A Four-Dimensional Framework for Analyzing the Boundaries of Social Media Engagement in K12 Educational Scenarios

Yao Huixian[1,2] Zhao Liang[(Corresponding Author)*2] Shang Yina[2]

[1]University of the East, Manila,Philippines
[2] Editorial Office of Blasting, Wuhan University of Technology, 430070, Wuhan, China
Email: 4057815@qq.com

Abstract: Social media, as an innovative communication medium in the digital era, is reshaping the ecological pattern of education governance with subversive power, especially in the field of K12 education, and its influence deeply penetrates into all aspects of teaching management, home-school interaction, and student development. Using Lasswell's "4W" analysis method, we reveal the blurring of boundaries among teachers, students, parents, educational administrative organizations, platforms and other subjects, such as teachers' privacy leakage, parents' overstepping their authority to intervene, and students' online misconduct, etc. We propose the "Layered Governance - Content, Space, Time" approach. The proposed boundary regulation path of "hierarchical governance - technology empowerment - collaborative education" aims to balance the openness and standardization of education, and provides theoretical references and practical solutions for K12 digital governance.

Keywords: Social media; four-dimensional framework; K12; boundaries of engagement; digitization of education

1. Introduction

In the context of the digital era, social media, which is characterized by its interactivity, immediacy, and broad reach, has become deeply embedded in all facets of contemporary life, including education. The rapid proliferation of platforms such as WeChat, Weibo, Douyin (Jitterbug), and Bilibili (Station B) has created unprecedented opportunities for transformation in the education sector. These platforms transcend the temporal and spatial limitations of traditional educational models, and facilitate the more efficient and convenient dissemination and sharing of educational resources.

According to the 2023 Report on Internet Use by Chinese Minors, 78.3% of primary and secondary school students utilize social media platforms to complete assignments and engage in classroom-related activities. Furthermore, 62% of parents participate in educational processes in real time via digital parent groups. These developments have disrupted the traditional linear governance structure of "school-family-society," giving rise instead to a networked governance model that supports multi-actor, real-time interactions [1].

Nonetheless, the integration of social media into educational settings has revealed governance challenges stemming from ambiguous boundaries of participation. In Hangzhou, elementary school parents expressed discontent over teachers sharing travel photos on personal timelines, while in Wuhan, students used social media to circulate information related to exam cheating. Such incidents underscore the pressing issue of how to preserve the vitality of educational participation while maintaining the integrity of educational norms and parental roles—an essential consideration in the digital transformation of K–12 education.

2. Literature Review

Driven by the ongoing technological revolution, research on the educational applications of social media has experienced exponential growth. A notable turning point occurred at the 2003 ETC Conference, where a keynote address on social media catalyzed global scholarly attention to the topic. In the same year, Mao Xianghui published the first Chinese academic paper on online education via social platforms [2], and Wang Yongqiang explored the instructional use of QQ at the ETC Conference, laying the groundwork for subsequent Chinese scholarship in this field [3].

Prior to 2015, Chinese research predominantly focused on the functional use of platforms such as QQ and WeChat for basic educational tasks, including class notifications and homework management. In recent years, however, scholars have shifted toward examining structural transformations in pedagogical models. For instance, Liu Qinyin (2020) constructed a social media-based interactive learning community utilizing big data algorithms, where user profiling facilitated personalized content delivery and the development of a socialized learning network [4]. Empirical research by Xu Tugen and Lu Jijian (2023) further demonstrated that DingTalk's social teaching functionalities significantly enhanced academic performance among pre-service university teachers [5]. Over the past two years, a growing body of Chinese literature has explored the influence of social media on students' ideological and political education.

In contrast, Western scholarship has pursued a more multidimensional approach to this topic. Notably, Ian Davis (2015) was the first to systematically explore the intrinsic relationship between civic engagement and the educational potential of

social media, offering a theoretical foundation for educational governance research [6]. Studies have shown that collaborative learning via social media can improve cross-regional knowledge-sharing efficiency by 40%, while algorithm-driven personalized recommendations better accommodate diverse cognitive styles [7]. According to a 2022 UNESCO report, social media has revolutionized education in three key dimensions: (1) eliminating temporal and spatial barriers allowed 85% of online courses to continue during pandemic disruptions; (2) machine-learning-driven resource matching improved educational efficiency by 35%; and (3) user-generated content (UGC) platforms reduced the cost of accessing high-quality educational materials in remote areas by 60%.

