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# Governing Through Digital Infrastructures: Rethinking Education in Platformed Environments

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**Abstract:** The expansion of digital infrastructures has profoundly reshaped the conditions under which education is organized, governed, and experienced. Rather than functioning merely as technical supports, platforms, data systems, and algorithmic architectures increasingly mediate institutional processes, redistribute authority, and redefine the boundaries of educational practice. This paper examines how governance in digital education is reconfigured through infrastructural mediation, with particular attention to the ways in which data flows, platform environments, and embedded decision logics shape both institutional coordination and everyday pedagogical interactions. Building on a governance-oriented analytical framework, the study conceptualizes digital infrastructures not as neutral tools but as active structuring forces that reorganize relations between actors, institutions, and regulatory logics. The paper argues that governance in digital education is increasingly enacted through infrastructural arrangements that simultaneously enable coordination and generate new forms of opacity, asymmetry, and dependency. By situating digital education within broader socio-technical transformations, it highlights the tensions between efficiency and accountability, flexibility and control, as well as innovation and institutional stability. Rather than proposing universally applicable solutions, the paper advances a context-sensitive perspective on governance transformation, emphasizing the need to align infrastructural design with institutional conditions and normative expectations. In doing so, the study contributes to ongoing debates on digital governance by offering a theoretically grounded account of how education is being reconfigured in platformed environments.

**Keywords:** digital governance; digital infrastructures; platformed education; institutional transformation; algorithmic mediation; socio-technical systems

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## 1. 1. Introduction

### *1.1 Digital Transformation and the Reconfiguration of Education*

The rapid integration of digital technologies into educational systems has transformed not only how knowledge is delivered but also the institutional conditions under which education is organized and governed. Online platforms, data systems, and algorithmically mediated environments have become central to contemporary education, reshaping interactions among teachers, students, and administrative actors [1]. These developments are often framed in terms of efficiency, accessibility, and innovation, particularly in policy-oriented discussions of digital transformation [2].

However, such perspectives tend to underestimate the depth of the ongoing shift. Digital technologies do not simply enhance existing institutional arrangements. They alter the conditions through which coordination, evaluation, and authority are exercised within educational systems [3]. As infrastructures become embedded in everyday practice, they begin to structure not only how education is delivered but also how it is governed.

### *1.2 From Tools to Infrastructures*

A central limitation in much of the existing literature lies in the tendency to conceptualize digital systems as tools that serve predefined institutional goals. This instrumental perspective overlooks the ways in which infrastructures actively mediate institutional processes. Platforms, data architectures, and algorithmic systems organize information flows, shape participation, and embed operational logics into routine practices.

An infrastructural perspective shifts attention from what technologies do to how they configure environments. Digital infrastructures are not neutral. They encode assumptions about visibility, efficiency, and control, and these assumptions shape how governance is enacted. Recognizing this allows for a more nuanced understanding of how power and coordination are redistributed within digital education.

### *1.3 Governing Through Infrastructures*

The growing reliance on digital infrastructures has contributed to the emergence of a form of governance that operates through embedded technical arrangements rather than formal rules alone. Governance is increasingly enacted through platform architectures, data systems, and algorithmic processes that structure behavior and decision making [4].

In educational contexts, this shift is evident in the use of learning management systems, performance dashboards, and automated recommendation mechanisms. These systems mediate pedagogical practices and administrative decisions in ways that are often opaque yet highly consequential. Governance thus becomes distributed across socio-technical configurations in which human actors and technical systems are tightly interwoven.

### *1.4 Research Objective and Structure*

This paper examines how governance in digital education is reconfigured through digital infrastructures. It focuses on how infrastructural mediation reshapes institutional coordination, redistributes authority, and transforms educational practice within platformed environments.

The remainder of the paper is organized as follows. Section 2 develops the theoretical framework by examining governance and infrastructures. Section 3 analyzes the mechanisms through which infrastructures mediate educational governance. Section 4 discusses the implications for authority and accountability. Section 5 proposes a context-sensitive approach to governance transformation. The final section concludes.

