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Innovative Educational Management Model of the School Principals to improve Discipline and Personality of Elementary School Students in the Digital Era

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ABSTRACT

The rapid advancement of digital technology has transformed educational practices while simultaneously posing challenges to the development of discipline and character among elementary school students. This study aims to develop and evaluate an innovative digital-based educational management model to strengthen students' discipline and character. Using a Research and Development (R&D) approach with the ADDIE framework, the study involved the stages of analysis, design, development, implementation, and evaluation. The resulting model integrates three key components: a QR Code–based digital attendance system, a discipline point system applying reward and punishment principles, and a digital teacher journal for monitoring daily student behavior. Expert validation indicated a very high feasibility level (93.33%). Statistical analysis using a paired samples t-test revealed significant improvements in students' discipline scores (from 42.95 to 52.50) and character scores (from 42.25 to 51.35), with $p = 0.000$ (< 0.05). Qualitative findings further supported these results, showing increased responsibility, politeness, rule compliance, and enhanced collaboration between teachers and parents. The findings suggest that digital-based educational management is an effective strategy for strengthening student character holistically through adaptive, collaborative, and visionary school leadership in the digital era.

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1. INTRODUCTION

The transformation of information and communication technology in the digital era has brought profound changes to the field of education. On the one hand, these advances have enabled more flexible, interactive, and globally accessible learning environments, while also providing broad access to learning resources that foster learner autonomy and the development of critical thinking skills

(Anastasopoulou et al., 2024; Kurniawan S. Djibran et al., 2024; Purnomo, 2024). Nevertheless, the use of digital technology also presents serious challenges, particularly in relation to character formation and discipline among elementary school students. Excessive use of digital devices may reduce learning motivation, weaken social skills, increase the risk of digital addiction, and diminish students' concentration on academic activities (Sembiring et al., 2024; Syafitri et al., 2024; Tantri et al., 2023).

From a theoretical perspective, numerous studies indicate that digitalization significantly influences students' moral and behavioral development through changes in social interaction patterns that may undermine fundamental values such as discipline, responsibility, and mutual respect (Tang & Fan, 2024; Аутлев, 2023). Uncontrolled use of technology, particularly excessive engagement with social media, can negatively affect learning concentration and student discipline (Lukose & Agbeyangi, 2025; Nand & Shaikh Ali, 2022). Therefore, a balanced pedagogical approach is required to ensure that improvements in academic achievement are aligned with students' character development (Hutasuhut & Harahap, 2024). Ethically and systematically designed technology-based learning has been shown to enhance students' learning motivation, critical thinking skills, and independence, while simultaneously strengthening their moral foundations and digital competencies (Gusti, 2024; Satria et al., 2023; Syafitri et al., 2024). Accordingly, effective managerial strategies are needed to integrate the use of digital technology with sustainable character education through the active involvement of educators and parents in guiding students toward the wise and responsible use of technology (Herak, 2025; Purnomo, 2024).

Empirically, numerous studies indicate a decline in discipline among elementary school students in the post–COVID-19 pandemic period, as reflected in increased delays in assignment submission, decreased compliance with school regulations, and the weakening of polite behavior in social interactions (Azhar et al., 2022; Nofiazein, 2021; Rahayu & Lidinillah, 2022; Wardani & Utami, 2024). Many students experience difficulties readjusting to face-to-face learning, which in turn affects their level of adherence to school rules (Yulianingrum & Mardiana, 2022). In addition, the implementation of online learning with limited supervision has hindered the internalization of moral and ethical values that were previously cultivated through direct interactions within the school environment (Nasution et al., 2022; Thorell et al., 2022). This condition underscores the importance of developing educational management systems that are adaptive to technological advancements while simultaneously integrating the sustainable strengthening of student character and discipline (Spadafora et al., 2025).