However, the dual effects of technological integration warrant caution. Siedlecki (2021) found that social media use during learning led to a 25% reduction in conceptual comprehension, with the cognitive fragmentation induced by constant digital stimuli posing a particular challenge in K–12 contexts [8].

Despite the growing body of domestic and international literature on the use of social media in education—spanning diverse dimensions such as instructional innovation and teacher–student interaction—there remains a notable gap in research specifically addressing its role in K–12 educational governance. In particular, few studies have systematically explored the concept of "participation boundaries" within K–12 educational contexts. This concept is of critical importance for ensuring the effective, ethical, and pedagogically aligned integration of social media into school systems.

The delineation of participation boundaries in K–12 education is foundational for constructing a healthy and sustainable educational ecosystem. Clearly defined boundaries enable key stakeholders—including parents, teachers, students, administrative authorities, and platform providers—to engage collaboratively in governance processes while maintaining a shared focus on educational objectives. Such clarity helps prevent the intrusion of non-educational, entertainment-oriented, or fragmented digital content that may undermine students' focus and dilute instructional quality. Establishing these boundaries thereby preserves the central goals of education: the transmission of knowledge and the development of competencies. Furthermore, boundary definition plays a vital role in maintaining ethical standards and social order within educational settings. Well-defined participation boundaries mitigate the risk of power imbalances and inequitable access to educational resources that may arise from unregulated digital environments. Moreover, these boundaries support the creation of robust privacy protection frameworks, minimizing the ethical risks associated with data misuse or unauthorized surveillance on social platforms. As a result, such regulatory mechanisms contribute to upholding the moral and institutional order of the educational domain.

3. Core Concept Definitions

Social Media: In the context of this study, social media refers specifically to digital tools and platforms employed within primary and secondary education settings for instructional management, home–school communication, and student engagement. These include instant messaging applications (e.g., WeChat, DingTalk), short-video platforms with educational features (e.g., Douyin Education), and professional educational communities (e.g., Class Butler, Class Optimizer).

Boundaries of Participation in Educational Governance: This concept denotes the delineation of authority, responsibility, and behavioral limits among various stakeholders—teachers, parents, students, education administrative bodies, and social media platforms—as they engage in educational activities within a social media environment. These boundaries are essential for maintaining ethical governance, pedagogical coherence, and role clarity in digital learning contexts.

K–12 Education: Internationally, "K–12" encompasses the full span of primary and secondary education, from kindergarten through 12th grade. In China, the term typically refers to the 12-year basic education system, consisting of six years of elementary school, three years of junior secondary education, and three years of senior secondary education.

4. Research Methodology

This study adopts Lasswell's classic "4W" analytical framework—Who, What, Where, and When—as a theoretical scaffold to dissect the multifaceted dilemmas associated with blurred participation boundaries in K–12 educational governance. By systematically analyzing the role confusion and governance challenges faced by teachers, students, parents, educational administrative bodies, and social media platforms, this research aims to identify the internal mechanisms underlying the imbalance in authority and responsibility. Key drivers—such as overlapping functional domains, the absence of technological oversight, and a lack of inter-stakeholder synergy—are closely examined. Based on this diagnosis, the study proposes targeted and actionable governance strategies designed to reconstruct an orderly, ethical, and pedagogically sound digital ecosystem for K–12 education.

5. Status Analysis of Social Media Participation Boundaries in K–12 Educational Governance

Lasswell's communication model, long utilized for the analysis of complex information flows, offers a valuable framework for deconstructing the boundary issues arising in the integration of social media into K–12 education. Specifically, the "4W" model—comprising Who (subject), What (content), Where (space), and When (time)—serves as an analytical lens through which participation boundaries may be meaningfully explored [9]. This study employs this model to examine the roles, behaviors, and institutional implications of various stakeholders in digital educational environments.

