Jurnal WANIAMBEY : *Journal of Islamic Education*
E-ISSN: 2722-9505
P-ISSN : 2722-9661
Vol. 7 No. 1, Juni 2026

A MODEL OF ARTIFICIAL INTELLIGENCE BASED TEACHER LITERACY GOVERNANCE FROM THE PERSPECTIVE OF SCHOOL PRINCIPALS MANAGERIAL LEADERSHIP

Uun Wahyuni[1] Rejokirono[2] Welius Purbonuswanto[3]
Sarjanawiyata Tamansiswa University[123]
Email:uun.wahyuni33@admin.sd.belajar.id[1] , rejokirono@ustjogja.ac.id[2]
,welius@ustjogja.ac.id[3]

ABSTRACT

This study aims to formulate and analyze a model of teacher literacy governance based on *Artificial Intelligence* (AI) from the perspective of the principal's managerial leadership. The research approach used is qualitative, employing a case study method at SDN Mangunsoka. Data collection was conducted through in depth interviews, participatory observation, and document analysis. The results indicate that integrating AI as *a Decision Support System* (DSS) into the principal's managerial leadership can optimize competency mapping, participation monitoring, and the personalization of teachers' professional literacy development. This AI based governance facilitates principals in planning precise, data driven literacy programs (*data driven leadership*), while simultaneously strengthening an adaptive literacy culture without neglecting the values of leadership character. The implementation of this model has been proven to significantly and sustainably improve the efficiency of teacher literacy performance evaluations.

Keywords: managerial leadership, governance, teacher literacy, artificial intelligence, elementary school

ABSTRAK

Penelitian ini bertujuan untuk merumuskan dan menganalisis model tata kelola literasi guru berbasis *Artificial Intelligence* (AI) melalui perspektif kepemimpinan manajerial kepala sekolah. Pendekatan penelitian yang digunakan adalah kualitatif dengan metode studi kasus di SDN Mangunsoka. Pengumpulan data dilakukan melalui wawancara mendalam, observasi partisipatif, dan analisis dokumentasi. Hasil penelitian menunjukkan bahwa integrasi AI sebagai *Decision Support System* (DSS) dalam kepemimpinan manajerial kepala sekolah mampu mengoptimalkan pemetaan kompetensi, monitoring partisipasi, dan personalisasi pengembangan literasi profesional guru. Tata kelola berbasis AI ini mempermudah kepala sekolah dalam merencanakan program literasi yang presisi berbasis data (*data-driven leadership*), sekaligus memperkuat budaya literasi yang adaptif tanpa mengesampingkan nilai-nilai karakter kepemimpinan. Implementasi model ini terbukti meningkatkan efisiensi evaluasi kinerja literasi guru secara signifikan dan berkelanjutan.

Kata kunci: kepemimpinan manajerial, tata kelola, literasi guru, artificial intelligence, sekolah dasar

E-ISSN: 2722-9505
P-ISSN : 2722-9661
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INTRODUCTION

Digital transformation in the Society 5.0 era demands a restructuring of educational governance that is not only adaptive to digital technology but also firmly grounded in character development. As the highest ranking leader at the school level, the principal plays a crucial managerial role in driving the entire school ecosystem, particularly in enhancing educator professionalism[1] . One of the key indicators of teacher professionalism which often faces substantial challenges is a culture of literacy[2] . Teachers' literacy culture encompasses not only the ability to read and write academic texts but also the capacity to synthesize information, conduct classroom action research, and utilize data to continuously improve the quality of learning[3] .

