies function in educational contexts. Table 3 shows the key studies and their theoretical focus in each phase of evolution.

Table 3

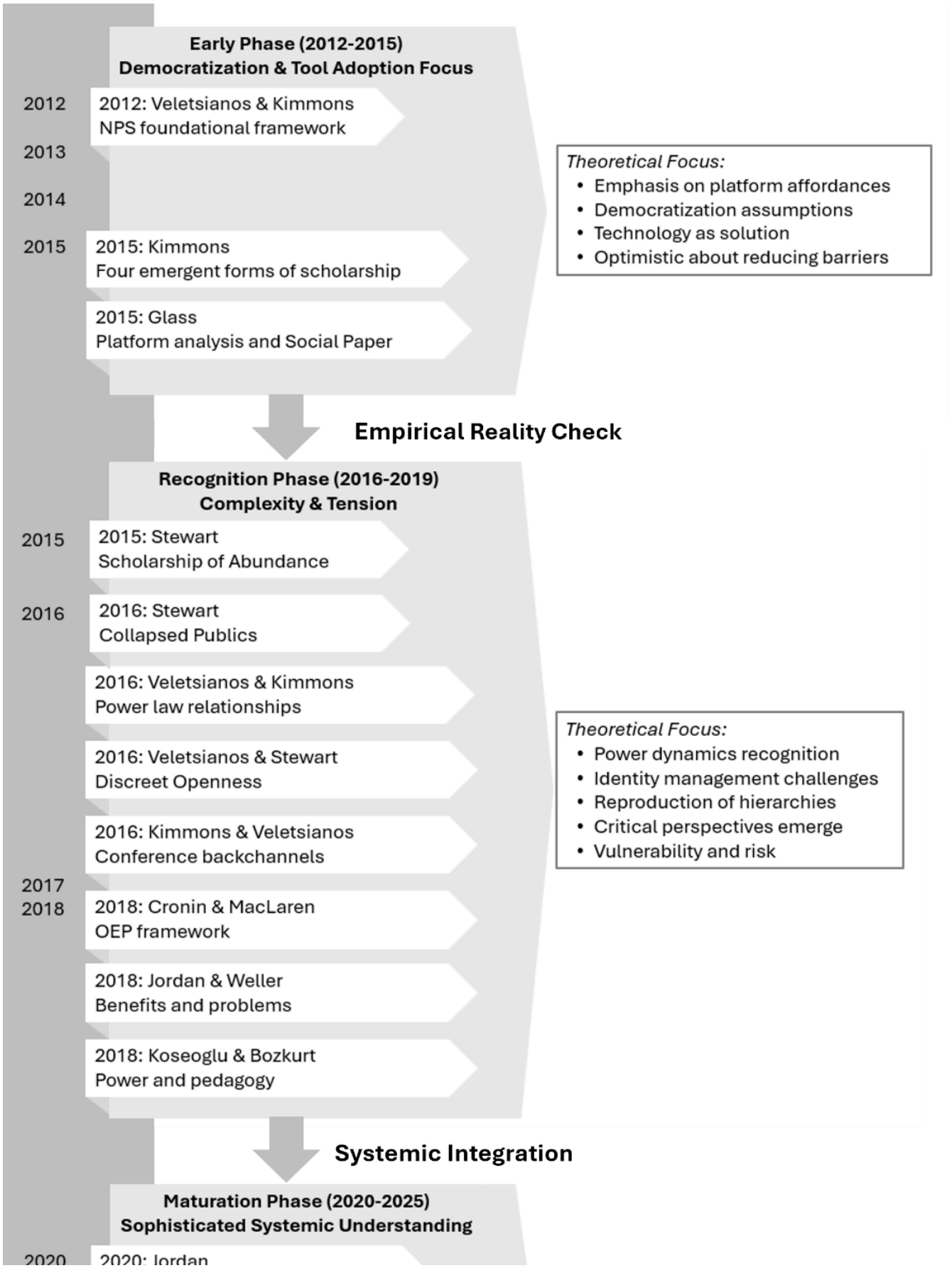
Evolution of NPS Theoretical Understanding

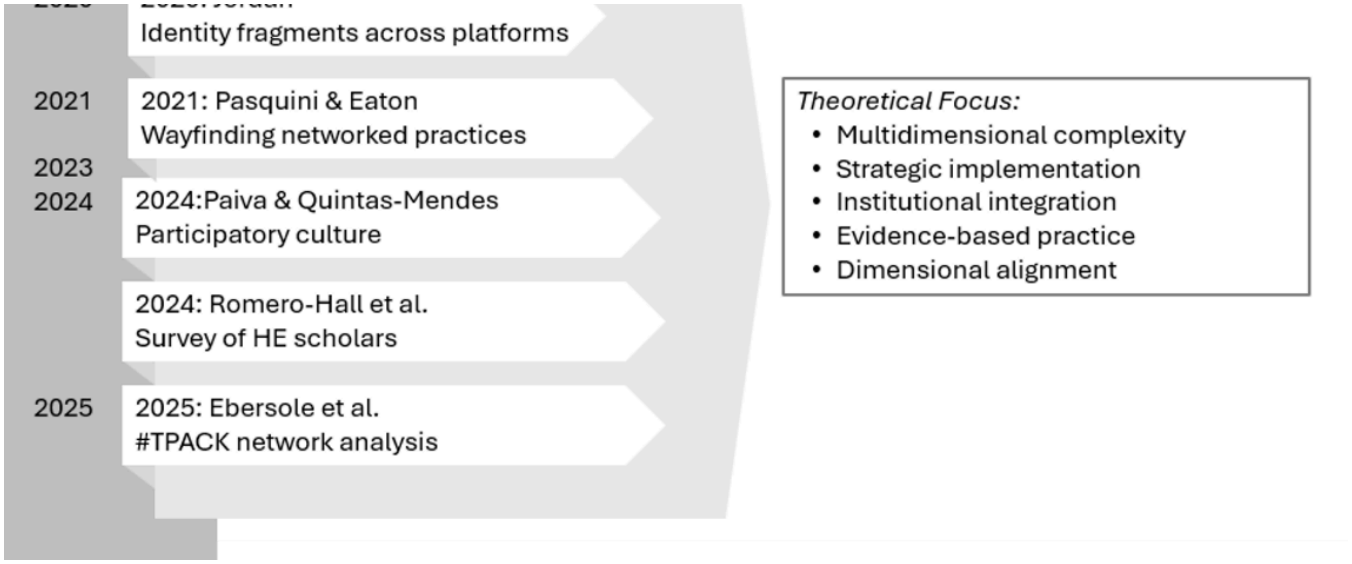
Phase	Years	Key Studies	Theoretical Focus
Early Phase: Democratization & Tool Adoption	2012-2015	Veletsianos & Kimmons (2012) Kimmons (2015) Glass (2015)	• Platform affordances • Democratization potential • Technical solutions
Recognition Phase: Complexity & Tensions	2016-2019	Stewart (2015, 2016) Veletsianos & Kimmons (2016) Veletsianos & Stewart (2016) Kimmons & Veletsianos (2016) Cronin & MacLaren (2018) Jordan & Weller (2018) Koseoglu & Bozkurt (2018)	• Power dynamics • Identity management • Systemic tensions • Critical perspectives
Maturation Phase: Systemic Understanding	2020-2025	Jordan (2020) Pasquini & Eaton (2021) Romero-Hall et al. (2024) Paiva & Quintas-Mendes (2024) Ebersole et al. (2025)	• Multidimensional complexity • Strategic implementation • Institutional integration • Evidence-based practice

Figure 1 illustrates this theoretical evolution visually, demonstrating how NPS understanding has progressed from early tool-focused optimism (2012-2015) to the recognition of inherent tensions (2016-2019) and ultimately to a mature systemic analysis (2020-2025). The timeline shows both the temporal progression and the conceptual deepening that characterizes each phase. Notably, the middle Recognition Phase contains the highest concentration of empirical studies, reflecting the field's intensive examination of the complexities that emerged when early democratization assumptions met the realities of implementation. The current Maturation Phase builds on this empirical foundation to develop sophisticated frameworks, including the Complexity Framework presented in this review, that enable strategic navigation of multidimensional challenges rather than seeking to eliminate them.

