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# GOVERNING DIGITAL CHANGE THROUGH SCHOOL LEADERSHIP COMPETENCIES

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**Abstract.** Digital transformation is reshaping school management and creating new demands for leadership competencies, decision-making, and resource allocation. This study examines the development of management competencies among general secondary school principals in Uzbekistan and proposes an organizational and economic mechanism to support their professional growth. Drawing on scientific literature, functional analysis, and process modelling, the research identifies key factors influencing effective school leadership in a digital environment. The proposed mechanism integrates competency assessment, targeted professional development, collaborative implementation, and systematic evaluation of managerial performance. Particular attention is given to evidence-based decision-making, efficient resource management, and staff coordination. The findings provide a conceptual foundation for strengthening school governance and improving organizational practices while highlighting the need for further empirical validation.

**Keywords:** school leadership; management competencies; digital transformation; organizational mechanism; decision-making; data governance; professional development; distributed leadership; Uzbekistan.

**Аннотация.** Цифровая трансформация изменяет подходы к управлению общеобразовательными школами и предъявляет новые требования к управленческим компетенциям руководителей, процессам принятия решений и распределению ресурсов. В исследовании рассматриваются вопросы развития управленческих компетенций директоров общеобразовательных школ Узбекистана и предлагается организационно-экономический механизм их профессионального совершенствования. На основе изучения научной литературы, функционального анализа и моделирования управленческих процессов определены ключевые факторы, влияющие на эффективность школьного управления в цифровой образовательной среде. Предложенный механизм объединяет оценку управленческих компетенций, целенаправленное профессиональное развитие, согласованную реализацию управленческих решений и систематическую оценку результатов управленческой деятельности. Особое внимание уделяется принятию решений на основе достоверных данных, рациональному использованию ресурсов и координации деятельности педагогического коллектива. Результаты исследования формируют концептуальную основу развития системы школьного управления и совершенствования организационных процессов, одновременно указывая на необходимость дальнейшей эмпирической проверки предложенного механизма.

**Ключевые слова:** руководство школой; управленческие компетенции; цифровая трансформация; организационный механизм; принятие решений; управление данными; профессиональное развитие; распределённое лидерство; Узбекистан.

## INTRODUCTION

Digital tools do not improve schools merely by generating more information. Improvement depends on whether principals can interpret evidence, set priorities, coordinate staff, and evaluate outcomes. For general secondary schools in Uzbekistan, this distinction is particularly important because school leaders operate within limited budgets, reporting obligations, and varying technical conditions. The article examines how digital readiness can be transformed into a sustainable management capability and proposes a recurring organizational mechanism rather than reporting an experimental intervention.

The increasing integration of digital technologies into educational administration requires school leaders to develop competencies that extend beyond the technical operation of information systems. Effective digital

leadership involves the ability to translate available data into informed managerial decisions, establish clear organizational priorities, and coordinate the activities of teachers and administrative personnel. In this context, digital transformation should be understood not simply as the introduction of technological solutions but as a continuous process of improving institutional practices, managerial accountability, and resource utilization. Particular importance should be attached to developing evidence-based decision-making, collaborative leadership, and professional learning mechanisms that enable school principals to respond effectively to changing educational and organizational requirements.

Furthermore, the sustainable implementation of digital transformation in general secondary schools depends on the alignment of leadership competencies with institutional resources, organizational responsibilities, and established management procedures. Differences in technological infrastructure, staff preparedness, and administrative capacity highlight the importance of flexible management approaches that can be adapted to individual school conditions. Consequently, there is a need for an integrated organizational mechanism that connects the assessment of leadership competencies with targeted professional development, distributed implementation, and systematic evaluation of managerial outcomes. Such a mechanism could provide a conceptual foundation for strengthening school governance, improving coordination among educational stakeholders, and supporting the effective use of digital resources within Uzbekistan's general secondary education system.