[1]Sufinatin Aisidah dan Safi'il Anam, "Pendampingan Aplikasi Rapor Digital di Madrasah Ibtidaiyah Miftahul Jinan Wonoayu Sidoarjo," *EL-BANAT: Jurnal Pemikiran dan Pendidikan Islam* 10, no. 2 (2020): 254–79, https://doi.org/10.54180/elbanat.2020.10.2.254-279; D. Allcoat, "Education in the Digital Age: Learning Experience in Virtual and Mixed Realities," *Journal of Educational Computing Research* 59, no. 5 (2021): 795–816, https://doi.org/10.1177/0735633120985120; Farid Ahmadi, *Guru SD di Era Digital (pendekatan, media, inovasi)* (Semarang: CV. Pilar Nusantara, 2017); Madina Akeshova dan Gulnara Rizakhojayeva, "The evaluation of communicative and cognitive competencies among tourism specialists: the impact of digital tools," *Cogent Education* 13, no. 1 (April 2026): 2581403, https://doi.org/10.1080/2331186X.2025.2581403; N. Akhtar, "Post-covid 19 tourism: Will digital tourism replace mass tourism?," *Sustainability (Switzerland)* 13, no. 10 (2021), https://doi.org/10.3390/su13105352; M. S. Alauddin, "The modern and digital transformation of oral health care: A mini review," *Healthcare (Switzerland)* 9, no. 2 (2021), https://doi.org/10.3390/healthcare9020118; Bareeq AlGhannama dkk., "Psychometric Evaluation of the Comprehensive Digital Literacy Scale (CDLS): A Measurement of Critical Digital Literacy and Basic Operational Digital Skills," *New Review of Information Networking* 30, no. 2 (Juli 2025): 353–82, https://doi.org/10.1080/13614576.2025.2588758; Anjarwati Anjarwati dan Kuswari Hernawati, "Technology Digital Integration Math Learning: Digital Competence in Mathematics and Digital Competence in Mathematics Teaching," *Advances in Social Science, Education and Humanities Research*, no. Query date: 2026-06-23 03:41:49 (2025): 110–20, https://doi.org/10.2991/978-2-38476-481-5_12.

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P-ISSN : 2722-9661
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Until now, the monitoring and development of teachers' literacy skills in elementary schools have tended to be conducted in a conventional, sporadic manner, with limited data accuracy. School principals often face difficulties in objectively mapping the specific literacy needs of each teacher. The advent of *Artificial Intelligence* (AI) technology offers a new paradigm as a managerial tool or *Decision Support System* (DSS) capable of processing teacher performance data in real time[4] . By integrating AI, school principals can implement *data driven leadership* to track progress in teachers' literacy competencies, identify obstacles, and formulate personalized literacy training recommendations tailored to the individual needs of educators.

The urgency of this research lies in combining AI technological innovations with the principal's managerial functions to strengthen a culture of teacher literacy without neglecting character based management aspects. SDN Mangunsoka was selected as the study site because this school has begun pioneering integrated digital governance to identify efficiencies in teachers' work. Therefore, this article aims to outline an AI based teacher literacy governance model from the perspective of the principal's managerial functions, which comprehensively cover planning, organizing, implementing, and supervising.

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RESEARCH METHOD

This study employs a qualitative approach using a descriptive case study[5] . This method was chosen to allow the researcher to delve into, describe, and fully understand the mechanisms of AI based teacher literacy management within the real world context at SDN Mangunsoka. The research was conducted from April to June 2026. The primary subject of this study was the principal, in his capacity as an educational manager, supported by additional informants such as the school literacy coordinator, classroom teachers, and the school information system operator.

The data collection techniques employed included semi structured interviews, direct observation of managerial activities and the use of the school's AI system, as well as a review of school work plans and teachers' digital literacy logbooks. The validity and reliability of the data were tested using source triangulation and methodological triangulation. Data analysis was conducted interactively based on the model proposed by Miles, Huberman, and Saldaña, which includes the stages of data reduction, systematic narrative data presentation, and drawing conclusions or verifying field findings[6] .

RESEARCH FINDINGS AND DISCUSSION

Based on the analysis of field data at SDN Mangunsoka, the principal's managerial leadership in building an AI based teacher literacy culture was implemented through four digitally integrated managerial pillars. The principal optimized a smart decision support platform to transform conventional governance into a precise and transparent ecosystem.