Figure 1

Evolution of Networked Participatory Scholarship Theory (2012-2025)


Early Phase (2012-2015)
Democratization & Tool Adoption Focus
2012
2012: Veletsianos & Kimmons
NPS foundational framework
2013
2014
2015
2015: Kimmons
Four emergent forms of scholarship
2015: Glass
Platform analysis and Social Paper
Theoretical Focus:
• Emphasis on platform affordances
• Democratization assumptions
• Technology as solution
• Optimistic about reducing barriers
Empirical Reality Check
Recognition Phase (2016-2019)
Complexity & Tension
2015
2015: Stewart
Scholarship of Abundance
2016
2016: Stewart
Collapsed Publics
2016: Veletsianos & Kimmons
Power law relationships
2016: Veletsianos & Stewart
Discreet Openness
2016: Kimmons & Veletsianos
Conference backchannels
2017
2018
2018: Cronin & MacLaren
OEP framework
2018: Jordan & Weller
Benefits and problems
2018: Koseoglu & Bozkurt
Power and pedagogy
Theoretical Focus:
• Power dynamics recognition
• Identity management challenges
• Reproduction of hierarchies
• Critical perspectives emerge
• Vulnerability and risk
Systemic Integration
Maturation Phase (2020-2025)
Sophisticated Systemic Understanding
2020
2020: Jordan



Note. Key studies are positioned chronologically, with theoretical focus areas highlighting the conceptual deepening that occurred in each phase.

Early Phase (2012-2015): Democratization and Tool Adoption Focus

The initial conceptualization of NPS emphasized the democratizing potential of digital technologies to transform scholarly communication and reduce barriers to participation. Kimmons' (2015) analysis of "emergent forms of technology-influenced scholarship" (p. 2481) positioned NPS as the synthesis of digital, social, and open scholarship approaches, emphasizing how participatory technologies could "fundamentally change our conceptions of scholarship and the role of the scholar in society" (p. 2483). This early phase was characterized by optimistic assumptions about technology's capacity to level playing fields and create more egalitarian scholarly communities.

Glass's (2015) analysis of digital platforms exemplified this early enthusiasm, arguing that tools like Social Paper could "retool student consciousness" (p. 1) by providing alternatives to restrictive learning management systems. The focus during this period was primarily on platform affordances and technical solutions, with limited attention to the social, cultural, and institutional factors that shape implementation outcomes. Early theoretical work assumed that providing access to collaborative technologies would naturally lead to more participatory and democratic scholarly practices.

Recognition Phase (2016-2019): Complexity and Tension Acknowledgment

The middle period of NPS evolution was marked by growing recognition of the complexities and contradictions inherent in networked scholarly practices. Stewart's (2015, 2016) ethnographic studies revealed how NPS operates as what she termed the "scholarship of abundance," which exists in tension with traditional "practices of scarcity" (Stewart, 2015, p. 320). Her work demonstrated that successful networked scholarship requires navigating what she called "collapsed publics" (Stewart, 2016, p. 61), where oral and literate communication traditions merge in ways that create both opportunities and vulnerabilities for scholars.

Veletsianos and Kimmons' (2016) large-scale quantitative analysis of education scholars' Twitter use challenged early democratization assumptions by documenting "power law relationships" (p. 4) where small percentages of participants controlled disproportionate influence and attention. Their finding that the most followed 1% of scholars garnered 21% of all

followers while contributing only 7% of all tweets revealed how networked platforms could reproduce rather than eliminate traditional academic hierarchies.

This period also saw increased attention to identity and professional development challenges. Veletsianos and Stewart's (2016) analysis of scholarly self-disclosure introduced the concept of "discreet openness" (p. 1), showing how academics strategically manage personal-professional boundaries in networked environments. Their work suggested that effective NPS participation requires sophisticated identity management skills rather than simple technology adoption.

Maturation Phase (2020-2025): Sophisticated Understanding of Power, Identity, and Community

The most recent phase of NPS evolution is characterized by a nuanced understanding of how individual, institutional, technical, and social factors interact to shape implementation outcomes. Jordan's (2020) network analysis of academic identity across platforms demonstrated how scholars construct "acceptable identity fragments" (p. 167) that enable different types of engagement while managing professional risks. This study moved beyond simple barrier identification to examine the strategic identity work required for successful networked participation. Critical perspectives have become increasingly prominent, with scholars like Koseoglu and Bozkurt (2018) examining how educational narratives spread through networks while revealing hidden power structures and gatekeeping practices. Their analysis of #DigPed networks showed how even seemingly open communities can reproduce exclusionary dynamics while maintaining democratic rhetoric.

Recent empirical studies have provided a more sophisticated understanding of implementation variations. Romero-Hall et al.'s (2024) survey of higher education scholars revealed that while NPS offers valuable networking and professional development opportunities, scholars continue to face significant challenges with "visibility, transparency, feedback and recognition" (p. 1) that necessitate institutional and cultural changes beyond individual adoption. The theoretical sophistication of this recent work is evident in its attention to systemic interactions rather than isolated factors. Pasquini and Eaton's (2021) analysis of "wayfinding through networked practices" (p. 939) highlighted how successful NPS participation requires navigation across multiple dimensions of complexity, ranging from individual risk assessment to institutional policy alignment to community norm negotiation.

Platform-Mediated Collaboration Affordances

While digital platforms provide essential infrastructure, sustained collaboration requires coordination across individual, institutional, technical, and social dimensions beyond technology alone. Within this broader system, platform characteristics play a crucial mediating role. Our systematic review suggests that connections among participants are fundamentally shaped by platform affordances, with different technologies enabling distinct types of collaborative engagement. Understanding these platform-mediated mechanisms is crucial for designing effective NPS initiatives. Table 4 summarizes the key platform types, their affordances, and their benefits and limitations for collaborative engagement.

Table 4

Platform Types, Affordances, Benefits, and Limitations

Platform	Key Affordances	Collaboration Benefits	Collaboration Limitations
Twitter	• Real-time networking	• Conference expansion • Rapid resource sharing	• Surface-level engagement

	• Hashtag communities	• Serendipitous connections	• High attrition • Platform dependency
Academic Social Network Sites (SNS)	• Formal knowledge sharing • Publication access	• Direct research access • Structured Q&A • Professional profiles	• Commercial gatekeeping • Proprietary metrics • Limited practitioner adoption
Hashtag Communities	• Topic-focused networking • Sustained engagement	• Shared interest collaboration • Community support • Cross-boundary dialogue	• Elite capture • Echo chambers • Sustainability challenges

Twitter Dominance in Academic Networking

Twitter emerged as the dominant platform for NPS implementation, appearing in 11 of the 25 reviewed studies. This dominance reflects specific affordances that prove particularly valuable for collaboration among scholars in diverse roles. Twitter's real-time, public, and hashtag-organized structure enabled what Greenhow et al. (2019) termed "expansive professional learning" that transcends traditional institutional boundaries. The platform's character limit forces concise communication that can make academic discourse more accessible to practitioners, while its public nature enables serendipitous connections across disciplinary and institutional boundaries. Kimmons and Veletsianos' (2016) longitudinal analysis of education scholars' Twitter use demonstrated how the platform enabled spontaneous, opportunistic dialogue, allowing scholars to engage with diverse audiences, including practitioners, policymakers, and the general public, in ways that traditional academic venues do not support.

Conference backchannels represented one of the most successful Twitter-mediated connection mechanisms. Greenhow et al.'s (2019) analysis of AERA conference backchannels illuminated how Twitter hashtags can expand participation beyond physical attendees, creating hybrid learning environments where remote participants can engage with conference content and connect with speakers and attendees. These backchannels proved particularly valuable for early-career researchers and practitioners who might not otherwise have access to expensive professional conferences.

Academic Social Networking Sites as Complementary Spaces

While Twitter dominated real-time networking and community formation, Academic Social Networking Sites (ASNS), such as ResearchGate and Academia.edu, served complementary functions for formal knowledge sharing and scholarly identity management. Manca's (2017) socio-technical analysis revealed how these platforms support different aspects of collaboration through distinct affordances. ResearchGate's emphasis on research metrics and publication sharing enabled practitioners to access academic research directly, while its Q&A features facilitated cross-boundary knowledge exchange. Academia.edu's "Sessions" feature, which facilitates collaborative review and annotation, provides mechanisms for participants to engage with academic work in progress, creating opportunities for feedback and co-development that traditional publishing models do not support. However, these platforms also have limitations for genuine collaboration.

