

AI-Enabled Management in Special Education: Bridging Administrative Efficiency and Inclusive Practice

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ABSTRACT

Special education institutions face dual challenges: heavy administrative burden and the need to deliver inclusive, personalized learning. With rapid advances in AI, tools like automated IEP generators, behavior tracking dashboards, and AI chatbots are transforming how special education managers operate. However, research on how AI-enabled management bridges efficiency and inclusion remains scarce, especially in emerging economies. This study examines how AI-enabled management practices adopted by special education managers influence administrative efficiency and promote inclusive educational practices in special education institutions. A cross-sectional survey was conducted among 220 special education managers, principals, and coordinators from special education centers and inclusive schools in Pakistan. AI-Enabled Management was measured using 4 dimensions: AI for IEP management, resource allocation, parent communication, and progress monitoring. Administrative Efficiency included time saved, reduced paperwork, and decision quality. Inclusive

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Practice was measured by student participation, individualized support, and teacher collaboration. Data was analyzed using PLS-SEM with Smart PLS 4. Findings show that AI-enabled management significantly improves administrative efficiency. Administrative efficiency in turn significantly enhances inclusive practice. The mediation effect is significant. Schools with higher AI adoption reported 34% less administrative workload and 28% higher ratings of inclusive classroom practices. Managerial digital competence moderates the relationship. AI-enabled management can shift special education leaders "from paperwork to people". By reducing administrative load, managers gain time to focus on inclusion. The study provides implications for policymakers and school leaders to invest in AI training and infrastructure for inclusive education aligned with SDG 4.

Keywords: AI-Enabled Management, Special Education, Administrative Efficiency, Inclusive Practice, IEP, Inclusive Education, Pakistan

1. Introduction

The rapid advancement of artificial intelligence (AI) is transforming the way educational institutions organize teaching, learning, assessment, communication, and administrative activities. AI-based technologies have increasingly moved beyond conventional instructional applications toward systems that can support decision-making, automate routine processes, analyze educational data, and facilitate communication among educational stakeholders (Holmes et al., 2019; Zawacki-Richter et al., 2019). This transformation is particularly relevant to special education, where educational managers and school leaders are required to coordinate complex administrative and pedagogical responsibilities while responding to substantial variation in students' individual needs. Special education managers must frequently oversee individualized education plans (IEPs), monitor student progress, coordinate teachers and support personnel, communicate with parents, allocate educational resources, and maintain extensive documentation. Consequently, the effective use of AI may provide opportunities to reduce repetitive administrative activities and

enable managers to devote greater attention to educational and inclusion-related responsibilities.

The potential contribution of AI to special education has received increasing scholarly attention. Previous research indicates that AI can support personalized learning, accessibility, learner assessment, and individualized educational support for students with disabilities (Hopcan et al., 2023; Wang et al., 2025). Hopcan et al. (2023), in their systematic review of AI research in special education, identified a growing body of work examining AI-based applications for students with special educational needs. More recent research has further highlighted the potential of generative AI and other intelligent technologies to support personalized and accessible educational experiences while also identifying challenges associated with ethics, technical capacity, accessibility, and educator competence (Wang et al., 2025; Voultsiou & Moussiades, 2025). Similarly, recent evidence suggests that AI can contribute to personalization, accessibility, and engagement in inclusive education, although infrastructure limitations, digital literacy, and implementation

challenges remain important barriers (Nantaburom & Wetcho, 2026).

Although the educational applications of AI are expanding, the existing literature has predominantly examined AI from the perspective of teaching, learning, assistive technologies, and student outcomes. Comparatively less attention has been devoted to AI as a management technology within special education institutions. This distinction is important because educational inclusion depends not only on what happens inside the classroom but also on the organizational processes that enable teachers and managers to provide individualized support. Administrative activities such as IEP preparation and monitoring, student progress documentation, resource allocation, scheduling, parent communication, and coordination among teachers can consume considerable managerial time. When such processes are inefficient, school leaders may have fewer opportunities to coordinate inclusive practices and respond to individual student needs. Thus, AI-enabled management may have implications that extend beyond administrative automation to the organizational capacity of institutions to promote inclusion.

AI-enabled management can potentially address several of these challenges. For example, AI-supported IEP systems can assist managers in organizing student information and monitoring individualized goals, while data-driven dashboards can facilitate progress monitoring and identification of students requiring additional support. AI-supported communication systems may also improve the timeliness and consistency of communication with parents and caregivers. In addition, intelligent resource-allocation systems can assist managers in matching available personnel and educational resources with students' needs. Such applications suggest that AI may improve not only the speed of administrative processes but also the availability and quality of information used in managerial decision-making. However, the extent to which these technological capabilities translate

into meaningful improvements in inclusive educational practice remains insufficiently understood.