## 2. Theoretical Framework

### *2.1 Governance Beyond Institutions*

Traditional understandings of governance have often been closely tied to formal institutions, hierarchical authority, and policy-based regulation. In such perspectives, governance is primarily associated with decision-making structures, administrative procedures, and the implementation of rules within clearly defined organizational boundaries. However, contemporary scholarship increasingly emphasizes that governance extends beyond formal institutions and operates through dispersed and heterogeneous arrangements that include networks, technologies, and socio-technical systems [5].

This shift reflects a broader transformation in how coordination and control are exercised in complex environments. Rather than being confined to centralized authorities, governance is now understood as a distributed process involving multiple actors, infrastructures, and modes of interaction. In this context, governance is not only about rule-making but also about the conditions under which action becomes possible, visible, and manageable [6].

Such an understanding is particularly relevant in digital environments, where traditional institutional boundaries are reconfigured by technological systems. As educational processes become increasingly mediated by digital infrastructures, governance cannot be fully understood without examining how these infrastructures participate in structuring institutional practices.

### *2.2 Infrastructures as Mediating Environments*

The concept of infrastructure provides a critical lens for analyzing how governance operates in digitally mediated contexts. Rather than being seen as passive background systems, infrastructures are increasingly conceptualized as active mediators that shape social relations, organize information, and enable coordination across dispersed actors [7]. They function as environments within which institutional processes are embedded, rather than as tools external to those processes.

Infrastructures are characterized by their relational and often invisible nature. They become noticeable primarily when they fail or when their underlying assumptions are contested. Yet it is precisely this embeddedness that gives infrastructures their governing capacity. By structuring how information is collected, processed, and circulated, infrastructures define what can be known and how decisions can be justified [8].

In educational settings, digital infrastructures such as learning management systems, data analytics platforms, and cloud-based services create environments in which teaching, learning, and administration are continuously mediated. These systems not only support educational activities but also shape how those activities are evaluated, monitored, and regulated.

### *2.3 Platformization and the Reorganization of Educational Space*

The rise of digital platforms represents a specific form of infrastructural transformation that has significant implications for governance. Platforms are not merely technological systems but socio-technical arrangements that organize interactions, standardize practices, and centralize control over data and processes [9]. Through their architectures, platforms define the terms of participation and structure the relationships between users, institutions, and external actors.

In the context of education, platformization involves the increasing reliance on centralized environments for delivering content, managing interactions, and collecting data. This process reconfigures educational space by integrating previously distinct functions such as teaching, assessment, communication, and administration into unified systems. As a result, governance becomes embedded in platform design, interface structures, and data flows.

Moreover, platforms introduce new forms of dependency and asymmetry. Educational institutions often rely on external providers for critical infrastructural services, which can shift control over key processes away from traditional institutional authorities. This raises important questions about autonomy, accountability, and the capacity of institutions to govern their own operations within platformed environments [10].

To establish a rigorous analytical foundation, it is essential to distinguish 'platformed environments' from the broader category of digital educational tools. While traditional software serves as a functional resource for specific tasks, a platformed environment operates as a dynamic socio-technical ecosystem characterized by its programmability and multi-sided connectivity. It functions as an integrated infrastructure that orchestrates interactions between students, educators, and third-party providers through standardized protocols. In this context, governance is no longer an external layer of administrative rules but is instead fundamentally embedded within the system architecture. Through this structural integration, user interactions are continuously captured as data and re-processed to steer institutional behavior, effectively transforming the platform into a primary site of invisible governance.

### *2.4 Algorithmic Mediation and the Transformation of Decision-Making*

A central feature of digital infrastructures is the increasing role of algorithmic systems in mediating decision-making processes. Algorithms are used to classify, predict, recommend, and evaluate, thereby influencing how information is interpreted and how actions are guided within institutional contexts [11]. In educational settings, algorithmic systems shape a wide range of processes, from personalized learning pathways to performance assessment and resource allocation.