## LITERATURE REVIEW

Research on distributed leadership situates leadership practices within interactions among leaders, staff, and organizational conditions rather than attributing them solely to the principal (Spillane et al. [6]). Schildkamp [4] demonstrates that data-based decision-making requires interpretation, professional capacity, and consideration of contextual barriers. A study of school data teams by Schildkamp et al. [5] identifies shared goals, individual support, intellectual stimulation, and a supportive environment for data use as enabling leadership practices.

Datnow et al. [1] demonstrate that data discussions are socially situated and can influence teachers' judgments about students; therefore, information should complement rather than replace professional dialogue. Desimone [2] associates effective professional development with content focus, active learning, coherence, duration, and collective participation. A systematic review of digital leadership in higher education by Jameson et al. [3] identifies areas requiring further conceptual and empirical development; however, its different institutional context suggests that direct generalization to schools should be approached with caution. Taken together, these studies support an integrated approach but do not specify a school-level cycle connecting leadership diagnosis, professional learning, delegation, and evaluation.

## RESEARCH METHODOLOGY

This study adopts a conceptual, design-oriented approach. Peer-reviewed literature was comparatively analyzed to identify recurring school leadership responsibilities, barriers to evidence use, and conditions supporting professional learning [1–6]. Functional decomposition was used to distinguish managerial judgments from technical operations, while process mapping connected activities with decisions, responsible actors, and review points. A competency matrix was subsequently developed as a formative assessment guide. No interviews, surveys, administrative datasets, or experimental trials were conducted, and no claims of causal effectiveness are made.

The proposed model was conceptually assessed in terms of internal coherence, feasibility, clearly defined accountability, and adaptability to different school conditions. Management competence is defined as the capacity to integrate evidence, professional judgment, and available resources into well-founded decisions rather than merely the ability to operate digital software.

Artificial intelligence (AI) tools were used to a limited extent, accounting for approximately 10% of the overall research preparation process. Their use was primarily confined to language refinement, technical editing, and structural support. The selection of research methods, analysis and interpretation of findings, formulation of scientific conclusions, and development of recommendations were carried out independently by the author. The author takes full responsibility for the accuracy, originality, and scientific integrity of the research.

## ANALYSIS AND RESULTS

The proposed mechanism consists of a repeatable four-stage cycle: diagnosis, targeted development, distributed implementation, and accountable review. Each stage should produce a documented management action, while the review stage informs the subsequent diagnostic decision. Figure 1 illustrates the proposed cycle.

First, the diagnostic stage examines actual management decisions, including responses to recurring student absenteeism, competing digital subscriptions, or duplicate reporting requirements. School leaders explain the evidence considered, available alternatives, and consultation processes. Staff feedback and decision records complement self-assessment, ensuring that proficiency is not evaluated solely on the basis of self-reported digital literacy.

Second, the professional development stage addresses the identified gaps in managerial judgment. Peer learning sessions, mentoring, and practical exercises based on authentic cases generate useful outputs, including problem statements, decision logs, delegation maps, and implementation schedules. This approach connects professional learning with everyday management practices, consistent with research on professional development [2].

Third, the implementation stage distributes clearly defined decision-making responsibilities. The principal retains strategic accountability; deputy principals coordinate operational activities; teacher representatives assess classroom-level implications; and authorized staff verify data access and quality. Each initiative requires a designated problem owner, a decision deadline, and a review date. Distributed responsibility therefore operates alongside clearly established accountability [5-6].

Fourth, the review stage evaluates whether the identified problem is better understood and managed rather than merely assessing whether digital software has been used. Relevant indicators include response timeliness, consistency of follow-up actions, staff workload, and data reliability. Unintended effects are documented and incorporated into the subsequent cycle (Figure 1).