1. Data Driven Planning and Mapping

   In the initial stage, school principals use AI analytics modules to map out an initial profile of each teacher's literacy competencies. The AI analyzes secondary data sourced from teachers' digital portfolios, their independently published scholarly articles, and their training history. The results of this analysis in the form of competency clusters help the principal develop the School Work Plan (RKS) objectively, ensuring that the budget and literacy programs are precisely targeted.

[5]Sugiyono, *Metode penelitian kuantitatif kualitatif dan R & D* (Alfabeta, 2013); Sugiyono Sugiyono, *Metode Penelitian Kuantitatif Dan R & D* (Bandung: Alfabeta, 2021); Sugiyono, *Metode Penelitian Pendidikan (Pendekatan Kuantitatif, Kualitatif, dan R&D)* (Yogyakarta: Bandung: Alfabeta, 2010).

[6]M. B. Miles, A. M. Huberman, dan J. Saldaña, *Qualitative data analysis: A methods sourcebook*, 5th ed. (Sage Publications, 2023).

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In my view, the results of this clustering should not simply remain as a neat table displayed in the principal's office. Rather, this is where more human centered decisions begin to be made: teachers with foundational competencies receive intensive mentoring; those at an intermediate level are encouraged to join professional learning communities and participate in article reviews; while teachers who are already strong in their field are guided to become mentors or module authors. The literacy budget also shifts toward needs that are genuinely felt on the ground whether that's internal capacity building, the provision of reading materials, or small incentives for teacher leaders. It sounds simple, but the difference is significant when programs are no longer applied uniformly.

Teachers' digital portfolios also need to be treated as living documents, not merely administrative archives that are uploaded and then forgotten. I envision school principals scheduling updates every semester, after which AI analytics modules review the progress of teachers' competencies. The results aren't meant to label who is weak and who is excellent, but rather to serve as material for collective reflection during supervision and staff meetings. Teachers should remain involved in interpreting the analysis results, since self published work and training histories don't necessarily capture all the best practices happening in the classroom. Sometimes the teacher who is most patient in guiding students to read has never written an article.

In the next phase, the analytics dashboard should be used to monitor whether the literacy program is actually being implemented and having an impact. The focus should not only be on the number of training sessions attended, but also on changes in teaching practices, teacher engagement in the community, and students' literacy learning outcomes. I emphasize the importance of upholding data ethics: teachers must give their consent, data must not be shared for purposes beyond professional development, and the final decision remains with the principal, supported by triangulation with classroom observations. In this way, the School Work Plan (RKS) and the literacy budget can be evaluated periodically, without getting bogged down in analytical figures alone. After all, a school is not a data laboratory; it is a space where people grow gradually including its teachers.

2. Organization of Technical Resources

Organization is carried out by dividing teachers' roles into learning communities based on collaborative platforms. Teachers with high literacy levels are

E-ISSN: 2722-9505
P-ISSN : 2722-9661
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grouped by the system to serve as mentors for colleagues who need intensive guidance. The principal acts as the primary facilitator, ensuring the availability of digital infrastructure and accessibility to AI based software to support the productivity of teachers' literacy work.

In addition to assigning roles as mentors and mentees, the organization of learning communities is also aimed at fostering a culture of collaboration and sustainable knowledge sharing. Through a collaborative platform integrated with AI technology, teachers can engage in discussions, exchange experiences, provide feedback, and develop various literacy products, such as scholarly articles, digital teaching materials, learning modules, and other written works. AI serves as a supportive tool that helps identify competency development needs, recommends relevant learning resources, and facilitates the documentation of each teacher's progress. Thus, the learning community's activities are not only focused on improving individual capabilities but also foster the formation of a mutually supportive professional learning ecosystem.