5.1 Subject Boundaries: Role Confusion and Misalignment of Authority and Responsibility

The deep integration of social media into K–12 education has significantly transformed stakeholder roles and responsibilities, often leading to blurred boundaries and systemic inefficiencies. Teachers, once primarily knowledge providers, are increasingly expected to function as multi-role facilitators—content disseminators, home–school

communication mediators, and even digital behavior monitors. A survey conducted among 53 teachers at a primary school in Wuhan revealed that 61% of respondents spend an average of 1.5 hours per day on social media for educational purposes, with approximately 9% of that time consumed by responding to non-instructional parental inquiries regarding matters such as classroom seating arrangements, merit rankings, and school uniform purchases. This role diffusion has significantly impinged on teachers' personal time and their capacity for instructional preparation.

Parents, empowered by digital connectivity, have become increasingly involved in education governance via social media. However, this involvement frequently crosses boundaries. A content analysis of public discourse on K–12 education from January to May 2025 identified a recurring pattern: parents questioning homework policies, disseminating unverified cafeteria complaints, and challenging administrative decisions on public platforms. These behaviors reflect a widespread conflation of participatory rights and supervisory authority, thereby undermining institutional governance norms.

Students, the primary recipients of education, also demonstrate dual identities on social media. On the one hand, they are academic participants who utilize platforms such as QQ groups for collaborative homework discussions. On the other hand, they are social agents who actively share personal and campus experiences on platforms like Douyin. However, a lack of awareness regarding appropriate boundaries has led to behavioral issues, such as the dissemination of inappropriate content. Moreover, the tension between the public-good orientation of education and the commercial imperatives of social media platforms presents a structural dilemma [10]. For instance, while DingTalk's "home–school address book" facilitates efficient communication, it is also embedded with commercial advertisements that distract from educational objectives. Similarly, one widely used learning app reportedly leverages student chat logs for algorithmic training purposes, yet there is a lack of regulatory mechanisms governing the use of such data in educational contexts. These developments signal pressing challenges for maintaining pedagogical integrity in the digital education landscape.

5.2 Content Boundaries: Information Disorder and Value Distortion

The integration of social media into educational administration has introduced substantial vulnerabilities related to content regulation, data integrity, and ethical communication. While platforms such as DingTalk and WeChat enable more efficient communication, they also expose schools to risks such as cyber fraud and misinformation. For example, according to Liuzhou Evening News (August 27, 2024), two class-based WeChat groups at a local secondary school were infiltrated by malicious actors, who inserted fraudulent links that led multiple parents to unknowingly transfer funds [11]. Similarly, technical instability—such as server failure during a scheduled online parent-teacher meeting using DingTalk's "Group Live" feature—has contributed to crises of trust between schools and families.

Moreover, unregulated digital behaviors often spill over into the physical world, escalating conflicts. Student-generated videos on Douyin (Shake Yin), particularly those featuring "campus trolling," have led to offline altercations. In another case, a teacher at a Beijing school reportedly marginalized a student in class due to reputational damage caused by parental accusations in a group chat—exemplifying a cycle of virtual conflict leading to real-world retaliation.

Content boundary violations also manifest in the reconfiguration of responsibilities. Teachers, seeking to maintain order, often delegate tasks such as homework monitoring to parents through digital platforms. This delegation blurs the professional boundaries of educators, while intensifying parental pressure to remain perpetually "available" online. Consequently, home–school collaboration risks devolving into what scholars term "home–school bondage"—a state of mutual surveillance that corrodes trust and disempowers both parties.

5.3 Spatial Boundaries: Disrupted Order in Hybrid Digital–Physical Spaces

The fusion of virtual and physical educational spaces has created new governance challenges, particularly in maintaining order and safeguarding privacy. While schools depend on social media for administrative efficiency, platform security remains inadequate. One classroom group chat was compromised, resulting in fraudulent messages that deceived 12 parents into transferring money—an event that highlights the fragility of digital infrastructures in educational contexts. Additionally, the interruption of a parent-teacher conference due to DingTalk server failure further intensified parental dissatisfaction and undermined institutional credibility.

Anonymity on social media intensifies these risks by creating environments ripe for cyberbullying and unaccountable behavior. "Tree hole" forums, which are intended to serve as anonymous emotional outlets, have been repurposed by some students for personal attacks, with few mechanisms in place to identify offenders or enforce accountability.