In the context of elementary school, the phase of child development is greatly influenced by the environment, including the use of digital technology. Basic values such as ethics, discipline, responsibility, and social skills need to be instilled early on as the foundation for personality formation. Technology, when used appropriately, can support children's cognitive development, such as the ability to solve problems, manage information, and think creatively and critically (Clemente-Suárez et al., 2024; Salim, 2022). However, excessive use can have negative effects in the form of digital addiction and weakened socialization Research shows that the dominance of virtual interactions can hinder empathy and interpersonal communication, even though technology itself supports creativity and cognitive development (Walker & Weidenbenner, 2019; Wu et al., 2020). Therefore, a balance between the use of technology and character building is an urgent need in the context of basic education in the digital era. Collaboration among educators, parents, and the wider community is essential for strengthening character values and mitigating the adverse effects of technology (Mahmuddah & Junaidi, 2025).

To answer these challenges, this study takes the title *"Principals' Innovative Education Management Models to Improve the Discipline and Personality of Elementary School Students in the Digital Era"* which aims to design innovative education management models that are relevant, effective, and applicable in the context of basic education. This model is designed to systematically foster students' discipline and personality through a holistic approach that integrates digital applications in the learning process and character development, as an effort to answer the challenges of the education system that must adapt to technological advances (Eko et al., 2022; Manaf, 2024). With this strategy, education in the digital era

is expected to be able to give birth to a generation that is not only technologically literate, but also has strong character.

Numerous previous studies have examined school principal leadership and the implementation of digital-based management in educational contexts, however these studies have largely focused on secondary and higher education levels and have primarily emphasized operational efficiency and academic quality improvement (Boronenko et al., 2020; Lukmantoro et al., 2024; Panggabean et al., 2022). Issues related to character formation and student discipline at the elementary school level have received comparatively limited attention. Moreover, most existing research positions digital technology merely as a learning support tool rather than as an integral component of educational management strategies systematically aligned with character development under the leadership of school principals.

Based on a critical review of prior studies, a research gap remains in the development of innovative digital-based educational management models specifically designed to strengthen discipline and personality development among elementary school students through the strategic role of school principals. This study addresses this gap by proposing a holistic educational management model that integrates managerial innovation, digital literacy, and character education within a unified framework (Lukmantoro et al., 2024; Mulia et al., 2023). In this model, the school principal is positioned as a transformational leader who leverages digital technology not only to enhance administrative efficiency but also as a systematic instrument for monitoring, managing, and fostering students' personality and behavioral development in a sustainable manner in the digital era (Anam et al., 2025; Arum, 2023; Manaf, 2024).

Based on the research background and gaps that have been identified, this study aims to: (1) develop an innovative educational management model based on digital technology that is valid, practical, and effective in improving the discipline and personality of elementary school students, (2) implement the model in the elementary school environment, and (3) evaluate its impact on changes in student behavior and character. Through the development of this model, it is hoped that it can make a conceptual and practical contribution to strengthening the basic education management system that is adaptive to the development of digital technology, as well as supporting the formation of a generation that is intellectually intelligent, and has strong character, discipline, and noble personality in accordance with the demands of 21st century education.

2. METHODS

This study employed a Research and Development (R&D) approach using the ADDIE development model, which consists of five stages: Analysis, Design, Development, Implementation, and Evaluation. The ADDIE model was selected because it provides a systematic framework for designing, testing, and evaluating an innovative digital-based educational management model for school principals aimed at improving elementary school students' discipline and personality development. The ADDIE model facilitates structured phases that allow for a comprehensive analysis of educational requirements and the systematic design of instructional and managerial interventions (Safitri et al., 2024; Santi et al., 2024).

The study was conducted at SD Negeri 2 Tamanasri, Pringkuku District, Pacitan Regency, involving the school principal, teachers, students in grades IV–VI, and parents as research participants. The research was carried out during the second semester of the 2024/2025 academic year.

Stage 1: Analysis

The analysis stage aims to identify needs, problems, and real conditions in elementary schools related to the decline in character and discipline of students in the digital era. At this stage, the researcher conducts direct observation of students' behavior and activities during the learning process, including aspects of attendance, tardiness, and compliance with school rules. In addition, in-depth interviews were conducted with principals and teachers to obtain information about the obstacles faced

in managing discipline and fostering students' character. The researcher also distributed student questionnaires to find out the condition of students before conducting research and questionnaires to parents to explore children's habits at home, especially related to the use of gadgets and their influence on daily behavior.