Algorithmic mediation introduces new dynamics into governance. On the one hand, it enables forms of coordination that would be difficult to achieve through manual processes, particularly in large-scale and data-intensive environments. On the other hand, it creates challenges related to transparency, accountability, and bias, as decision-making processes become embedded in complex and often opaque computational systems [12].

Importantly, algorithmic systems do not operate independently of infrastructures. They are integrated into broader socio-technical arrangements that determine how data is generated, processed, and applied. As such, their governance effects cannot be understood in isolation but must be analyzed in relation to the infrastructural contexts in which they are embedded.

### *2.5 Toward an Infrastructural Perspective on Digital Governance*

Bringing these strands together, this paper adopts an infrastructural perspective on digital governance in education. This perspective emphasizes that governance is not only enacted through policies and institutional arrangements but also through the design and operation of digital infrastructures that mediate educational processes.

Such an approach allows for a more comprehensive understanding of how authority, coordination, and accountability are reconfigured in platformed environments. It highlights that governance is increasingly embedded in technical systems that structure interaction and decision-making in ways that are not always immediately visible.

At the same time, an infrastructural perspective underscores the importance of context. The effects of digital infrastructures are not uniform but depend on institutional conditions, regulatory frameworks, and socio-cultural expectations. This suggests that governance in digital education cannot be reduced to universal models but must be understood as context-sensitive and dynamically evolving.

## 3. Mechanisms of Infrastructural Governance in Education

### *3.1 Datafication and the Reconfiguration of Visibility*

One of the most significant transformations brought about by digital infrastructures in education is the increasing centrality of data in shaping institutional processes. Educational activities that were once ephemeral and context-dependent are now continuously recorded, quantified, and stored. Through learning platforms, administrative systems, and digital interfaces, interactions between students, teachers, and institutions are translated into data points that can be aggregated and analyzed [13].

This transformation fundamentally reconfigures visibility within educational environments. What becomes visible is no longer limited to formal assessment outcomes but extends to patterns of engagement, participation, and behavioral traces. Attendance, interaction frequency, task completion rates, and even temporal rhythms of learning are rendered measurable and comparable. In this sense, data infrastructures do not simply capture educational activity. They actively construct what counts as relevant information within institutional settings [14].

The expansion of data-driven visibility has important governance implications. On the one hand, it enables more fine-grained monitoring and coordination, allowing institutions to respond to emerging patterns and adjust interventions accordingly. On the other hand, it introduces new forms of asymmetry. The ability to collect and analyze data is unevenly distributed, often privileging institutional actors or platform providers over individual participants. This raises concerns about surveillance, autonomy, and the shifting balance between support and control in educational contexts [15].

### *3.2 Platform Environments and the Structuring of Interaction*

Beyond data, digital infrastructures also reshape governance by organizing the environments within which educational interactions take place. Platforms function as integrative spaces that bring together multiple functions, including content delivery, communication, assessment, and administration. By centralizing these activities within unified systems, platforms redefine the spatial and organizational boundaries of education [16].

The structuring role of platforms is not limited to technical integration. Through interface design, access permissions, and standardized workflows, platforms shape how users interact with each other and with institutional processes. They define what actions are possible, how communication is structured, and how participation is regulated. In doing so, platforms embed governance directly into the environments in which educational activities occur [17].

This embeddedness has significant consequences. Governance becomes less visible as it is enacted through routine interactions rather than explicit rules. At the same time, control can become more pervasive, as platform architectures subtly guide behavior and constrain alternatives. Educational institutions operating within platform environments must therefore navigate a complex terrain in which governance is shared between institutional actors and infrastructural systems, often with overlapping and sometimes conflicting logics [18].

### *3.3 Algorithmic Mediation and the Redistribution of Authority*

A further dimension of infrastructural governance emerges through the increasing use of algorithmic systems in education. Algorithms are employed to recommend content, evaluate performance, detect anomalies, and support decision-making processes. These functions introduce a layer of computational mediation that influences how information is interpreted and how actions are guided [19].