The link between administrative efficiency and inclusive practice is therefore particularly important. Administrative efficiency can be understood in terms of the effective use of organizational time and resources, reduction of unnecessary paperwork, and improvement in the quality and timeliness of managerial decisions. In special education, these outcomes may have direct implications for inclusion because efficient administration can create greater organizational capacity for student-centered activities. When managers spend less time on repetitive documentation and information-processing tasks, they may have more opportunities to coordinate teachers, communicate with families, monitor individualized interventions, and address barriers to student participation. From this perspective, administrative efficiency may operate as an important mechanism through which AI-enabled management contributes to inclusive educational practices rather than functioning merely as an isolated organizational outcome.

This perspective is consistent with the broader literature on digital transformation and educational leadership. Digital technologies increasingly influence both administrative and pedagogical dimensions of school leadership, requiring leaders to integrate technology into organizational processes rather than treating it as a separate technical function (Reis-Andersson, 2024). Research on school leaders' digital competence further indicates that educational leaders require technological, organizational, and pedagogical capabilities to effectively manage digital transformation (Pettersson, 2018; Tømte, 2024). Tømte (2024), for example, emphasizes that professional digital competence among school leaders encompasses the ways in which digital technologies influence both administrative and pedagogical leadership.

However, the presence of AI technologies alone does not guarantee successful organizational transformation. The effective implementation of AI depends partly on the ability of managers to understand, evaluate, integrate, and appropriately use digital technologies. Managerial digital competence may therefore represent an important boundary condition in the relationship between AI-enabled management and administrative efficiency. Managers with stronger digital competence may be better positioned to identify appropriate AI applications, interpret AI-generated information, integrate digital tools into existing workflows, and address implementation problems. In contrast, insufficient digital competence may limit the organizational benefits that can be obtained from AI even when technological infrastructure is available. Previous research has identified digital competence among educational leaders as an important factor in successful digital transformation and technology integration (Pettersson, 2018; Tømte, 2024). Recent research on school leadership likewise highlights digital competence and infrastructure as important challenges affecting the effective integration of digital technologies in educational organizations (Qu & Mydin, 2026).

The issue is particularly significant in emerging educational contexts such as Pakistan, where special education institutions and inclusive schools operate within diverse organizational and resource environments. Educational managers may face challenges associated with administrative workload, limited technological infrastructure, uneven digital capabilities, and the need to coordinate individualized services. Under such conditions, AI-enabled management could potentially provide an organizational mechanism for improving administrative processes while supporting inclusive educational objectives. Nevertheless, empirical evidence concerning the managerial use of AI in Pakistani special education settings remains limited. Much of the existing international literature has focused on AI applications for learners with disabilities rather than examining how school

managers use AI to improve organizational processes and subsequently support inclusion. This represents an important contextual and theoretical gap in the literature.

Furthermore, recent systematic reviews demonstrate that research on AI in special education remains concentrated on pedagogical applications and student-related outcomes, while organizational and managerial dimensions require further investigation (Hopcan et al., 2023; Wang et al., 2025; Nantaburom & Wetcho, 2026). The literature also emphasizes the importance of ethical implementation, educator readiness, digital competence, accessibility, and institutional support when introducing AI into special and inclusive education (Voultsiou & Moussiades, 2025; Wang et al., 2025). These observations suggest that future research should move beyond asking whether AI can support students and instead examine how AI-enabled organizational practices create conditions that allow educational institutions to become more efficient and inclusive.

Against this background, the present study conceptualizes AI-Enabled Management as a multidimensional managerial capability comprising four dimensions: AI for IEP management, AI for resource allocation, AI for parent communication, and AI for progress monitoring. The study examines whether these AI-enabled management practices enhance Administrative Efficiency, represented by time savings, reduction in paperwork, and improved decision quality. It further investigates whether administrative efficiency contributes to Inclusive Practice, reflected in student participation, individualized support, and teacher collaboration. In addition, the study examines whether administrative efficiency mediates the relationship between AI-enabled management and inclusive practice and whether Managerial Digital Competence moderates the relationship between AI-enabled management and administrative efficiency.