The interpenetration of digital and physical interactions has also amplified the intensity and reach of school-based conflicts. Content such as "campus tweets" or short-form videos shared on Douyin can trigger real-world confrontations among students. Similarly, disparaging remarks made in parent group chats may escalate into strained home–school relationships. A notable incident involved a teacher excluding a student from classroom interaction as retribution for public criticism in a parental forum—illustrating the dangerous entanglement of digital and physical retaliatory dynamics [12].

5.4 Time Boundaries: The Strain of 24/7 Digital Engagement

The instantaneous nature of social media has significantly disrupted the temporal rhythms of teaching and learning, contributing to cognitive fragmentation and professional burnout. The traditional boundaries of school time are eroded by the constant connectivity afforded by digital platforms. Teachers often assign homework late at night, while parents respond to notifications in the early hours, normalizing an "always-online" educational environment.

A survey conducted across four middle schools involving 225 students revealed that 37% of junior secondary students spend over 30 minutes on social media platforms even after completing their assigned homework, reflecting the intrusion of digital tasks into rest and leisure periods. This perpetual engagement not only affects students' cognitive recovery but also contributes to extended screen time and reduced learning efficacy.

Additionally, the pervasive use of social media has created new distractions during critical academic periods. Many students report being drawn into livestreams, drama clips, and influencer content from "study bloggers" on platforms like WeChat Video and Douyin, leading to significant time diversion from actual study. In some cases, during examinations, these platforms have even been implicated in compromising academic integrity through the unauthorized sharing of test information.

The digital expectations placed on teachers and parents to engage in clock-ins, consultations, and continuous communication have stretched professional responsibilities beyond official working hours. This erosion of time boundaries not only heightens teacher burnout but also threatens the sustainability of the entire educational ecosystem by diluting the distinction between professional and personal life.

6 Path Reconstruction of Social Media Engagement Boundaries in K12 Educational Scenarios

6.1 Subject Boundary Regulation: Clarifying Rights and Responsibilities and Constructing a Tiered Governance Framework

To ensure orderly participation in educational governance through social media, a clearly delineated list of rights and responsibilities must be established for all stakeholders. For teachers, this involves institutionalizing a codified framework that outlines professional boundaries and privacy safeguards. School regulations should explicitly define appropriate use of social media platforms, for instance, by restricting the posting of assignments to working hours (e.g., 16:00–19:00 on weekdays) and enforcing a 24-hour window for responding to parent inquiries. Additionally, schools must prohibit the dissemination of sensitive student information—such as academic records or medical histories—and mandate the separation of personal and professional accounts on platforms such as WeChat.

Parental engagement should be regulated through a Home–School Convention, which specifies permissible modes of participation, such as submitting instructional suggestions via class advisors or engaging in online voting on significant issues. To mitigate the risk of opinion polarization among parents, multiple oversight channels should be instituted, including a dedicated principal's mailbox and scheduled offline reception hours.

For students, fostering digital literacy requires a dual strategy: (1) embedding curriculum modules focused on rumor identification and the "Seven Principles of Privacy Protection," and (2) establishing student-led digital governance committees to formulate and enforce classroom media use guidelines—such as prohibiting unrelated advertisements and requiring parental approval for short-form video content.

Social media platforms and regulatory authorities must also assume active roles in boundary regulation. Platforms catering to educational users should be subject to stringent oversight, including the prohibition of game-related top-up services and inappropriate advertisements. Content moderation protocols and usage time controls must be strictly enforced to prevent the degradation of the learning environment [13].

6.2 Content Boundary Regulation: Implementing Tiered Management and Reinforcing Value Guidance

To maintain educational integrity and safeguard against value distortion, content disseminated via social media in educational contexts should be subjected to classification-based and tiered management. A tripartite review committee—comprising teachers, parents, and technical experts—should be established to vet educational materials such as instructional videos and assignment content for pedagogical relevance and appropriateness.

To mitigate risks associated with harmful content, schools should deploy AI-driven keyword detection systems capable of flagging sensitive terms related to violence, cheating, or harassment in real time. These systems should be coupled with targeted "information literacy training" sessions for parents to align home and school standards regarding online conduct.