Algorithmic mediation reshapes authority in several ways. First, it redistributes decision-making capacity by embedding evaluative and predictive functions within technical systems. Decisions that were once made by educators or administrators are now partially delegated to algorithmic processes. Second, it alters the basis of justification. Decisions are increasingly grounded in data-driven outputs, which may appear objective but are shaped by underlying models, assumptions, and training data [20].

At the same time, algorithmic systems introduce challenges related to transparency and accountability. The complexity of computational processes can make it difficult for users to understand how decisions are produced, while the integration of algorithms into broader infrastructures complicates efforts to assign responsibility. As a result, authority becomes more diffuse, distributed across human actors, institutional structures, and technical systems [21].

This algorithmic mediation is most clearly manifested in adaptive learning platforms, such as Knewton or similar management systems that employ Bayesian Knowledge Tracing to monitor student progress. These systems do not merely store information; they actively analyze granular data points, including the specific error

patterns and the duration of student responses, to autonomously recalibrate learning trajectories. This process shifts the locus of authority from the human educator to the underlying predictive models of the infrastructure. Consequently, the teacher's role is redefined from a primary decision-maker to a facilitator who responds to the analytical outputs of the algorithm, illustrating a significant redistribution of pedagogical agency within the digital infrastructure.

### *3.4 Interactions Between Mechanisms*

While data, platforms, and algorithms can be analytically distinguished, in practice they operate as interconnected components of a broader infrastructural assemblage. Data generated through platform interactions feeds into algorithmic systems, which in turn influence how platforms structure future interactions. This recursive dynamic creates feedback loops that continuously reshape educational processes [22].

These interactions amplify the governance effects of infrastructures. For example, the combination of continuous data collection and algorithmic analysis can lead to increasingly fine-grained forms of monitoring and intervention. Similarly, platform environments that integrate multiple functions can extend the reach of governance across different aspects of educational activity, from learning to administration.

Importantly, the effects of these mechanisms are not predetermined. They depend on how infrastructures are designed, implemented, and embedded within specific institutional contexts. Different configurations can produce different governance outcomes, ranging from enhanced coordination and support to increased control and dependency.

### *3.5 From Mechanisms to Governance Effects*

Taken together, these mechanisms illustrate how governance in digital education is enacted through infrastructural mediation rather than solely through formal institutional arrangements. Datafication reshapes what is visible and knowable. Platform environments structure interaction and participation. Algorithmic systems influence decision-making and evaluation. Their combined effects lead to a reconfiguration of authority, accountability, and coordination within educational systems [23].

This shift does not eliminate the role of institutions but transforms how institutional governance is exercised. Authority is no longer located exclusively in formal hierarchies but is distributed across socio-technical arrangements. Accountability becomes more complex as decision-making processes are mediated by infrastructures that are not fully transparent. Coordination is achieved not only through policies but also through the design of systems that shape behavior in subtle and often indirect ways.

Understanding these transformations is essential for analyzing the broader implications of digital education. It provides the basis for examining how governance is being redefined in platformed environments and for identifying the challenges and opportunities that arise from this reconfiguration.

## **4. Implications for Authority, Accountability, and Legitimacy**

### *4.1 Reconfiguring Authority in Platformed Education*

The expansion of digital infrastructures in education has led to a significant reconfiguration of authority. In traditional educational settings, authority was primarily located within institutional hierarchies, embodied in roles such as administrators, teachers, and regulatory bodies. Decision-making processes were relatively transparent in terms of responsibility, even when contested or negotiated. However, as educational practices become increasingly mediated by digital infrastructures, authority is redistributed across a broader assemblage of actors and systems [24].

This redistribution does not imply a simple transfer of power from human actors to technical systems. Rather, it reflects a more complex transformation in which authority becomes embedded in infrastructural arrangements. Platform architectures, data systems, and algorithmic processes collectively shape the conditions under which decisions are made and actions are taken. In many cases, these systems define the parameters of possible action before formal decision-making even occurs.