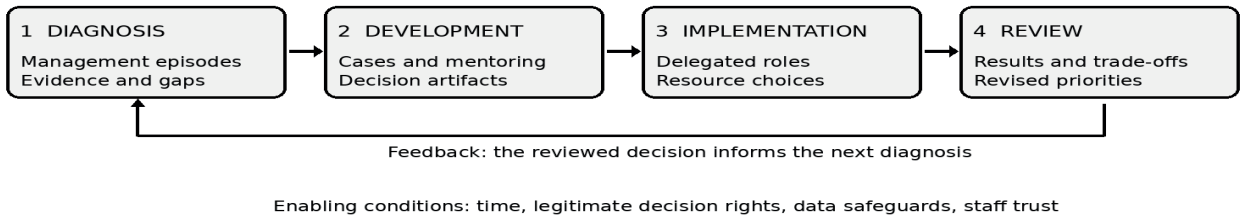



**Figure 1. Proposed cyclical mechanism for developing school management competencies**[1]

Table 1 translates this cycle into competency domains and illustrative evidence. The indicators concern decisions and organizational conduct, not the number of devices purchased or training events attended (Table 1).

Table 1
Competency domains, management actions and proposed evidence[2]

| Domain | Illustrative management action | Possible evidence |
|---|---|---|
| Strategic prioritization | Select a limited digital priority linked to a school problem | Decision rationale; trade-off record |
| Data-informed judgement | Question data quality and compare alternatives | Documented interpretation; response decision |
| Resource stewardship | Assess total cost, time and support requirements | Budget note; staff workload assessment |
| People development | Arrange peer support and protected practice time | Mentoring plan; follow-up conversation |
| Distributed governance | Assign decision rights and escalation routes | Role map; minutes; decision log |
| Ethical accountability | Limit access and review unintended effects | Access rules; incident and revision records |

1 Author's development.
2 Author's development.

The matrix is intended for formative assessment rather than high-stakes scoring. Two priority competencies may be selected during each cycle, reviewed against concrete decisions, and discussed with staff. Its indicators have not been psychometrically validated.

Consider a hypothetical attendance management system. Faster reporting reveals recurring student absenteeism, but staff members have differing views on escalation thresholds and responsibility for contacting families. Rather than purchasing additional software, the principal establishes a joint protocol, delegates weekly exception monitoring, and reviews response times, staff workload, and family feedback. This illustration describes a proposed process rather than an observed school case.

Data governance is an integral component of the cycle. Operational student records should be accessible only to authorized staff; management reviews should rely on appropriately aggregated data, and professional development activities may use anonymized examples. Every new reporting requirement should be justified by the management decision it supports.

An unsuccessful pilot should prompt an assessment of its underlying assumptions, implementation processes, and resource constraints rather than the automatic attribution of responsibility. For example, an appropriately designed family-contact procedure may encounter implementation challenges when teachers lack sufficient allocated time. The review process should document these explanations before additional funding is allocated for expansion.

National digital transformation strategies establish common policy priorities and implementation directions, while individual schools may need to adapt their operational practices to local educational needs within the applicable regulatory framework. Common technical safeguards and interoperable systems should coexist with local discretion in addressing educational needs. The proposed model therefore distinguishes external infrastructure constraints from decisions within the principal's authority.

Digital maturity is not necessarily equivalent to managerial quality. A well-equipped school may still experience duplicate reporting, while a school with more limited technical resources may make transparent and timely decisions. Research on data use similarly emphasizes that the value of information depends on collaborative interpretation [1, 4-5].

Autonomy requires clearly documented responsibilities. Principals should clarify which decisions are governed by regulations, which remain within managerial authority, and which are developed collaboratively with teachers. This approach operationalizes distributed leadership while maintaining clarity regarding responsibility for implementation [5-6].

The economic rationale concerns the efficient allocation of limited staff time, professional development opportunities, and maintenance resources. Evaluation should consider implementation efforts and opportunity costs rather than procurement expenditures alone. Reducing duplicate data entry could free up staff time, but any resulting benefits must be measured rather than assumed.

The proposed mechanism has several limitations. It has not been empirically tested as a causal model, the proposed indicators may create additional administrative demands for smaller schools, and digital records may be incomplete or subject to bias. Staff feedback may also be influenced by organizational hierarchy. These considerations require proportionate monitoring and an organizational environment that encourages constructive disagreement.

Future studies should compare schools of different sizes and geographical locations, assess management decisions before and after implementation, and collect teachers' perceptions alongside data on time and resource costs. Such empirical evidence is necessary to refine the proposed model and evaluate its effects.