Privacy protection mechanisms must adhere to the principle of data minimization, collecting only the information strictly necessary for educational purposes. When gathering personal data such as addresses, identification numbers, or photographs, anonymization techniques (e.g., using masked student IDs) and data encryption practices (e.g., password-protected collaborative files) should be rigorously implemented [14].

6.3 Spatial Boundary Regulation: Strengthening Management Norms in Physical and Digital Spaces

To maintain the integrity of educational spaces, spatial boundaries between digital and physical environments must be clearly demarcated. This begins with the deployment of dedicated educational accounts (e.g., "Education WeChat") that segregate academic communication from personal social interactions. Parent group management should follow a three-tiered authority structure: teachers make announcements, parent committees maintain group order, and general parent contributions are restricted and time-bound.

In physical classrooms, strict regulations must be enforced to limit the use of social media platforms during instruction. These measures may include the installation of mobile phone lockers, deployment of signal-jamming technology, and the institutionalization of policies prohibiting device use during teaching hours.

Furthermore, when addressing sensitive issues such as psychological concerns or major disciplinary violations, schools should adhere to the principle of offline primacy. In such cases, communication must take place through home visits or in-person meetings, thereby minimizing the potential for misinterpretation or escalation often associated with virtual interactions .

6.4 Time Boundary Regulation: Safeguarding Temporal Rhythms and Enhancing Efficiency

Effective governance of time boundaries is essential to reduce overburdening of stakeholders and preserve the temporal structure of the educational process. Schools and education authorities should formulate policies to regulate the timing and frequency of social media use in pedagogical activities. Homework assignments, for instance, should be communicated primarily during in-person classroom sessions, with digital dissemination limited to weekday evenings

between 16:00 and 19:00. This helps prevent the encroachment of school-related obligations into the personal time of students, teachers, and parents.

To streamline communication, institutions should establish fixed "Home–School Communication Days" during which parental consultations are addressed collectively, thus preventing ad hoc disruptions. Additionally, schools can incorporate intelligent Q&A systems capable of delivering automated responses to frequently asked questions—such as assignment deadlines or class schedules. These technologies significantly reduce the administrative burden on educators and allow them to allocate more time to core teaching responsibilities, thereby enhancing overall instructional quality.

7. Discussion

As a central concept in the digital transformation of education, the notion of participation boundaries is often abstract and lacks direct applicability in practice. By employing Lasswell's "4W" analytical framework—Who says What in Which channel to Whom—this study proposes an innovative, multidimensional model that conceptualizes participation boundaries through four interrelated dimensions: subject, content, space, and time. This figurative model enables the transformation of a highly theoretical construct into a tangible, observable phenomenon within K12 educational settings, enhancing interpretability through triangulation across multiple analytical perspectives.

This structured, four-dimensional analysis not only enriches our conceptual understanding of social media participation boundaries but also systematically exposes underlying structural issues. These include tensions arising from ambiguous distributions of authority and responsibility among actors, inadequacies in content oversight mechanisms, and spatial disorder caused by the entanglement of digital and physical learning environments. By clearly demarcating these boundaries, the study offers practical guidance for optimizing teacher-student interactions, enhancing home–school collaboration, and clarifying the functional positioning of digital platforms. Ultimately, these contributions provide a theoretical and practical foundation for advancing digital governance frameworks in K12 education.

However, this study is not without limitations. Constraints in research duration and access to data limited the depth of theoretical exploration and the breadth of empirical validation. Specifically, the dynamic evolution of participation boundaries and their variability across different educational scenarios remain underexplored. Furthermore, the dataset primarily reflects the domestic context of K12 education in China, thereby limiting the generalizability of findings across cultural or national boundaries. Future research should address these limitations by extending longitudinal observations, diversifying sample demographics, and conducting comparative cross-cultural analyses to enhance both the robustness and applicability of the theoretical framework.

8. Conclusion

The issue of defining participation boundaries in social media-mediated governance of primary and secondary education reflects a broader conflict between the redistribution of educational authority in the digital era and the developmental needs of young learners [13]. This study, through the construction and application of a four-dimensional framework, identifies key challenges—role ambiguity among participants, value misalignment in content dissemination, erosion of spatial learning order, and the disruption caused by 24/7 digital engagement—as symptomatic of the misalignment between rapid technological advancement and the slower institutional adaptation of educational systems.