As a result, authority becomes less centralized and more diffuse. Institutional actors continue to play important roles, but their capacity to exercise control is increasingly mediated by infrastructures that they may not fully design or govern. This creates a situation in which authority is simultaneously exercised and constrained through the same systems, raising questions about institutional autonomy and control.

### *4.2 Accountability Under Conditions of Opacity*

Alongside the transformation of authority, digital infrastructures introduce new challenges for accountability. In conventional governance frameworks, accountability is typically linked to identifiable actors and traceable decisions. Responsibility can be assigned, contested, and, in principle, enforced. However, when decision-making processes are mediated by complex socio-technical systems, the lines of responsibility become less clear [25].

Algorithmic systems, in particular, contribute to this opacity. Decisions that affect students and educators may be influenced by models whose internal logic is not easily interpretable. Even when institutions retain formal responsibility, their ability to fully explain or justify outcomes may be limited by the complexity of the systems involved. This creates a tension between the demand for accountability and the technical realities of infrastructural mediation.

At the same time, data-driven governance introduces new forms of accountability that are oriented toward measurement and performance. Metrics, dashboards, and analytics systems provide continuous feedback on institutional activities, enabling forms of monitoring that were previously difficult to achieve. While these mechanisms can enhance transparency in certain respects, they may also narrow the scope of what is considered accountable, privileging quantifiable indicators over qualitative dimensions of education [26].

### *4.3 Legitimacy and the Normative Foundations of Governance*

The reconfiguration of authority and accountability has direct implications for the legitimacy of governance in digital education. Legitimacy is not only a matter of formal compliance or procedural correctness. It also depends on the extent to which governance arrangements are perceived as fair, transparent, and aligned with broader social values.

Digital infrastructures complicate these normative foundations. When governance is enacted through systems that are partially opaque and externally controlled, it becomes more difficult for stakeholders to assess whether decisions are justified. Students and educators may experience decisions as imposed rather than deliberated, particularly when they are mediated by automated processes or standardized platform environments [27].

Moreover, the reliance on external platform providers introduces additional layers of complexity. Institutions may depend on infrastructures that are developed and maintained by actors with different priorities, such as commercial objectives or global scalability. This can create tensions between institutional values and infrastructural logics, further complicating questions of legitimacy.

At the same time, digital infrastructures also open up possibilities for new forms of legitimacy. Enhanced data availability can support evidence-based decision-making. Digital platforms can facilitate participation and communication across institutional boundaries. The challenge lies in aligning these potentials with normative expectations, ensuring that governance arrangements remain responsive to the needs and values of educational communities.

### *4.4 Tensions Between Efficiency and Institutional Values*

A crucial distinction must be made between the governance of digital education and that of other public sectors such as healthcare or transportation. While infrastructure in those domains typically prioritizes technical efficiency and flow optimization, education remains a deeply normative endeavor centered on human socialization and the cultivation of critical autonomy.

The intervention of digital infrastructures in this field goes beyond simple data management; it directly shapes the development of human subjectivity. The inherent tension here lies in the fact that the predictive logic of algorithmic governance often stands in direct opposition to the educational necessity of unpredictable creativity. Unlike the purely administrative goals of other sectors, the displacement of professional judgment by technical metrics in education poses a unique threat to the foundational values of the institution.

A recurring theme in the transformation of digital education is the tension between efficiency and broader institutional values. Digital infrastructures are often introduced with the promise of improving coordination, reducing costs, and enhancing performance. These objectives are reflected in the design of systems that prioritize scalability, standardization, and optimization.

However, educational institutions are not solely oriented toward efficiency. They are also spaces of socialization, critical reflection, and value formation. When governance is increasingly shaped by infrastructures optimized for efficiency, there is a risk that these broader dimensions may be marginalized. For example, metrics-driven evaluation may prioritize measurable outcomes over less tangible aspects of learning, such as creativity or critical thinking [28].