Furthermore, a review of various school documents, such as discipline, attendance reports, and student violation records, was conducted to strengthen the data from observations and interviews. The data collected consisted of qualitative data obtained from observations and interviews, as well as quantitative data sourced from recaps of student attendance and violations, which were all used to map problems and the basis for the development of education management models in accordance with the digital context.

Stage 2: Design

The design stage aims to design an innovative digital-based education management model that is tailored to the needs and characteristics of elementary schools. At this stage, the researcher together with the principal and teachers prepared a model design that includes three main components, namely

1. QR Code-based digital attendance application to automatically record student attendance,
2. Digital discipline point system with *reward* and *punishment mechanisms* as a form of behavior reinforcement, and
3. A teacher's digital journal that is used to record students' activities and behaviors every day.

Furthermore, the researcher formulated a measurement indicator consisting of two main variables, namely discipline which includes compliance with regulations, punctuality, and responsibility, and personality which includes good manners, empathy, cooperation, and honesty. Based on these indicators, research instruments were prepared in the form of student questionnaires, teacher observation sheets, and behavioral assessment rubrics used to measure the effectiveness of the model. In addition, the researcher designed the flow of the implementation of the digital model and prepared a guide for the use of it for teachers and principals so that the implementation could run systematically and in a directed manner.

Stage 3: Development

The development phase aims to build a digital product and test the feasibility of the model that has been designed through a validation process and reliability test. At this stage, the researcher developed a prototype of a digital model using the Appsheet platform integrated with Google Sheets as a data management base. After the product is completed, an expert validation process is carried out to assess the quality and suitability of the model and research instruments. Validation involves three groups of experts, namely media experts who assess aspects of the application's appearance, ease of use, and navigation; material experts who assess the suitability of the content, the completeness of the indicators, and their relevance to character education; and practitioner experts (principals) who evaluate the application of the model in the context of elementary schools. The assessment was carried out using a validation sheet based on the Likert scale of 1–5 to obtain an objective model feasibility score. In addition, the reliability test of the instrument was carried out using Cronbach's Alpha, and the results showed a value of 0.87, indicating that the instrument has a high level of consistency because it exceeds the minimum limit of 0.70. The data collected at this stage includes validation scores as well as notes and inputs from experts as a basis for model improvement before being applied in the field.

Stage 4: Implementation

The implementation stage aims to apply the digital model that has been developed while measuring its effectiveness in improving the discipline and personality of elementary school students. At this stage, the researcher first carries out training and assistance for teachers in the use of digital attendance applications, discipline point systems, and teachers' digital journals so that they understand how the model works and the goals of the model as a whole. Furthermore, socialization was carried

out to parents of students to introduce the digital system and emphasize the importance of collaboration between home and school in fostering children's character. The model was then implemented for three months, from March to May 2025, at SD Negeri 2 Tamanasri involving all teachers and students in grades IV-VI. To assess changes in student behavior, researchers collected data through pretest and posttest questionnaires using a four-point Likert scale. In addition, direct observation of student behavior in the classroom and reflective interviews with teachers and principals were conducted to gain an in-depth understanding of the effectiveness of the model's implementation. The instruments used included digital applications, student questionnaires, teacher observation sheets, and digital behavior journals, with the data collected consisting of quantitative data in the form of pre-test results and qualitative data from observation and interview results.

Stage 5: Evaluation

The evaluation stage aims to thoroughly assess the level of effectiveness of the innovative education management model that has been implemented. Evaluation is carried out through two approaches, namely formative evaluation that takes place during the implementation process to monitor the course of activities and make improvements if necessary, and summative evaluation that is carried out after all activities are completed to assess the final results of model application. In this stage, the researcher assessed the effectiveness of the model through quantitative analysis using *the paired samples t-test* with the help of SPSS software version 25 to find out the significant difference between students' pretest and posttest scores after the application of the digital model. In addition, a qualitative analysis was carried out using the Miles and Huberman interactive model, which included the stages of data reduction, data presentation, and conclusion drawing to understand changes in student behavior in more depth. The validity of the data was strengthened through the process of triangulating sources and techniques, by comparing the results of observations, interviews, and responses from teachers, principals, and parents, so that the results of the evaluation illustrated the effectiveness of the model objectively and comprehensively.