At the heart of reconstructing participation boundaries lies the principle of limited openness under hierarchical governance. While it is essential to dismantle the traditional closed-loop governance systems and harness the participatory potential of social media, it is equally crucial to preserve the integrity of educational professionalism and uphold child protection standards. These aims can be achieved through institutional innovation in rule-making and the establishment of clear boundaries that promote responsible and constructive digital participation.

To establish a robust and sustainable digital ecosystem for K12 education, it is imperative that educational authorities expedite the formulation of dedicated regulatory frameworks for social media use in educational contexts. Such frameworks should include explicit definitions of roles and responsibilities for schools, educators, parents, and digital platforms. They should also stipulate temporal and content boundaries, along with tiers of management authority. Concurrently, rigorous monitoring and accountability mechanisms must be implemented to deter and correct boundary violations [14].

As the integration of social media into educational practices deepens, the academic community must continue to investigate its multifaceted effects. Future research should delve into the relationship between social media use and students' academic performance, mental health, and behavioral development. Moreover, emerging digital phenomena—such as short-form video platforms and metaverse-based interactions—warrant critical inquiry regarding their implications for the governance and structure of K12 education.

References

[1]Fang Yong, Ji Weimin, Shen Jie, eds. Report on Chinese Minors' Internet Use (2023)[M]. Beijing: Social Science Literature Press, 2023.

[2]Mao Xianghui. The Integrity of Online Teaching[J]. Computer Teaching and Learning(IT Search),2003,(09):22-23.

[3]Wang Yongqiang. Talking about the application of network QQ tool in the teaching of education in ECTU[J]. Journal of Shanxi Radio and Television University, 2003,(02):13-14.

[4]Liu Uyin. Research on the impact of social media interaction on user engagement [D]. Chongqing University,2020.DOI:10.27670/d.cnki.gcqdu.2020.003076.

[5]XU Tugen,XU Jiaying,LU Jijian. A Comparative Study of Science Teaching Materials in Chinese and South African Junior High Schools from a STEM Perspective[J]. Journal of Comparative Education,2023,(5): 160-172.

[6]Ian Davies; The link between civic engagement, education and the use of social media [J]; Academic Monthly; 12, 2015

[7]Bazen, A., Barg, F., & Takeshita, J. (2021). Research techniques made simple: an introduction to qualitative research. Journal of Investigative Dermatology, 141(2), 241-247. https://doi.org/ 10.1016/j.jid.2020.11.029.

[8]Siedlecki, S. (2020). Understanding Descriptive Research Designs and Methods. clinical nurse specialist CNS. 34. 8-12. 10.1097/NUR.0000000000000493.

[9] Harold Lasswell. The Structure and Function of Communication in Society [C]// World Journalism Research Office, Institute of Journalism, Chinese Academy of Social Sciences. Communication Studies. Hong Yunxiu, Huang Lin, Translation. Beijing: People's Daily Press, 1982: 37-51.

[10] Gao Duan,Li Gang. Status quo, challenges and countermeasures of platform-based media content auditing[J]. All-media exploration,2024,(11):54-56.

[11] None. Alert! 2 days, Shenzhen 36 parents were cheated [EB/OL]. (2024-08-27)[2025-05-27]. https://m.thepaper.cn/newsDetail_forward_28538608.

[12] None. "Beijing elementary school teacher led the isolation of students follow-up, two teachers have been suspended, photos out by the net storm ." Sohu.com, January 28, 2023, https://m.sohu.com/a/634930816_121642905/.

[13] He Jingjing. The logic of coherent change of public affairs rules in cross-border governance[D]. Jilin University, 2025.DOI:10.27162/d.cnki.gjlin.2025.000022.

[14] WANG Ran, YU Yixin, DU Kehan, et al. A comparative study of the influence and dissemination power of opinion groups inside and outside the social media echo chamber[J/OL]. New Media and Network,1-11[2025-06-09].http://kns.cnki.net/kcms/detail/61.1531.G2.20250604.1049.002.html.