This tension does not imply that efficiency and educational values are inherently incompatible. Rather, it highlights the need for careful consideration of how infrastructures are designed and implemented. Governance in digital education must

balance the benefits of efficiency with the preservation of institutional missions and normative commitments.

### *4.5 Toward Reflexive Infrastructural Governance*

The transformations discussed above suggest that governance in digital education cannot be understood solely in terms of institutional arrangements or technological capabilities. It requires a reflexive approach that recognizes the mediating role of infrastructures and critically examines their implications.

Reflexive infrastructural governance involves making the assumptions embedded in digital systems visible, assessing their effects on authority and accountability, and aligning their operation with normative expectations. This includes not only technical adjustments but also institutional and regulatory interventions that address the broader socio-technical context [29].

Such an approach emphasizes that governance is an ongoing process rather than a fixed structure. As digital infrastructures continue to evolve, so too must the frameworks through which they are governed. This requires continuous engagement from institutions, policymakers, educators, and learners, as well as a willingness to reconsider established practices in light of emerging challenges.

## 5. Toward Context-Sensitive Governance in Digital Education

### *5.1 Beyond Universal Models of Digital Governance*

The reconfiguration of governance through digital infrastructures can be understood through three interconnected dimensions that link technical mechanisms to their broader socio-technical implications. First, the datafication of the learning process enhances institutional visibility but simultaneously creates new forms of surveillance, necessitating a shift toward context-sensitive transparency. Second, the organizational integration of platforms redefines institutional boundaries while fostering technical dependencies, which requires the development of collaborative governance frameworks between schools and providers. Finally, the rise of algorithmic mediation automates decision-making at the cost of accountability, demanding a reflexive approach to oversight that restores human agency in the face of technical efficiency. By addressing these dimensions collectively, we can move beyond the fragmented view of infrastructure as merely a tool or a constraint.

Discussions of digital governance in education are often framed in terms of best practices, standardized solutions, or transferable models. Such approaches assume that governance challenges can be addressed through the implementation of predefined frameworks, regardless of institutional or socio-technical context. However, the analysis presented in this paper suggests that governance in digital education cannot be reduced to universal prescriptions [30].

Digital infrastructures do not operate in a vacuum. Their effects are shaped by institutional arrangements, regulatory environments, cultural expectations, and existing distributions of authority. As a result, similar technologies can produce different governance outcomes depending on how they are embedded within specific contexts. This variability calls into question the assumption that a single model of digital

governance can be broadly applied across educational systems.

*5.2 Aligning Infrastructures with Institutional Conditions*

A context-sensitive approach to governance requires careful alignment between infrastructural design and institutional conditions. Rather than treating infrastructures as external solutions to be imposed on educational systems, it is necessary to consider how they interact with existing practices, norms, and organizational structures.

This alignment involves multiple dimensions. At the institutional level, governance frameworks must account for differences in capacity, resources, and organizational complexity. At the socio-technical level, attention must be paid to how infrastructures shape interaction, visibility, and decision-making processes. Effective governance thus depends on the ability to integrate infrastructural systems in ways that support institutional objectives without undermining core educational values.

Importantly, alignment is not a one-time process but an ongoing adjustment. As infrastructures evolve and educational practices adapt, governance arrangements must be continuously re-evaluated to ensure coherence between technical systems and institutional expectations.

*5.3 Rebalancing Authority and Responsibility*

The redistribution of authority discussed in previous sections highlights the need to reconsider how responsibility is allocated within digital education. When governance is mediated by infrastructures, traditional distinctions between decision-makers and implementers become less clear. Authority is exercised through a combination of human judgment and technical processes, making it more difficult to assign responsibility in straightforward ways.

A context-sensitive approach therefore involves rebalancing authority and responsibility across different actors. Educational institutions must retain the capacity to oversee and critically evaluate the infrastructures on which they depend, even when those infrastructures are externally provided. At the same time, designers and providers of digital systems must be recognized as participants in governance, with corresponding responsibilities for the effects of their technologies.