Manca's (2017) analysis identified concerns about "aggressive marketing practices" (p. 30) and "ghost academic reputations" (p. 31) created by proprietary metrics that may not reflect actual scholarly value or practitioner relevance.

Hashtag Community Formation and Maintenance

Hashtag-based communities represented a crucial mechanism for enabling sustained connections around shared interests or problems of practice. Our systematic review identified several successful examples of hashtag communities that facilitated collaboration across research and practice boundaries; each has distinct characteristics and sustainability factors. Ebersole et al.'s (2025) analysis of the #TPACK network highlighted both the potential and the limitations of hashtag communities for cross-boundary collaboration. While the network connected education technology researchers and K-12 practitioners globally, most interactions remained at the surface level of resource sharing rather than deep collaborative engagement. Only 36% of tweets demonstrated value-added contributions through meaningful commentary or discussion initiation.

Institutional hashtags, such as #UNTedu (Eutsler et al., 2023), illustrate how organizations can foster connections within specific contexts while navigating the challenges of sustainability and authentic engagement. Successful institutional hashtags require ongoing community management and must balance institutional promotion with genuine professional development and networking opportunities. The #DigPed community (Koseoglu & Bozkurt, 2018) exhibited sustained collaboration through hashtag organization. This community demonstrated how shared pedagogical values can create resilient communities that bridge research and practice boundaries, sustaining engagement across multiple events and years.

Implementation Patterns for Collaboration

Analysis of successful NPS implementations suggests distinct patterns that facilitate meaningful collaboration; failed implementations typically result from addressing only technical or individual factors while ignoring systemic requirements for sustainable partnership. Table 5 summarizes the key implementation patterns, characteristics, benefits, and challenges

Table 5

Platform Types, Affordances, Benefits, and Limitations

Implementation Pattern	Key Characteristics	Collaboration Benefits	Collaboration Challenges
Conference Augmentation	• Official hashtags • Hybrid participation • Real-time engagement	• Expanded access • Networking beyond attendees • Lasting relationships	• High attrition rates • Event dependency • Sustainability gaps
Resource Sharing Networks	• Collaborative curation • Open sharing • Abundance practices	• Serendipitous discovery • Intellectual exchange • Co-development	• Quality control • Attribution complexity • Participation inequality
Institutional Integration	• Systematic curriculum integration	• Sustained engagement • Legitimacy	• Policy constraints • Authenticity tensions

- Formal support
- Assessment criteria
- Scaffolded participation
- Measurement difficulties

Conference Augmentation and Hybrid Participation

Conference backchannels represented one of the most documented and successful patterns for collaboration among scholars in diverse roles through NPS. Kimmons and Veletsianos' (2016) longitudinal analysis of AERA conference participation demonstrated how Twitter backchannels can transform traditional academic conferences from closed, elite gatherings into more inclusive and participatory events. However, successful conference augmentation required more than simply creating official hashtags. Greenhow et al.'s (2019) analysis identified key factors for meaningful hybrid participation: official organizational endorsement, active moderation and community management, integration with formal conference programming, and post-conference sustainability planning. When these factors align, conference backchannels can foster lasting professional relationships and ongoing collaboration among scholars in diverse roles, including faculty researchers, graduate students, and educational professionals who might not have otherwise connected through traditional networking. However, the same studies revealed the limitations of conference-focused NPS implementation. High attrition rates between conferences (70.5% of participants didn't author another tweet the following year, as noted in Kimmons and Veletsianos' study) suggest that event-based networking requires additional mechanisms for maintaining relationships and sustaining collaboration.

Resource Sharing Networks and Collaborative Curation

Effective collaboration through NPS often emerged around the development and curation of shared resources, rather than formal research partnerships. Semingson et al.'s (2018) collaborative autoethnography demonstrated how scholars can utilize networked tools, such as Google Docs and social media, to engage in real-time collaborative writing that integrates academic research with practitioner insights. Successful resource-sharing networks depended on what Stewart (2015) identified as "practices of abundance," where participants prioritize open sharing and collaborative improvement over individual ownership and competitive advantage. Her ethnographic work revealed how these networks developed norms around attribution, remix, and collaborative development, enabling authentic intellectual exchange.

Paiva and Quintas-Mendes' (2024) interview study identified three key themes in successful resource sharing: strategic sharing based on perceived value, reciprocal interaction and dialogue, and network building that transcends immediate resource needs. Their participants emphasized "the need to find value in what is shared in networks as well as the need for these shares to have some utility for themselves or for the collectives where information and knowledge are shared" (p. 100).

Institutional Integration and Systematic Implementation

While the most successful NPS implementations emerged organically through grassroots community formation, systematic institutional integration can provide sustainability and legitimacy for collaboration. Smith and Buchanan's (2019) nursing education program represents one of the few documented examples of comprehensive NPS integration into formal academic programming. Their approach required students to engage with three social media platforms (blogging, microblogging using Twitter, and ePortfolios using WordPress) across the entire curriculum, with comprehensive orientation, faculty support, and clear assessment criteria. This systematic integration enabled sustained practitioner engagement throughout the degree program rather than episodic networking around specific courses, events, or projects.

However, formal programmatic implementation also revealed challenges that organic communities avoid. The need for extensive policy development around privacy and professional boundaries, concerns about unmoderated content creating organizational risks, and difficulties in measuring learning outcomes suggest that institutional integration requires a careful balance between formal structure and the openness that makes NPS valuable for collaboration.

Vigurs' (2016) study of part-time doctoral students demonstrated how institutions can provide scaffolding for NPS participation without constraining authentic community engagement. Her research suggested that successful institutional support includes formal workshops and guidance documents, integration into program orientation, tutor modeling and encouragement, and recognition that meaningful participation requires ongoing community engagement that extends beyond formal requirements. Vigurs' analysis indicates that sustainable collaboration through NPS requires alignment across individual, institutional, technical, and social dimensions.

From Evolution to Implementation

The theoretical evolution of NPS, from simple democratization narratives to a sophisticated understanding of systemic complexity, parallels the empirical evidence on implementation patterns. Early assumptions that providing access to collaborative technologies would naturally lead to meaningful partnerships among scholars in diverse roles have given way to recognition that successful implementation requires careful attention to platform affordances, community dynamics, and institutional contexts. The most successful implementation patterns, whether conference augmentation, resource sharing networks, or institutional integration, share common characteristics: 1) they address multiple dimensions of complexity rather than focusing solely on technical solutions, 2) they develop sustainable community engagement rather than episodic interactions, and 3) they balance formal structure with the openness that enables real collaboration.

However, the persistent challenges documented across all implementation patterns, from high attrition rates to sustainability gaps to authenticity tensions, suggest that understanding barriers and facilitators in isolation is insufficient. The evidence suggests systemic complexities that require more sophisticated analytical frameworks, which we examine in the following section.

Evidence of Impact and Effectiveness

This section addresses Research Question 4: What empirical evidence exists regarding NPS impacts on collaborative scholarly work? Our systematic review shows substantial empirical evidence for NPS impacts across multiple domains, although the evidence varies significantly in methodological rigor and scope. Analysis of documented outcomes demonstrates that NPS can create meaningful changes in teaching, research, knowledge dissemination, and community building when implementation conditions align appropriately. However, the evidence also finds significant limitations and contextual factors that influence effectiveness.

Impact Evidence by Domain

The studies in our analysis document the impacts of NPS across four primary domains: teaching and learning, research visibility and collaboration, knowledge dissemination, and professional development. Table 6 summarizes the documented impacts, types of evidence, and key contextual factors that influence outcomes.