3. FINDINGS AND DISCUSSION

3.1 Results

Development of Digital-Based Innovative Education Management Models

This research produces an innovative education management model for school principals based on digital technology designed through the ADDIE (Analysis, Design, Development, Implementation, Evaluation) stage. The main objective of this model is to assist principals in managing and fostering discipline and personality of students more effectively with the support of an integrated digital system.

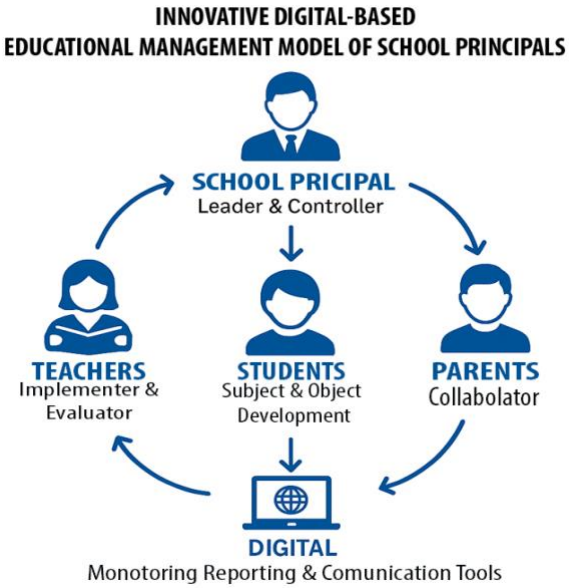
The developed model consists of three main components:

1. The Digital Attendance Application is based on QR Code, which is used to record student attendance automatically and accurately.
2. Digital Discipline Point System, which functions to record positive and negative student behavior with *a reward* and *punishment* mechanism in real-time.
3. Guru Digital Journal, which is used to document students' daily behaviors, attitudes, and activities as a material for reflection on character development.

These three components are interconnected in a single *Google Workspace for Education-based* system using *Appsheet* and *Google Sheets*. The principal acts as a controller and evaluator, teachers as implementers and observers, students as subjects as well as objects of coaching, while parents function as external collaborators who receive reports and provide feedback.

The Model Synthesis shows the integration between the innovative leadership of the principal, the role of the teacher as a character coach, and the support of digital technology in one adaptive and participatory managerial system. This model is collaborative, transparent, and character-oriented,

where technology is used as a tool to strengthen the management of character education, rather than replace it.



Application of the Model in the Elementary School Environment

The implementation of the model was carried out at SD Negeri 2 Tamanasri, Pacitan for three months (March-May 2025) involving the principal, eight classroom teachers, forty students in grades IV-VI, and parents. The implementation began with training for teachers and principals on the use of digital applications and the management of student behavior data.

The implementation phase consists of three main phases:

1. **Planning Stage;** The researcher prepared digital tools, including the installation of *the QR Code Attendance Application*, *the Digital Discipline Point System*, and *the Teacher's Digital Journal* which was integrated through Appsheet and Google Sheet. Teachers and school principals received training on the use of applications, data input, and digital report analysis, while parents were socialized about the goals and benefits of the program to play an active role in fostering children's character. As a result, all devices and parties involved are ready to implement the model consistently.
2. **Implementation Stage;** Students are absent through *QR Codes* when they arrive and are about to go home, while their behavior is monitored through *the Digital Points System* where teachers assign additional points for positive behaviors such as punctuality, responsibility, and good manners, as well as point deductions for negative behaviors or violations such as tardiness or non-compliance with school rules. The system automatically calculates and displays the accumulated points. In addition, teachers record students' daily activities and reflections through *Digital Journals*, and all data is automatically stored in the Google Sheets and Appsheet cloud systems that can be accessed by teachers, principals, and parents. The principal supervises and validates data as control and evaluation to ensure the accuracy and consistency of reports.
3. **Evaluation Stage;** Student behavior data is analyzed every weekend by teachers and principals through reflective meetings to analyze student discipline and personality data, discuss students who need special attention, and formulate advanced coaching strategies. Parents receive digital reports and are asked to provide feedback through an online form that serves as feedback on the effectiveness of the system and input on the school.