This rebalancing does not imply a return to centralized control. Rather, it calls for more nuanced arrangements that acknowledge the distributed nature of governance while maintaining clear lines of accountability.

*5.4 Enhancing Transparency Without Oversimplification*

Transparency is often proposed as a solution to the challenges posed by digital governance, particularly in relation to algorithmic decision-making. While greater transparency can contribute to accountability, it is not sufficient on its own. The complexity of digital infrastructures means that simply making information available does not necessarily make governance processes understandable or contestable.

A more effective approach involves developing forms of transparency that are meaningful within specific contexts. This may include interpretative tools, participatory mechanisms, and institutional practices that enable stakeholders to engage with the

operation of infrastructures. At the same time, there is a need to avoid oversimplification, as reducing complex systems to easily digestible explanations can obscure important nuances.

Context-sensitive transparency thus requires balancing accessibility with depth, ensuring that governance processes are both visible and interpretable without being distorted.

### *5.5 Adaptive Governance and the Dynamics of Change*

Finally, the ongoing evolution of digital infrastructures underscores the importance of adaptive governance. Educational systems are operating in environments characterized by rapid technological change, shifting institutional conditions, and evolving social expectations. Static governance frameworks are unlikely to remain effective under such conditions.

Adaptive governance emphasizes flexibility, learning, and responsiveness. It involves continuous monitoring of infrastructural effects, iterative adjustment of governance arrangements, and openness to revising assumptions in light of new developments. This approach recognizes that governance is not a fixed endpoint but a dynamic process shaped by ongoing interaction between institutions and infrastructures.

By adopting an adaptive and context-sensitive perspective, educational systems can better navigate the complexities of digital transformation. Rather than attempting to control or fully predict the effects of infrastructures, governance can focus on guiding their development in ways that remain aligned with institutional values and societal expectations.

## 6. Conclusion

This paper has examined how governance in digital education is being reconfigured through the expansion of digital infrastructures. Moving beyond an instrumental view of technology, it has argued that infrastructures function as mediating environments that actively shape institutional processes, redistribute authority, and transform educational practices. By focusing on datafication, platform environments, and algorithmic mediation, the analysis has shown that governance is increasingly enacted through socio-technical arrangements rather than solely through formal institutional mechanisms.

The findings suggest that digital transformation in education should not be understood merely as a process of technological adoption or policy implementation. Instead, it involves a deeper restructuring of how coordination, decision-making, and accountability are organized. Authority becomes distributed across human and technical actors, accountability is challenged by infrastructural opacity, and legitimacy is renegotiated under conditions of increasing complexity. These changes highlight the need to reconsider established assumptions about governance in educational systems.

At the same time, the paper has emphasized that the effects of digital infrastructures are not uniform or predetermined. They depend on how infrastructures are designed, implemented, and embedded within specific institutional and socio-technical contexts. This insight underpins the argument for a context-sensitive approach to governance, which prioritizes alignment between infrastructural systems and institutional conditions,

as well as continuous adaptation in response to changing environments.

Rather than offering fixed solutions, the study contributes a conceptual framework for understanding governance in platformed educational environments. It calls attention to the importance of examining infrastructures as sites of governance in their own right, where technical design, institutional practice, and normative considerations intersect. In doing so, it opens up new avenues for research on digital education, particularly in relation to the evolving relationship between technology, institutions, and forms of authority.

Ultimately, the transformation of digital education raises broader questions about the future of governance in increasingly mediated societies. As infrastructures continue to expand and integrate into everyday institutional life, understanding their governing effects becomes essential not only for education but also for other domains shaped by digital transformation. The challenge ahead lies in developing forms of governance that can engage with these transformations in ways that remain both effective and normatively grounded.

## References


[1] A. Zuiderwijk, Y. Chen, and M. Salem, "Implications of the use of artificial intelligence in public governance: A systematic literature review," Government Information Quarterly, vol. 38, no. 3, 2021.