Table 6

Documented Impacts of NPS by Domain

Impact Domain	Documented Outcomes	Evidence Type	Key Contextual Factors	Representative Studies
Teaching & Learning	• Enhanced student engagement and real-time	Qualitative, mixed methods	• Higher education focus	Vigurs (2016)

	knowledge sharing • Professional skill development • Curriculum integration	Case studies	• Graduate programs • Professional degree contexts	Greenhow et al. (2019) Smith & Buchanan (2019)
Research Visibility	• Increased citation metrics • Expanded collaboration networks • Interdisciplinary connections • Alternative impact measures	Quantitative (Social Network Analysis) Mixed methods Surveys	• Platform-dependent • Career stage variations • Disciplinary differences	Veletsianos & Kimmons (2016) Jordan (2020) Romero-Hall et al. (2024)
Knowledge Dissemination	• Broader audience reach • Public engagement • Open access promotion • Real-time knowledge transfer	Mixed methods Qualitative analysis	• Platform affordances • Content accessibility • Community receptivity	Stewart (2015) Cooper & Condie (2016) Koseoglu & Bozkurt (2018)
Professional Development	• Network expansion • Informal learning • Mentorship opportunities • Career advancement	Qualitative interviews Surveys Ethnography	• Individual agency • Institutional support • Community norms	Ahmad et al. (2017) Pasquini & Eaton (2021) Paiva & Quintas-Mendes (2024)

Teaching and Learning Impacts

The strongest empirical evidence for NPS effectiveness comes from teaching and learning contexts, particularly in professional degree programs where authentic practitioner engagement enhances educational relevance. Smith and Buchanan's (2019) systematic integration of social media across a doctoral nursing curriculum demonstrated how NPS approaches can develop students' professional networking skills while creating real-time connections with practicing professionals in their field. Vigurs' (2016) study of part-time doctoral students revealed how Twitter participation helped geographically isolated students engage with academic communities and professional development opportunities typically available only to full-time, campus-based students. The study documented specific benefits, including an enhanced sense of belonging to academic cohorts, access to wider academic communities, and ongoing motivation through peer support networks. However, teaching-related impacts are heavily dependent on institutional support and scaffolding. Students who received formal orientation and ongoing faculty mentorship showed sustained engagement, while those expected to develop NPS competencies independently often struggled with platform navigation and professional boundary management.

Research Visibility and Collaboration

Evidence for research impact presents a more complex picture, with documented benefits and significant concerns about measurement validity and equity. Veletsianos and Kimmons' (2016) large-scale analysis of education scholars' Twitter use

found that social media engagement correlated with traditional academic metrics, but also revealed extreme participation inequality, where small percentages of highly active users dominated attention and influence. Jordan's (2020) network analysis demonstrated how strategic social media use can enhance scholarly visibility across multiple platforms but also revealed that effective participation requires sophisticated identity management skills that may advantage those with existing social and cultural capital. The study documented how academics construct "acceptable identity fragments" (p. 165) that enable professional networking while protecting career interests. This suggests that research visibility benefits may not be equally accessible across career stages and demographic groups. Romero-Hall et al.'s (2024) survey of higher education scholars provided empirical validation for the benefits of networking and visibility, with participants reporting enhanced professional connections, increased opportunities for research collaboration, and improved access to diverse perspectives. However, the same study documented significant concerns about time investment, information overload, and privacy risks that limit sustained participation.

Knowledge Dissemination and Public Engagement

NPS demonstrates clear potential for expanding knowledge dissemination beyond traditional academic audiences, though evidence suggests that meaningful public engagement requires a strategic approach and ongoing commitment. Stewart's (2015) ethnographic study documented how networked scholars develop practices that prioritize open sharing and collaborative knowledge construction over traditional competitive academic approaches. Cooper and Condie's (2016) "Book of Blogs" project provided concrete evidence that digital platforms can amplify diverse voices and enable rapid knowledge dissemination across geographic boundaries. Their collaborative publication involving 83 authors from multiple countries demonstrated how NPS approaches can create new forms of scholarly communication that bridge academic research with practical applications. However, the impact of knowledge dissemination faces significant challenges related to information quality, audience engagement, and sustainability. Multiple studies have highlighted concerns about "information overload," difficulties in distinguishing high-quality contributions from promotional content, and challenges in maintaining audience attention over time.

Successful vs. Failed Implementation Cases

Analysis of implementation outcomes reveals distinct patterns that differentiate successful from failed NPS initiatives, providing empirical guidance for designing effective practice-based scholarship initiatives.

Successful Implementations

The most successful NPS implementations share several common characteristics that enable sustained collaboration. Conference backchannels represent one of the most consistently successful implementation patterns, with studies documenting increased participation, enhanced networking, and sustained professional relationships that extend beyond event boundaries. Kimmons and Veletsianos' (2016) longitudinal analysis of AERA conference backchannels revealed that success factors include official organizational endorsement, active community moderation, integration with formal programming, and post-event sustainability planning. When these factors aligned, conference backchannels created lasting professional networks that continued collaborative work throughout the year.

Smith and Buchanan's (2019) systematic integration of social media across a doctoral nursing curriculum exemplifies successful institutional implementation through comprehensive scaffolding and sustained support. Their systematic approach achieved sustained practitioner engagement and demonstrable professional skill development while maintaining authentic community participation and student agency in network building.

Institutional integration efforts showed mixed results, with success heavily dependent on alignment between formal requirements and authentic community engagement. The nursing program succeeded by providing comprehensive scaffolding while maintaining flexibility for student-directed networking and professional development.

Failed Implementations

Failed implementations typically result from addressing only technical or individual factors while ignoring institutional, social, or cultural requirements for sustainable participation. Studies consistently documented failure patterns, including initial enthusiasm followed by gradual abandonment, elite capture by highly active users, and reproduction of existing hierarchies rather than the creation of more inclusive scholarly communities.

Ebersole et al.'s (2025) analysis of the #TPACK network suggested that even well-intentioned communities can fail to achieve meaningful collaboration when structural factors limit authentic engagement. The study identified specific failure mechanisms, including paywall restrictions that limited resource accessibility, self-promotional posting that overwhelmed substantive discussion, and a lack of community support for newcomers attempting to join established networks. These findings suggest that technical platform provision alone is insufficient for creating meaningful collaborative communities. Vigurs' (2016) research showed that individual-focused interventions can fail when there are inadequate institutional and social support systems. Part-time doctoral students who received only basic Twitter training without ongoing mentorship or community integration showed limited sustained participation and reported feeling intimidated by established academic discourse patterns.

Contextual Success Factors

Our analysis indicates that NPS can have a meaningful impact on teaching, research, knowledge dissemination, and professional development when implementation conditions align appropriately. However, similar NPS initiatives succeed in some contexts and fail in others despite comparable resources, institutional support, and technical infrastructure. Conference backchannels thrive at AERA but struggle in other disciplinary contexts. Twitter hashtags build community in some institutions while fragmenting in others. Academic social networking sites enable meaningful collaboration for some scholars while remaining superficial promotional tools for others.

Traditional barrier-facilitator analyses prove insufficient for explaining this contextual variation. The same factors appear as both enablers and constraints, depending on how they interact with other elements. Time constraints limit participation, yet the most successful implementations require significant time investment. Institutional policies can both support and constrain authentic engagement. Platform affordances enable community formation while simultaneously creating vulnerabilities. The recurring theme across successful implementations is not the absence of barriers or presence of facilitators, but rather the sophisticated navigation of inherent tensions. The evidence suggests that systemic complexities require frameworks capable of analyzing multidimensional interactions rather than isolated factors.

A Complexity Framework for Practice-Based Scholarship

This section addresses Research Question 5 by synthesizing review findings into a framework that explicates the systemic complexities accompanying meaningful NPS implementation. Our analysis reveals that successful NPS emerges not from addressing isolated barriers or leveraging individual facilitators, but from navigating complex, interacting systems of tensions. This finding challenges the dominant approach in educational technology research that treats implementation challenges as discrete problems requiring targeted solutions.