## CONCLUSION AND RECOMMENDATIONS

Strengthening school leaders' competencies in the context of digital transformation requires developing managerial judgment, coordination, and accountability rather than focusing solely on technical skills. The proposed mechanism integrates diagnosis, targeted professional development, distributed implementation, and evidence-based review through observable management decisions.

For Uzbekistan, the model provides a practical hypothesis for aligning school-level management practices with digital modernization. Professional development providers can incorporate authentic cases into training programs, educational authorities can establish minimum infrastructure requirements and define the scope of managerial discretion, and school principals can systematically evaluate staff workload, coordination, and decision-making quality. Further empirical validation remains an essential next step.

Based on the findings of the study, the following recommendations are proposed to strengthen school leadership competencies and improve the effectiveness of school management in the context of digital transformation.



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1. Establishing a systematic framework for assessing and developing school leadership competencies. It is recommended to introduce a structured competency assessment framework that evaluates school principals' abilities in evidence-based decision-making, strategic planning, resource allocation, staff coordination, and digital governance. The assessment process should emphasize practical managerial decisions rather than theoretical knowledge or technical proficiency alone. Based on the identified competency gaps, individualized professional development plans should be developed, incorporating mentoring, peer learning, and practical case-based training. Regular formative assessments would help school leaders monitor their professional progress and adapt their management practices to changing institutional needs.

2. Strengthening distributed leadership and collaborative decision-making mechanisms. School management practices should promote clearly defined responsibilities and coordinated participation among principals, deputy principals, teachers, and authorized administrative staff. Particular attention should be given to establishing transparent decision-making procedures, effective communication channels, and regular opportunities for professional consultation. The introduction of structured delegation mechanisms and collaborative problem-solving activities would support organizational coordination while preserving the principal's strategic accountability. Such an approach would facilitate the effective implementation of digital initiatives and strengthen institutional capacity for continuous improvement.

3. Improving data governance and evidence-based management practices. It is recommended to develop practical guidelines for collecting, interpreting, protecting, and applying educational management data at the school level. These guidelines should establish clear responsibilities for data access, ensure the appropriate use of aggregated information, and promote the use of reliable evidence in managerial decisions. School principals should receive targeted training in interpreting administrative and educational indicators, identifying organizational priorities, and evaluating the consequences of management decisions. Particular emphasis should be placed on reducing duplicate reporting requirements and ensuring that data collection activities contribute directly to improving school management rather than increasing administrative workload.

4. Introducing a phased monitoring and evaluation mechanism for digital leadership development. The proposed organizational mechanism should be implemented gradually through pilot initiatives involving schools with different organizational capacities and technical conditions. Monitoring should focus on observable management outcomes, including decision-making timeliness, staff coordination, resource utilization, workload distribution, and the consistency of follow-up actions. Feedback from teachers and administrative personnel should complement documented management records to provide a more comprehensive understanding of implementation processes. The results of pilot evaluations should be used to refine competency indicators, improve professional development activities, and assess the feasibility of broader implementation.

The implementation of these recommendations requires coordination among educational authorities, school administrations, and professional development institutions. Particular attention should be given to ensuring that competency development initiatives remain adaptable to differences in school size, available resources, staff capacity, and technological infrastructure. A gradual and evidence-based implementation approach would allow educational institutions to strengthen managerial competencies while maintaining organizational flexibility and accountability.

Effective governance of digital transformation in general secondary schools depends not only on the availability of technological infrastructure but also on the ability of school leaders to make informed decisions, coordinate institutional resources, distribute responsibilities, and evaluate management outcomes. The proposed mechanism provides a conceptual foundation for integrating these competencies into a continuous professional development and organizational improvement cycle. Its practical effectiveness, however, requires further empirical investigation and validation. Consistent application of the proposed recommendations could contribute to strengthening school governance, improving resource management, enhancing professional collaboration, and supporting the sustainable development of Uzbekistan's general secondary education system.

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