[2] D. Gritsenko and J. Wood, "Algorithmic governance: A modes of governance approach," Regulation & Governance, vol. 16, no. 1, pp. 45–62, 2022.

[3] K. Yeung, "Algorithmic regulation: A critical interrogation," Regulation & Governance, vol. 12, no. 4, pp. 505–523, 2018.

[4] P. D. König and G. Wenzelburger, "The legitimacy gap of algorithmic decision-making in the public sector," Technology in Society, vol. 67, 2021.

[5] J. Pierre and B. G. Peters, Governance, Politics and the State, 2nd ed. London: Palgrave Macmillan, 2020.

[6] T. Ansell and A. Gash, "Collaborative governance in theory and practice," Journal of Public Administration Research and Theory, vol. 18, no. 4, pp. 543–571, 2008.

[7] S. Star and K. Ruhleder, "Steps toward an ecology of infrastructure," Information Systems Research, vol. 7, no. 1, pp. 111–134, 1996.

[8] G. C. Bowker and S. L. Star, Sorting Things Out: Classification and Its Consequences. Cambridge, MA: MIT Press, 1999.

[9] J. van Dijck, T. Poell, and M. de Waal, The Platform Society: Public Values in a Connective World. Oxford: Oxford University Press, 2018.

[10] N. Srnicek, Platform Capitalism. Cambridge: Polity Press, 2017.

[11] R. Kennedy, "The rule of law and algorithmic governance," in The Cambridge Handbook of the Law of Algorithms, Cambridge University Press, 2020.

[12] K. Levy, K. Chasalow, and S. Riley, "Algorithms and decision-making in the public sector," 2021.

[13] Y. Wang, "Algorithmic decisions in education governance: Implications and challenges," Discover Education, 2024.

[14] J. Komljenovic, "Digitalised higher education: Key developments, questions, and future directions," Globalisation, Societies and Education, 2025.

[15] R. F. Kizilcec and H. Lee, "Algorithmic fairness in education," 2020.

[16] B. Marland, "Reframing AI governance in education," Learning, Media and Technology, 2025.

[17] O. P. Barus et al., “Shaping generative AI governance in higher education,” Computers and Education: Artificial Intelligence, 2025.
[18] I. Pinho et al., “Generative AI governance model in educational research,” Frontiers in Education, 2025.
[19] I. Oncioiu et al., “Artificial intelligence governance in higher education,” Societies, vol. 15, no. 6, 2025.
[20] R. Taheri et al., “Factors influencing educators' AI adoption,” Computers and Education: Artificial Intelligence, 2025.
[21] A. Cox, “Algorithmic literacy, AI literacy and responsible AI,” Journal of Documentation, 2024.
[22] R. Moylan, “Algorithmic futures and teacher professional development,” Teaching and Teacher Education, 2024.
[23] M. P. Knox and A. W. Knox, “Artificial intelligence in higher education: Ethical challenges and governance frameworks,” Journal of Information Technology and Innovation, 2025.
[24] M. Busuioc, “Accountable artificial intelligence: Holding algorithms to account,” Public Administration Review, vol. 81, no. 5, pp. 825–836, 2021.
[25] B. Mittelstadt et al., “The ethics of algorithms: Mapping the debate,” Big Data & Society, vol. 3, no. 2, 2016.
[26] F. Pasquale, The Black Box Society. Cambridge, MA: Harvard University Press, 2015.
[27] L. Floridi et al., “AI4People—An ethical framework for a good AI society,” Minds and Machines, vol. 28, no. 4, pp. 689–707, 2018.
[28] N. Selwyn, Should Robots Replace Teachers?. Cambridge: Polity Press, 2019.
[29] A. Veale and L. Edwards, “Clarity, surprises, and further questions in the EU AI Act,” Computer Law & Security Review, vol. 46, 2022.
[30] X. Xu et al., “AI optimization algorithms enhance higher education systems,” Scientific Reports, 2025.