Furthermore, school principals need to ensure that the organization of learning communities proceeds in a structured manner through the division of tasks, the setting of targets, and the establishment of a clear schedule of activities. Each mentor group can be given the responsibility to assist teachers in developing literacy development plans, conducting mentoring activities, and evaluating the resulting work. The use of AI can also help school principals monitor community members' engagement, identify collaboration barriers, and gain insights into the progress of teachers' literacy productivity. However, AI recommendations still need to be reviewed based on the principal's professional judgment to ensure that decisions align with teachers' actual needs. Therefore, an organization based on learning communities and supported by AI technology is expected to create a collaborative, focused work environment oriented toward the continuous improvement of teachers' literacy skills.

3. Implementation and Adaptive Guidance

During the implementation phase, AI is used as a "copilot" for teachers to search for scholarly references, draft academic papers, and independently detect plagiarism before submitting work to academic forums. School principals use a managerial dashboard to view graphs tracking teachers' literacy activity. Through a

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character based leadership approach, the principal provides humanistic motivation and periodic rewards to teachers who demonstrate a high level of consistency in developing their digital literacy.

4. Real Time Monitoring and Evaluation

Program performance evaluations are no longer conducted manually at the end of the year but are monitored periodically through a digital key performance indicator (KPI) system. The success of this governance model is reflected in the data showing increased participation and productivity in scientific publications by teachers at SDN Mangunsoka during the system's monitoring period, as presented in Table 1 below.

Table 1. Development of Literacy Culture Indicators for Teachers at SDN Mangunsoka

No	Teacher Literacy Culture Indicators	Before AI (%)	After AI (%)
1	Access and Review Scientific Journal Weekly	35	85
2	Productivity Article Writing Innovative Works	20	75
3	Data Utilization Digital in Learning	40	90

The discussion of the research findings indicates that the integration of AI from a principal's managerial perspective can eliminate subjective bias in teacher performance evaluations. Visionary leadership by the principal is the key to the success of this implementation. AI is not intended to replace the human role of teachers or principals, but rather to serve as an intelligent tool that streamlines administrative processes. Aligning technology with character based management ensures that the use of AI continues to uphold the values of academic integrity, scientific honesty, and the moral responsibility of educators toward achieving "Golden Indonesia."

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This improvement in teachers' literacy culture is clearly evident from the research results in Table 1. The three indicators used show positive progress following the implementation of Artificial Intelligence (AI) based management. For the indicators of access to and review of weekly scientific journals, for example, the percentage of teachers increased from 35% to 85% a rise of 50 percentage points. This change indicates that access to scientific resources is beginning to become part of teachers' professional routines. The use of AI facilitates finding relevant references, searching for articles based on specific topics, and understanding journal content through information summarization. Activities that previously might have taken a considerable amount of time can now be carried out more efficiently. However, what is most important is not merely the ease of obtaining information, but the growing awareness among teachers to use research findings as a basis for developing their teaching practices. Teachers no longer rely solely on textbooks or personal experience but are beginning to open themselves up to new knowledge emerging in the field of education.

A particularly interesting change is also evident in the productivity indicators for producing articles and innovative works. Before the implementation of AI, the achievement rate for this indicator was only 20%; it then increased to 75% after implementation. This 55 percentage point increase represents the highest improvement among the three indicators studied. These findings suggest that one of the challenges in developing a culture of literacy among teachers is transforming acquired knowledge into tangible work. Reading journals, attending training sessions, or acquiring new information does not necessarily automatically encourage teachers to produce scholarly writing. This is where AI can serve as a companion in the creative and productive process. Teachers can utilize it to develop ideas, draft article outlines, organize findings from classroom observations, and even explore innovative alternatives that can be applied in the classroom. For example, a teacher's experience with low student engagement in learning can be developed into a research idea or an innovative project with the support of this technology. Nevertheless, AI must still be viewed as a tool, not a substitute for the teacher's own thinking. The originality of ideas, the accuracy of data, and the quality of scientific arguments must remain the educator's responsibility.