Rather than viewing NPS implementation as a simple adoption problem, our systematic review suggests that it can be understood as a complexity management challenge, where scholars, institutions, technologies, and communities can work toward dynamic alignment across multiple dimensions. Complexity management approaches in organizational theory emphasize navigating rather than eliminating systemic tensions, recognizing that productive outcomes emerge from

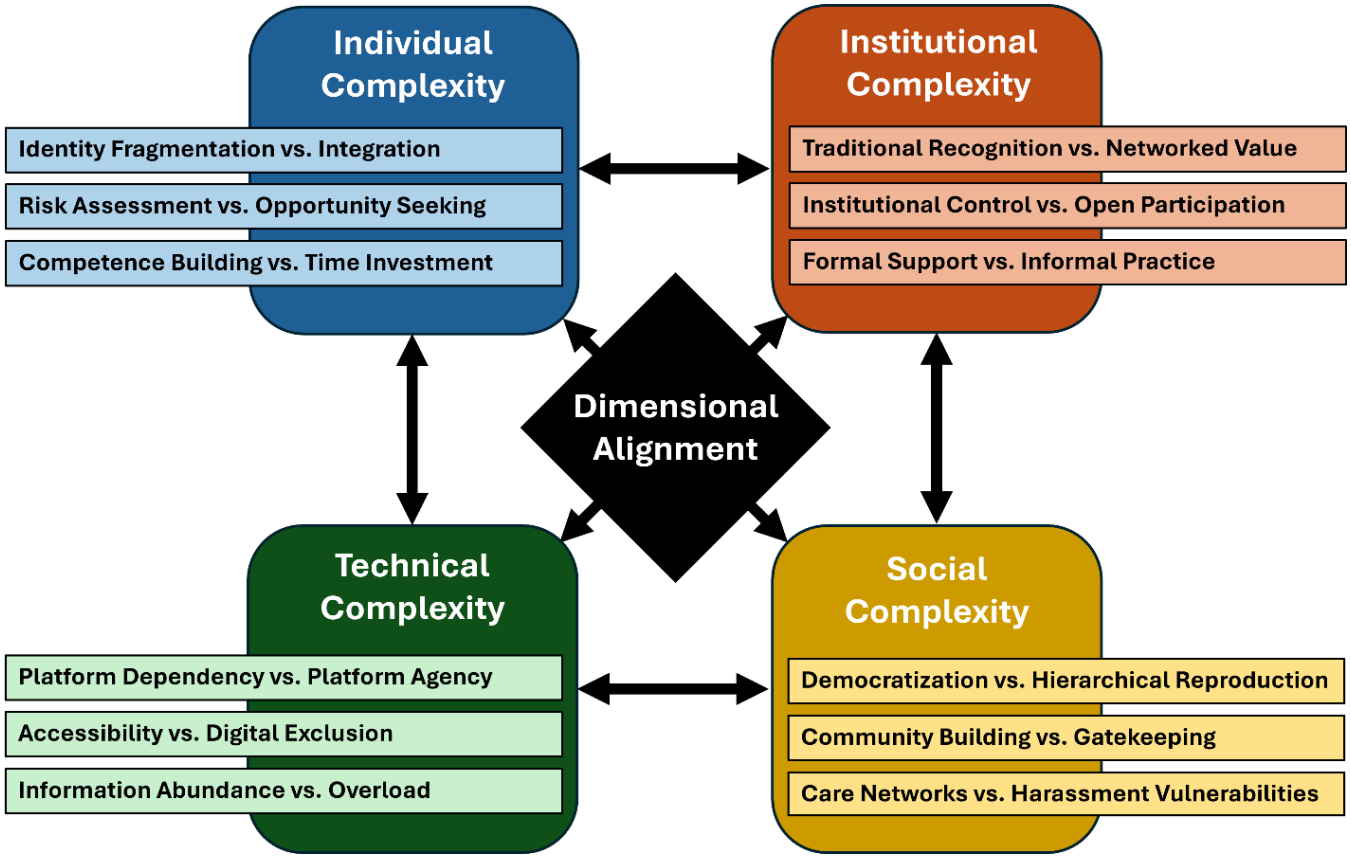
balancing contradictions rather than resolving them (Maylor & Turner, 2017; Rosenhead et al., 2019). This perspective proves particularly relevant for understanding NPS, where collaboration success depends on managing dynamic interactions between multiple factors rather than addressing isolated barriers.

The barriers that prevent meaningful collaboration often emerge from systemic misalignment rather than individual factors. The Complexity Framework for Practice-Based Scholarship addresses this limitation by synthesizing the findings of our systematic review into four interacting dimensions: Individual (personal navigation challenges), Institutional (organizational forces and contradictions), Technical (infrastructure tensions and platform dependencies), and Social (community dynamics and power negotiations). Each dimension contains inherent tensions that become productive when skillfully managed rather than resolved.

This framework serves as a diagnostic and planning tool for NPS implementation. It recognizes that sustainable partnerships emerge from coordination across these four dimensions rather than excellence in a single area. For those implementing NPS initiatives, this approach offers guidance for developing initiatives that address systemic complexity while adapting to local contexts. Figure 2 illustrates how dimensional alignment enables sustained, meaningful collaboration through the interaction of individual, institutional, technical, and social factors.

Figure 2

The Complexity Framework for Practice-Based Scholarship



The Four Complexity Dimensions

Individual Complexity

Individual Complexity: The Personal Navigation Challenge

At the individual level, scholars engaging in NPS must negotiate three core tensions that fundamentally reshape what it means to be an academic professional in networked environments, creating authentic connections across traditional boundaries.

Tension 1: Identity Fragmentation vs. Integration. Jordan's (2020) network analysis revealed that academics strategically construct "acceptable identity fragments" (p. 175) across different platforms, presenting professional personas on LinkedIn while sharing personal insights on Twitter. This fragmentation creates cognitive strain as scholars struggle to balance authentic self-expression with the protection of their professional image (Ahmad et al., 2017). The complexity arises because successful NPS participation often demands authentic self-presentation that transcends traditional academic boundaries, while also requiring strategic identity management to protect professional standing. This identity fragmentation particularly challenges collaboration when academics must maintain credibility with institutional peers while engaging authentically with practitioners who value accessible, personal communication over formal academic discourse.

Tension 2: Risk Assessment vs. Opportunity Seeking. Pasquini and Eaton's (2021) interviews with higher education professionals revealed continuous "risk-reward calculations" (p. 953) where the same activities that enable career advancement also create professional vulnerabilities. Early-career scholars face a particular complexity: they need the visibility and networking opportunities that NPS provides, yet they also face the most significant potential consequences from professional missteps in public forums. This tension intensifies because risk and reward are not equally distributed, with women scholars and scholars of color facing disproportionate harassment and professional consequences for the same NPS activities that benefit their privileged counterparts (Greenhow et al., 2019). For cross-boundary collaboration, this creates barriers when the scholars most able to engage safely may be least connected to practice realities, while those with crucial practitioner insights face the highest participation risks.

Tension 3: Competence Building vs. Time Investment. Semingson et al.'s (2017) collaborative autoethnography revealed the necessity of a DIY approach, where scholars must develop "an aspect of self-efficacy to continue learning" (p. 362) digital tools and practices without institutional guidance, while managing demanding professional responsibilities. The complexity lies in the paradox that NPS skills are best developed through active participation, yet effective participation requires precisely the skills newcomers lack (Vigurs, 2016). This creates particular challenges for education practitioners seeking to engage with research communities, as they often lack the institutional support and time allocation that academics receive for professional development, yet their participation is crucial for meaningful connections between research and practice.

Individual Complexity Design Insight. NPS initiatives must provide scaffolded identity management support and risk management guidance rather than assuming scholars will navigate these personal tensions independently while building authentic practitioner relationships.

Institutional Complexity

Institutional Complexity: Organizational Forces and Contradictions

Institutional complexity manifests through tensions between traditional academic structures and emergent networked practices. These tensions occur not because institutions resist change but because they must simultaneously maintain established functions while adapting to new scholarly realities that enable meaningful connections across research and practice.

Tension 1: Traditional Recognition vs. Networked Value. Stewart's (2015) ethnographic work revealed that scholars operate within "two overlapping but very distinct sets of practices" (p. 334): traditional institutional recognition, based on peer review and formal credentials, alongside networked recognition, based on community engagement and collaborative knowledge construction. This creates acute tensions in tenure and promotion processes where, as Stewart notes, "even though social media presence has been shown to increase visibility and citations...digital practices tend to remain on the margins of the tenure and promotions systems by which academia defines itself" (p. 319). Stewart further explains that "networked scholars may value the techno-cultural system of NPS, but many remain economically dependent on the institutional system" (p. 335), creating professional identity concerns about investing time in scholarship that lacks formal recognition. Belikov and Kimmons (2019) similarly identified limited recognition for digital scholarship and professional identity concerns about maintaining scholarly credibility in networked environments as persistent barriers. The complexity increases because creating new recognition systems risks devaluing traditional scholarship, while ignoring NPS contributions, which fail to acknowledge increasingly important forms of academic work that directly serve practitioner communities and bridge gaps between research and practice.