Furthermore, the research instruments used consisted of student questionnaires, teacher observation sheets, reflective interviews, and digital application data. Data was collected in two forms: quantitative (results of pre-test discipline and personality) and qualitative (results of observations, interviews, and teacher journal notes).

Evaluation of the Impact of the Model on Student Discipline and Personality

Expert Validation Results

The developed model has been validated by three experts, namely media experts, material experts, and practitioners (principals). The validation results showed an average eligibility rate of 93.33% which was included in the very valid category. The aspects with the highest scores were the ease of use of the application (95%), the suitability of the content with the principles of character education (92%), and the application of the model in elementary school (93%). The results of this validation confirm that the model is feasible to use in the context of elementary schools and can support the principal's duties as a leader in technology-based character development.

Model Practicality Test Results

The practicality test was carried out through a limited trial involving eight teachers and principals. The results showed an average score of 85% (practical category), ease of implementation 77.5%, and contribution to character development 80%. Teachers stated that the model is easy to operate, efficient in recording student behavior, and helps speed up the reporting process to the principal and parents. In addition, the digital points system is considered to be able to increase students' motivation to behave positively because every good action gets immediate appreciation through the addition of points, which at certain points will be rewarded.

Effectiveness Test Results (Quantitative)

The analysis of the effectiveness test (quantitative) was carried out using *the paired samples t-test* to compare *the pretest* and *posttest scores* of discipline and personality of students.

Table 1. Descriptive Statistics of Discipline and Personality

Paired Samples Statistics

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	Discipline_Pre	42.95	40	2.726	.431
	Discipline_Post	52.50	40	2.532	.400
Pair 2	Personal_Pre	42.25	40	3.470	.549
	Personal_Post	51.35	40	3.541	.560

The results of statistical data analysis show a significant increase after the implementation of the digital model. The average score of students' discipline increased from 42.95 to 52.50, while the personality score increased from 42.25 to 51.35, with $p = 0.000$ (< 0.05). This improvement shows that the model has a significant effect on students' disciplinary behavior and personality.

Correlation tests were carried out to determine the relationship between pre-test and post-test scores on each variable. The results of the correlation test are presented as follows:

Table 2: Paired correlation

Paired Samples Correlations

		N	Correlation	Sig.
Pair 1	Discipline_Pre & Discipline_Post	40	.687	.000
Pair 2	Personal_Pre & Personal_Post	40	.917	.000

The results of the correlation analysis showed a strong association between *pretest* and *posttest* scores ($r = 0.687$ for discipline; $r = 0.917$ for personality), which confirmed that the increase was consistent and did not occur randomly. Thus, these findings validate the effectiveness of the principal's innovative management approach in fostering positive behavior change in students.

Furthermore, the results of the t-test were paired to determine the significance between the pre-test and post-test values.

Table 3. Significance Test Paired Samples t-Test

Paired Samples Test									
		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
Pair 1	Discipline_Pre - Discipline_Post	-9.550	2.087	.330	-10.218	-8.882	-28.938	39	.000
Pair 2	Personal_Pre - Personal_Post	-9.100	1.429	.226	-9.557	-8.643	-40.285	39	.000

The results of the statistical test showed that the implementation of innovative education management by the principal succeeded in increasing the student's discipline score by 9.55 points. The significance value (p = 0.000) indicates that this increase is statistically significant. This proves that innovative education management has a real impact on improving students' discipline and personality.