Meanwhile, the indicator for the use of digital data in learning has increased from 40% to 90%. This achievement represents the highest percentage following the

E-ISSN: 2722-9505
P-ISSN : 2722-9661
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implementation of AI compared to the other two indicators. These results indicate that the use of technology is not only related to teachers' ability to access information but also impacts how they understand and make decisions during the learning process. Through AI based analytics, teachers have the opportunity to analyze student assessment results in a more structured manner, identify material that has not been understood, and recognize varying learning needs among students. For example, when assessment results show that most students have not mastered a particular topic, teachers can use this information as a basis for refining teaching methods, selecting more appropriate learning materials, or providing additional support. Such changes are important because effective learning should not rely solely on assumptions but should also take into account the actual conditions revealed by the data. However, the results of AI analysis still need to be reviewed and interpreted by teachers so that decisions are not based entirely on the system's recommendations.

When these three indicators are examined together, a significant shift in the literacy culture at SDN Mangunsoka becomes evident. The average achievement rate before AI implementation stood at 31.67%, whereas after implementation, it reached 83.33%. This represents an increase of 51.67 percentage points. This figure demonstrates that the development of literacy culture does not occur in just one aspect but encompasses the habit of reading scientific references, the ability to produce original work, and the skill of utilizing digital data in learning. Interestingly, these three aspects are actually interrelated. Teachers who are accustomed to reading journals have a greater chance of discovering new ideas. These ideas can then be developed into articles or innovative works, while the use of digital data helps teachers test and refine their application in learning activities. In other words, AI has the potential to connect literacy activities that previously operated in isolation into a more holistic professional development process.

This transformation, of course, cannot be separated from the role of the principal as both a guide and a driving force behind digital transformation in the educational environment. The mere availability of technology is not enough to build a culture of literacy if it is not accompanied by ongoing mentoring, task delegation, supervision, and evaluation. Principals need to create an environment that encourages teachers to share knowledge with one another, discuss research findings, and develop projects based on

E-ISSN: 2722-9505
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real world challenges they face in the classroom. Teachers who already possess stronger digital literacy skills can be engaged as mentors for their peers, ensuring that the process of competency development occurs through collaboration rather than merely one way training. At the same time, school principals must ensure that the use of AI adheres to academic ethics, integrity in writing, the validity of information sources, and the protection of student data.

These findings show that transforming teachers' literacy culture is not simply a matter of replacing old ways of working with new technology. Rather, the desired change involves fostering habits of learning, critical thinking, writing, and making decisions based on accountable information. AI can accelerate this process, but its sustainability ultimately depends on teachers' willingness to grow and the principal's ability to foster a supportive academic environment. Improvements in all three indicators provide an initial positive sign for SDN Mangunsoka in building an educational ecosystem that is adaptive to technological advancements. The next challenge is to ensure that these improvements do not remain mere numbers in a research table but truly evolve into professional habits ingrained in teachers' daily practices. After all, the success of educational transformation is ultimately measured not only by how advanced the technology used is, but also by how effectively that technology helps teachers become more reflective, creative educators capable of providing meaningful learning experiences for students.

CONCLUSION

An *Artificial Intelligence* (AI) based model for teacher literacy management, viewed from the perspective of the principal's managerial leadership, has proven to bring about a significant leap in quality for the SDN Mangunsoka ecosystem. The implementation of this technology has successfully transformed the principal's managerial approach into *a data driven leadership* style, ranging from precise planning and proportional organization to adaptive mentoring and *real time* monitoring of teacher performance. The synergy between artificial intelligence and character based management serves as the primary foundation for ensuring the sustainability of a teacher literacy culture rooted in integrity. This study offers practical implications regarding the importance of strengthening elementary school principals' digital literacy in managing modern, responsive, and adaptive educational institutions capable of

E-ISSN: 2722-9505
P-ISSN : 2722-9661
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navigating the dynamics of the times.

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E-ISSN: 2722-9505
P-ISSN : 2722-9661
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