Tension 2: Institutional Control vs. Open Participation. Institutional control mechanisms can significantly constrain NPS participation. Pasquini and Eaton (2021) documented participants being "reprimanded for contributing to a Facebook thread" and supervisors requiring "a signed contract to prohibit participation on Twitter while attending a conference" (p. 953), with scholars expressing fears about peers reporting social media behavior to administrators. The open, networked nature of NPS derives much of its value from precisely the kinds of boundary-crossing, public engagement that traditional institutional control mechanisms seek to regulate. This creates paradoxes where organizations simultaneously encourage innovation and networking while maintaining policies that constrain these same activities, particularly limiting the authentic practitioner engagement that makes connections between research and practice valuable. Pasquini and Eaton (2021) noted, “We are not prepared to work in this sort of connected environment, as the policies and practices within our workplaces have not quite caught up with our digital actions” (p. 954).

Tension 3: Formal Support vs. Informal Practice. Most successful NPS activities occur through informal networks and grassroots communities that develop independently of formal institutions. Conference backchannels, as documented by Kimmons and Veletsianos (2016), demonstrated how spontaneous Twitter communities expanded academic conversations beyond physical boundaries, creating "expansive professional learning" without formal institutional orchestration. However, the essential character often changes when institutions attempt to formalize these successful practices. Smith and Buchanan's (2019) systematic nursing program integration required extensive policy development around privacy and professional boundaries, illustrating how formalization necessarily changes the spontaneous, experimental nature that enables authentic connections. The tension emerges because informal practices facilitate experimentation and authentic community building, while formal support provides sustainability and legitimacy.

Institutional Complexity Design Insight. Successful NPS initiatives require institutional policies that support rather than constrain authentic engagement across professional communities while developing new recognition systems that value collaborative scholarship alongside traditional metrics.

Technical Complexity

Technical Complexity: Infrastructure Tensions and Platform Dependencies

Technical complexity in NPS extends beyond simple tool adoption to encompass how technological infrastructures shape and constrain scholarly possibilities. While platforms provide enabling infrastructure for collaboration, they cannot create the sustained relationships, shared norms, or institutional support that meaningful partnerships require. These emerge only through coordinated alignment across multiple dimensions. Platform choice is never neutral; each technology enables distinct types of scholarly engagement and collaboration patterns while creating unique vulnerabilities that can fundamentally alter the conditions under which collaboration occurs.

Tension 1: Platform Dependency vs. Platform Agency. Twitter's dominance in NPS implementation (documented in 11 reviewed studies) demonstrates both the power of platform affordances and the risks of dependency on commercial services. Twitter's real-time, hashtag-organized format enabled specific types of scholarly community formation, such as conference backchannels, institutional hashtags, and rapid resource sharing that would be difficult to replicate elsewhere (Greenhow et al., 2019). However, this dependency creates vulnerabilities that extend beyond simple service interruption. Koseoglu and Bozkurt's (2018) analysis revealed how algorithmic content curation can create "calculated publics," personalized feeds that filter users into bubbles based on existing connections, rather than enabling genuinely open scholarly communities. Veletsianos and Kimmons (2016) documented how platform algorithms concentrated attention on already-popular accounts, with visibility determined by activity patterns rather than contribution quality. Within hashtag communities like #EdTech or #HigherEd, teachers and campus technology staff may share valuable insights that reach only their limited follower networks, while posts from well-known professionals with larger followings, often promoting their own publications, appear prominently even when less relevant to the immediate topic. For practice-based scholarship, this algorithmic curation becomes problematic because it systematically favors already established academic voices while preventing practitioners and emerging scholars from gaining visibility within scholarly networks.

Tension 2: Accessibility vs. Digital Exclusion. Technical affordances simultaneously enable and constrain participation, directly affecting who can engage in collaboration. Mobile technology and social media platforms have dramatically lowered barriers to scholarly participation, enabling professional learning that transcends geographic and institutional boundaries (Vigurs, 2016). However, Jordan and Weller's (2018) analysis revealed that digital literacy gaps, time constraints, and platform-specific cultural norms can exclude precisely the practitioners and diverse voices that NPS aims to include. The complexity increases because designing for accessibility often conflicts with designing for advanced functionality, with tools optimized for sophisticated scholarly collaboration simultaneously creating barriers for newcomers or those with limited technical skills.

Tension 3: Information Abundance vs. Overload. NPS platforms provide unprecedented access to real-time scholarly discourse and diverse perspectives, enriching connections between research and practice. Ebersole et al.'s (2025) analysis of the #TPACK network demonstrated how scholars can access global conversations and resources that are impossible through traditional academic channels. However, multiple studies documented "information overload" as a significant barrier to sustained participation, with scholars struggling to manage multiple information streams while maintaining primary professional responsibilities (Romero-Hall et al., 2024). The complexity arises because managing information abundance requires precisely the time and filtering expertise that busy practitioners lack, creating a paradox in which those who would benefit most from broader access to scholarly networks are least able to sustain participation.

Technical Complexity Design Insight. NPS initiatives must balance platform functionality with accessibility needs and develop sustainable approaches that reduce dependence on any single commercial platform. This balancing is particularly important for maintaining long-term collaborative relationships across research and practice.

Social Complexity

Social Complexity: Community Dynamics and Power Negotiations

Social complexity in NPS encompasses community dynamics, power structures, and cultural negotiations that shape who can participate meaningfully in networked scholarly spaces and under what conditions, factors that directly determine whether collaboration can form and thrive.

Tension 1: Democratization vs. Hierarchy Reproduction. Early theorists emphasized the democratization potential of NPS, yet empirical studies have consistently documented that digital platforms reinforce rather than disrupt traditional academic hierarchies. Kimmons and Veletsianos (2016) revealed how the same networking activities that provide democratizing opportunities also concentrate influence among those with existing advantages-established reputations, institutional positions, and social capital– creating power law relationships where small percentages of highly active users dominate attention and follower counts. The complexity lies in recognizing that some hierarchies serve productive functions in scholarly communities, such as expertise recognition, quality curation, and community leadership, while also acknowledging that reproducing hierarchy can undermine NPS goals of broadening participation and including practitioner voices that don't conform to traditional academic status markers.

Tension 2: Community Building vs. Gatekeeping. Successful NPS communities develop shared norms and practices that enable meaningful collaboration; however, these same processes can also become exclusionary. Koseoglu and Bozkurt's (2018) analysis of #DigPed networks revealed how "distributed gatekeeping" operates through community influencers who shape discourse and determine which voices receive amplification, with key influencers holding strategic positions that shaped which educational narratives gained attention. Vigurs' (2016) study directly illustrated this tension. While Twitter provided opportunities for part-time doctoral students to join academic communities, many felt intimidated by established discourse patterns and struggled to transition from "peripheral observation" to meaningful participation. This gatekeeping can maintain community focus and quality, but it can also exclude practitioner perspectives that don't conform to established scholarly communication styles, limiting the authentic boundary-crossing dialogue that effective collaboration across research and practice requires.

Tension 3: Care Networks vs. Harassment Vulnerabilities. NPS communities provide crucial support networks, particularly for isolated scholars and early-career researchers. Veletsianos and Stewart's (2016) analysis revealed how strategic vulnerability in networked spaces fosters authentic relationships and mutual support systems that are not available through traditional academic channels. However, the same openness that enables care also creates vulnerability to harassment and professional consequences. Stewart's (2016) analysis revealed how marginalized scholars face particular vulnerabilities in "collapsed publics" where personal and professional boundaries blur, creating differential participation costs that can undermine inclusion goals. This complexity deepens because the community features that make NPS valuable for bridging gaps between research and practice—trust, shared values, mutual support—can also create insular environments that resist the kind of boundary-crossing dialogue that effective practice-based scholarship requires.

Social Complexity Design Insight. NPS initiatives must actively design for inclusive participation while preventing elite capture, creating community norms that welcome diverse voices and maintain openness to practitioner perspectives that may challenge academic conventions.