Qualitative Findings

The results of interviews and in-depth observations show a real change in student behavior. Students become more punctual, responsible for assignments, and show courtesy and mutual respect. The teacher stated that the implementation of the digital system makes students more motivated because the results of their behavior are recorded and can be seen directly by parents. Meanwhile, parents expressed satisfaction with the transparency presented by the digital monitoring system. The principal assessed that the collaboration between teachers and parents became closer because information on student behavior was conveyed transparently. Overall, the qualitative data support the quantitative findings that this model effectively strengthens students' discipline and character holistically.

3.2 Discussion

Model Validity and Practicality

The results of expert validation show that the innovative education management model of digital-based school principals has a very high level of eligibility. The involvement of three groups of experts (media, material, and practitioners) in the assessment process guarantees that the model is not only theoretically valid, but also practical in the field. This success is due to the design of a model that is responsive to educational challenges in the digital era, where school management must be able to integrate aspects of character development with information technology.

The high level of practicality shows that teachers and principals can implement this model easily without facing significant technical obstacles. The use of QR Code-based applications and digital points systems has been proven to improve administrative efficiency, strengthen reporting transparency, and expand parental involvement in the process of fostering students' character. The application of this technology not only facilitates discipline management, but also encourages the creation of a more participatory and accountable school culture. These findings are in line with the results of research by Istiqomah & Nursofah, (2024), who explain that a systematically designed and technology-based student management system contributes significantly to character education, especially in fostering the values of responsibility, discipline, and tolerance in the school environment.

The Influence of Models on Student Discipline and Personality

The results of the t-test showed a significant improvement in students' discipline and personality after the implementation of the digital model. This increase is not only due to an objective assessment

system, but also due to the direct *feedback* received by students and parents. Data-driven *reward and punishment* mechanisms encourage students to be more disciplined, while parental involvement through digital reports strengthens the consistency of coaching at home and at school.

From a psychopedagogical perspective, digital systems create a reflective and participatory learning environment, where students understand that their behavior is recorded and assessed transparently. This forms self-awareness (*self-regulated behavior*) which is the main foundation of discipline. In addition, intensive interaction between teachers and parents through digital platforms strengthens emotional relationships and constructive communication, in accordance with Bronfenbrenner's concept of educational ecology, which emphasizes that the development of a child's character is greatly influenced by the interaction between the home and school environment.

Conceptually, the findings of this study affirm that innovative school leadership, particularly principals' effective utilization of digital technology, plays a crucial role in strengthening systems for student character development and discipline. Principals are not only expected to lead the integration of technology into educational processes to create a conducive learning environment, but also to guide its use in supporting the reinforcement of character values (Zhang et al., 2023). In this context, principals serve as the primary drivers who coordinate collaboration between teachers and parents to build a positive, participatory school culture oriented toward character formation.

4. CONCLUSION

This study concludes that the digital-based innovative education management model developed by elementary school principals has proven to be valid, practical, and effective in improving students' discipline and personality in the digital era. Through the application of the ADDIE model, this research produces a management system consisting of three main components, namely *a QR Code-based Digital Attendance Application*, a *Digital Discipline Point System*, and a *Teacher Digital Journal* that is integrated with each other. The validation results showed a high feasibility score of 93.33%, while the effectiveness test showed a significant increase in discipline (from 42.95 to 52.50) and student personality (from 42.25 to 51.35) with a $p = 0.000$ value, indicating that the application of this model had a positive impact on changes in student behavior.

The implementation of this model emphasizes the role of school principals as transformational leaders who are able to build a culture of discipline and moral responsibility through technology-based management strategies. In line with Budiyono, (2023), the integration of digital tools enables real-time monitoring of student behavior, strengthens collaboration between teachers and parents, and fosters a conducive moral climate within the school. These findings show that digital innovation can be a strategic instrument in education management to support character formation as well as improve students' academic performance. Further research is recommended to develop the integration of *Artificial Intelligence (AI)* and *Learning Analytics* in digital systems so that student behavior monitoring can be carried out automatically, as well as to expand the application of the model to diverse cultural levels and contexts to examine its long-term impact on strengthening the spiritual, social, and character values of the nation in the era of digital disruption.

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