Dimensional Interactions

The framework's central insight is that NPS success emerges from dimensional alignment, rather than focusing on isolated factors. The visual framework's center represents contexts where all four dimensions achieve a productive balance of tension, rather than a resolution of tension. Understanding these interactions explains why well-intentioned NPS initiatives often fail despite adequate resources and institutional support—for example, providing technical platforms without considering identity management, or changing institutional policies without building individual confidence or community support. Stewart's (2015) ethnographic work revealed how scholars struggled when institutional recognition lagged behind their networked participation, creating unsustainable tensions that led to gradual abandonment. Table 7 summarizes the key dimensional interactions and their implications for NPS implementation.

Table 7

Four Key Dimensional Interactions in Practice-Based Scholarship

Interaction	How Dimensions Affect Each Other	NPS Implementation Insight
Individual ↔ Institutional	Personal risk assessments shaped by institutional policies; individual champions influence institutional culture	Clear policies enable confident participation; individual success stories drive institutional change.
Technical ↔ Social	Platform affordances shape community dynamics; community needs drive platform choices	Match platform capabilities to community goals; build social norms around technical tools.
Individual ↔ Social	Identity work occurs within community contexts; individual contributions shape community culture	Supportive communities enable authentic participation; diverse voices strengthen networks.
Institutional ↔ Technical	Organizational policies influence platform access; technical capabilities shape institutional possibilities	Align infrastructure decisions with institutional values; ensure technical capacity supports policy goals.

Individual-Institutional Interactions. Institutional policies and cultural norms fundamentally shape personal risk assessments. Pasquini and Eaton (2021) demonstrated this interaction directly: while some participants reported institutional support that enabled confident NPS engagement, others faced explicit constraints that shaped individual participation strategies. The complexity emerges because institutional support alone is insufficient—scholars must still develop individual competencies—while individual initiative alone is unsustainable without institutional recognition.

Technical-Social Interactions. Platform affordances fundamentally shape community dynamics, while community needs drive platform adoption patterns. Kimmons and Veletsianos (2016) demonstrated this co-evolution in conference backchannels, where Twitter's hashtag capabilities enabled new forms of academic community formation, which then influenced how scholars adopted similar practices in other contexts.

Individual-Social Interactions. Personal identity development occurs within community contexts that provide both support and constraints for authentic participation. Veletsianos and Stewart's (2016) analysis shows how scholars' strategic self-disclosure practices shaped community norms around vulnerability and professional sharing, while supportive community responses facilitated continued, authentic engagement. The complexity emerges because individual scholars must navigate community expectations while their own contributions simultaneously influence community culture and inclusion practices.

Institutional-Technical Interactions. Organizational policies and infrastructure decisions significantly influence which platforms scholars can access and how they can use them, while technical capabilities shape what institutional NPS policies are feasible to implement. Cooper and Condie's (2016) Book of Blogs project illustrated this interaction, where a lack of traditional institutional publishing support led scholars to adopt commercial platforms. However, the project's success then required institutional endorsement to provide credibility and legitimacy. This interaction demonstrates why technical solutions must align with institutional values and capacity rather than being implemented in isolation.

Applying the Complexity Framework: The #TPACK Network Case

To demonstrate the framework's practical value, we can apply it to diagnose why the #TPACK network achieved limited collaboration despite favorable conditions. Ebersole et al.'s (2025) analysis revealed that while the network connected 558 users globally, only 36% of tweets demonstrated value-added engagement.

The Complexity Framework reveals that these challenges stemmed not from isolated problems but from systemic misalignments across dimensions. While Twitter provided essential technical infrastructure for global connection, the platform alone could not create meaningful collaboration without supportive conditions across other dimensions. For example, individual risk-averse behavior (64% promotion-only tweets) directly reflected institutional lack of recognition. The teachers couldn't invest time without administrative approval, while researchers couldn't count participation toward advancement. Similarly, Twitter's technical design enabled broad reach but prevented the depth needed for community building, while unclear social norms exacerbated challenges in managing individual identity. These dimensional interactions demonstrate why isolated interventions that address only technical barriers, or only individual training, cannot overcome systemic misalignments.

Table 8 presents a systematic diagnostic analysis that identifies observed challenges, root causes, and priority interventions for each dimension.

Table 8

Complexity Framework Diagnostic Analysis: The #TPACK Network

Dimension	Observed Challenges	Root Cause	Priority Interventions
Individual	64% promotion-only tweets; hesitancy around authentic engagement; newcomers lacking participation models	Identity fragmentation (uncertain expert vs. learner positioning); risk-averse behavior without institutional support; underdeveloped competence	Provide Scaffolding through mentorship, templates, and participation models

Institutional	No formal recognition for contributions; K-12 practitioners constrained by work policies; faculty unable to justify time investment	Networked value vs. traditional recognition misalignment; contradictory incentives across education sectors	Establish Recognition Systems that credit participation professionally for all participants
Technical	Paywall restrictions blocked resource access; character limits prevented nuanced discussion; algorithmic feeds caused fragmentation	Platform dependencies limiting accessibility; Twitter design conflicts with sustained dialogue needs; lack of collaboration tools	Diversify Technical Infrastructure beyond Twitter to support sustained collaboration and open resource access
Social	Power law participation (few dominating); limited cross-cluster engagement; separate higher ed and K-12 subgroups	Hierarchical reproduction; gatekeeping through academic discourse conventions; absence of inclusive norms	Implement Community Moderation with explicit, inclusive norms and structured bridging activities

Framework-Guided Strategic Response

Effective intervention requires coordinated action across all four dimensions rather than isolated fixes. The priority interventions in Table 9 must work together:

- Establish Recognition Systems (Institutional) that enable confident participation by crediting contributions professionally
- Diversify Technical Infrastructure (Technical) beyond Twitter to support sustained collaboration and open resource access
- Implement Community Moderation (Social) with explicit inclusive norms and structured bridging activities
- Provide Scaffolding (Individual) through mentorship, templates, and participation models

These interventions must be sequenced appropriately. For example, establish inclusive community norms before recruiting large numbers of new participants. Interventions must be continuously adapted as contexts evolve.

Critical Lessons

This application demonstrates that the Complexity Framework functions as both a diagnostic tool for understanding NPS struggles and a planning tool for designing effective interventions. Three insights are essential:

First, isolated interventions fail. Addressing only technical barriers or only individual training cannot overcome systemic misalignments. Success requires coordinated attention across all four dimensions.

Second, context specificity matters. While the framework identifies universal dimensions, appropriate interventions vary by context. The #TPACK network's needs differ from conference backchannels or institutional hashtags, requiring tailored rather than generic solutions.

Third, measurement must be multidimensional. Evaluating success through participation metrics alone (e.g., tweets, followers) overlooks crucial dimensions of collaboration quality and sustained partnership outcomes. Framework-guided evaluation examines progress across all dimensions and their interactions.

By systematically analyzing challenges across individual, institutional, technical, and social dimensions, practitioners can develop strategic approaches that address root causes rather than merely treating symptoms.

Successful Dimensional Alignment: The #DigPed Example

Koseoglu and Bozkurt's (2018) analysis of Digital Pedagogy Lab networks provides one of the clearest examples of successful dimensional alignment in NPS. The #DigPed community achieved a productive balance across all four complexity dimensions rather than resolving tensions. At the individual level, participants developed sophisticated identity management strategies that integrated personal and professional engagement around shared pedagogical values. Institutionally, the Digital Pedagogy Lab organization provided a legitimate endorsement and coordinated events while maintaining an open approach to diverse perspectives. Technical infrastructure effectively leveraged Twitter's hashtag and networking affordances, creating what the authors termed "unified-tight crowd networks" with strong interconnections and minimal isolation. Socially, the community developed inclusive participation norms that distributed influence among key contributors while maintaining focus on critical pedagogical narratives. This dimensional alignment enabled participants to generate influential educational narratives, maintain sustained engagement across multiple events and years, and create meaningful connections around shared pedagogical concerns. The #DigPed example demonstrates how dimensional coordination creates resilient communities that can adapt to changing conditions while maintaining their core purpose of bridging research and practice in educational contexts.

Implications for Learning Design and Technology Practice

The Complexity Framework offers practical guidance for educational professionals seeking to implement NPS initiatives that foster meaningful collaboration between research and practice. Rather than providing prescriptive solutions, the framework enables diagnostic assessment and strategic planning that address systemic complexity while adapting to local contexts. These implications are organized into strategies for three key audiences implementing NPS initiatives: instructional designers and educational technologists, scholars in diverse roles who develop collaborative partnerships, and institutional leaders and policymakers who create supportive environments for practice-based scholarship. Table 9 outlines the key implications for different stakeholder groups.

Table 9

Framework Implications by Stakeholder Group

Stakeholder Group	Primary Focus	Key Applications
Instructional Designers and Educational Technologists	Initiative design and implementation	• Diagnostic assessment • Strategic planning • Intervention coordination
Scholars in Diverse Roles	Partnership development	• Relationship formation

		• Collaboration sustainability • Boundary spanning
Institutional Leaders	Policy and culture change	• Framework development • Cultural transformation • Evaluation approaches

Instructional Designers and Educational Technologists

Instructional designers and educational technologists can use the Complexity Framework as a diagnostic tool and implementation guide for NPS initiatives. The framework's primary value lies in helping professionals understand why well-intentioned initiatives often fail despite adequate resources and technical support, while providing strategic direction for designing more effective approaches.

Before launching NPS initiatives, professionals should conduct comprehensive dimensional assessments. These assessments evaluate participant readiness (digital literacy, identity management capabilities, and risk tolerance), institutional conditions (policies, reward systems, and cultural norms), technical infrastructure (platform affordances and sustainability), and community dynamics (existing power structures and participation patterns). Critically, technical assessment must recognize that platforms function as enabling infrastructure requiring alignment across all dimensions—platform selection alone cannot ensure successful collaboration.

The framework provides guidance for coordinated implementation that addresses dimensional interactions rather than isolated factors. Effective initiatives integrate individual development (identity management support, digital literacy training), institutional changes (policy alignment, recognition systems), appropriate technical infrastructure (platform selection aligned with community needs and institutional capacity), and inclusive social practices (community norms that prevent elite capture). Success requires ongoing tension management through continuous adaptation, rather than relying on fixed solutions, as conditions and needs evolve over time.

Scholars in Diverse Roles

The Complexity Framework offers targeted guidance for fostering sustainable collaborative partnerships through digital scholarship approaches, cultivating lasting professional relationships, and promoting ongoing knowledge exchange beyond episodic collaborations. Effective collaboration requires careful attention to dimensional alignment from the beginning.

At the individual level, participants need support for authentic engagement while managing professional risks and identity boundaries, with scaffolding provided for those new to networked scholarly practices. Institutionally, research organizations should develop recognition systems that value collaborative work, while practice organizations need policies supporting professional learning and external collaboration. Technical infrastructure must support diverse communication styles and accessibility needs through strategic use of multiple platforms rather than single-solution dependencies. Socially, partnerships must develop norms that balance research rigor with practical relevance while attending to power dynamics that could reproduce traditional hierarchies of knowledge extraction without reciprocal benefit. Sustainable partnerships create mutual value by addressing genuine practice problems while contributing to scholarly understanding, requiring social norms that balance research rigor with practical relevance. Maintaining this balance demands ongoing attention to power dynamics and continuous adaptation across all dimensions as partnership contexts, participant needs, and institutional expectations evolve.

Institutional Leaders and Policymakers

Institutional support for NPS requires coordinated policy development that addresses all four complexity dimensions, while recognizing the inherent tensions that cannot be resolved through administrative solutions alone. Effective institutional policies provide professional development for digital scholarship skills, clear guidelines for managing professional risks, and recognition systems that value collaborative work alongside traditional metrics.

Individual and institutional policies must align formal reward systems with networked scholarship values, including tenure criteria that recognize digital scholarship contributions, support for public engagement, and social media policies enabling authentic engagement while protecting institutional interests. Technical infrastructure policies must ensure sustainable platform access while protecting data privacy and security through strategic planning for platform sustainability and integration with existing institutional systems. Social dimension policies should address power dynamics, promote inclusive participation norms, and establish mechanisms for addressing harassment or exclusionary practices in digital scholarly spaces.

Policy development alone is insufficient for meaningful NPS. Cultural change requires visible administrative support, investment in professional development, and willingness to experiment while learning from implementation challenges. Effective institutional support helps community members navigate complexity productively through evaluation approaches that focus on dimensional alignment and collaborative outcomes rather than simple adoption metrics, recognizing that meaningful culture change requires sustained commitment over time.

Limitations

This systematic review has several limitations that contextualize our findings and suggest areas for future inquiry. Our search focused on peer-reviewed English-language publications from 2012 forward, potentially missing relevant work in other languages, gray literature, or earlier foundational scholarship. The reviewed studies concentrated heavily on higher education contexts in North America and Europe, with limited evidence from K-12 settings, non-Western contexts, or disciplines beyond education and educational technology. Twitter's prominence in the empirical literature (11 of 25 studies) may reflect both its actual significance for NPS and potential publication bias toward highly visible platforms. The evidence base consists primarily of qualitative and descriptive studies; experimental or quasi-experimental research could provide stronger causal evidence about which dimensional configurations most effectively support sustained collaboration.

Future Research Directions

This systematic review generates important directions for future research. Longitudinal studies could examine how community needs drive platform choices, how platform affordances shape community dynamics, and how changes in platform structure impact community participation. Recent research documenting academic migration away from X/Twitter demonstrates how platform ownership changes and algorithmic modifications can rapidly destabilize even long-established scholarly communities. Survey data from 1,790 academics reveals that 35% reduced X usage due to ownership concerns, while platforms like Bluesky, though smaller, generate significantly higher engagement and trust levels (De Gruyter Brill, 2025a; Shiffman & Wester, 2025). Cross-disciplinary comparative research could explore how different professional communities react to changes in core social networks, investigating whether disciplinary cultures, institutional contexts, or network structures mediate migration patterns and influence which alternative platforms gain traction within specific scholarly communities.

Conclusion

Networked Participatory Scholarship has matured significantly since Veletsianos and Kimmons' (2012) foundational article. Through analysis of 25 studies spanning over a decade of research and implementation, our review contributes both theoretical advancement and practical guidance to strengthen connections between research and practice in educational contexts.

The Complexity Framework represents the primary theoretical contribution of this study. By synthesizing empirical evidence across individual, institutional, technical, and social dimensions, the framework demonstrates how success in NPS results from dimensional alignment that manages inherent tensions rather than eliminating isolated obstacles. This perspective proves particularly valuable for understanding why similar NPS initiatives succeed in some contexts and fail in others despite comparable resources and support. Methodologically, this review demonstrates the value of systematic analysis that examines both theoretical evolution and empirical implementation, while exploring the applications of complexity theory in educational technology research.

The Complexity Framework provides facilitative guidance on dimensional alignment, validating JAID's assertion that the learning design and technology field must engage meaningfully with the realities of educational practice. The framework demonstrates that platforms function as enabling infrastructure rather than sufficient conditions for collaboration. While technical affordances create possibilities for connection, sustained collaboration emerges only through alignment across all four dimensions: individual competencies, institutional support, appropriate technical infrastructure, and inclusive social norms working in concert. This understanding proves increasingly critical as scholars' approaches to digital engagement evolve. Recent large-scale studies document that scholars are moving away from platform-centered visibility strategies toward "spaces that foster meaningful exchange, not just visibility," seeking engagement that is "quieter, slower, and more human" (De Gruyter Brill, 2025b, para. 47). This shift from platform-centered to community-centered engagement reinforces why dimensional alignment—rather than technology adoption alone—remains central to understanding and supporting effective practice-based scholarship. By providing structure for navigating rather than eliminating complexity, the framework offers practical methods for planning and implementing initiatives that strengthen and sustain collaboration across research and practice.

The evolution of Networked Participatory Scholarship from early democratization expectations to the mature understanding of systemic complexity reflects broader shifts in educational technology research toward more nuanced implementation approaches. As Veletsianos and Kimmons (2012) observed in their foundational NPS article, "The challenge for scholarly practice is to devise review frameworks that are not just better than the status quo, but systems that take into consideration the cultural norms of scholarly activity, for if they don't, they might be doomed from their inception" (p. 770). This insight captures precisely why the Complexity Framework is essential for understanding NPS. The field's future lies not in seeking technological solutions to educational challenges, but in developing frameworks that enable meaningful collaboration across traditional boundaries while navigating the inherent tensions that such work involves. By embracing, rather than avoiding complexity, the field can move toward more effective approaches to practice-based scholarship that genuinely strengthen connections between academic research and educational practice.

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*Note: Papers included in the systematic review are marked with an **

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