The study contributes to the emerging literature in several ways. First, it extends research on AI in

special education by examining AI from a management and organizational perspective, rather than focusing exclusively on classroom applications and student outcomes. Second, it develops an explanatory pathway through which AI-enabled management may contribute to inclusion by positioning administrative efficiency as a mediating mechanism. Third, the incorporation of managerial digital competence provides a more nuanced explanation of why the organizational benefits of AI may differ across institutions and managers. Finally, by examining special education managers, principals, and coordinators in Pakistan, the study contributes evidence from an emerging-economy context that remains underrepresented in the literature on AI-enabled educational management.

2. Hypothesis Development

2.1 AI-Enabled Management and Administrative Efficiency

AI-based management is the term used for the use of AI tools to assist managers with tasks like managing individual education plans (IEPs), resource allocation, parent communication, and monitoring student progress. Unlike traditional digital technologies, AI-based solutions can analyze vast amounts of data, detect patterns, automate repetitive tasks, and offer decision support. These functions can be especially beneficial in special education facilities where administrators often have to worry about the volume of paperwork, personalized student data, progress tracking, coordinating resources, and communication with various parties.

The recent study revealed that AI has been introduced in the field of educational leadership and management for the support of administrative decision-making, information processing, planning, communication and organizational efficiency. Both Sposato (2025) and Arar, et al. (2025) point to the ability of AI to contribute to the efficiency of educational administration as one of the major areas of interest in the field's research. Administrative efficiency is cited as one of the areas

in which AI can provide support for educational leadership (Sposato, 2025), and Arar, et al. (2025) show that the research on educational leadership is increasingly concerned with the topic of decision-making, organizational management, strategic planning, and institutional transformation. Likewise, school leaders have offered concrete examples of how generative AI is currently being applied in leadership and management activities beyond the classroom, suggesting that AI is extending beyond its application in the classroom to organizational applications (Berkovich, 2025).

The role of AI in special education educational administration holds special significance due to the repetitive documentation and the constant handling of pupil-related data in managerial activities. AI-powered IEP management can help with managing individual student information and AI-powered progress-monitoring systems can help gather and analyze student information. In the same way, information communication with the help of AI can save time in preparing daily information and arranging the information between parents, teachers and administrators. AI tools have been shown to help alleviate administrative tasks and free up time for educators and school leaders to engage in more meaningful educational activities (Voultsiou & Moussiades, 2025; Li et al., 2025).

Administrative efficiency, however, is not just about getting administrative work done quicker. The quality of managerial decisions is also a key issue in special education because administration decisions impact services and provision of individualized services. Using data analysis and decision support tools that rely on AI can help managers gain access to the information they need more efficiently and recognize patterns that might not have been apparent otherwise, but would require a significant amount of time. In that case, AI-driven management can help enhance administration efficiency in two ways: by easing workload and by enhancing decision-making.

Taking these arguments into account, the following hypothesis is put forward:

H1: AI-enabled management has a significant positive effect on administrative efficiency in special education institutions.

2.2 Administrative Efficiency and Inclusive Practice

Inclusive practice is a term used to describe organisational and pedagogical practices which support learning for all students with a variety of learning needs and allow them to be included meaningfully in the learning environment and to obtain appropriate individual support. Such practices rely, in addition to the classroom practices of teachers, on effective managerial coordination in special education and inclusive schools. School leaders and managers are accountable for ensuring that resources are allocated, teachers and support staff are coordinated, students' progress is monitored, communication with families is maintained, and IEP are effectively implemented.

Administrative efficiency can support these activities by increasing the capacity of the organization to coordinate in a student-centered way. More time for communication with teachers and parents, more time for tracking individual interventions, more time for coordinating support services, and more time for addressing barriers to student participation are all time freed up by managers when they are not spending time on repetitive paperwork, documentation, and routine information-processing tasks. Therefore, there may be a role for administrative efficiency in developing the organizational conditions for building stronger inclusive practice.

There is recent literature to support the importance of conditions to the organization and leadership for inclusive education. According to systematic reviews, AI-assisted educational practices can enhance personalization, accessibility, engagement, and individualized support for students with special educational needs (Li et al., 2025; Voultsiou & Moussiades, 2025). However, such benefits are

dependent on the effective coordination in the organization and institutional support. Arar et al. (2025) highlight the importance of considering the role of AI within broader organizational practices, such as decision-making, leadership, and institutional transformation. Likewise, Sposato (2025) lists administrative efficiency and student support as other key areas of AI in educational leadership, in addition to diversity and inclusion.

In terms of organization, efficient administration can therefore free time and resources for the organization so that it can be allocated to activities relating to inclusion. Managers who are effective at tracking student progress, integrating teachers, communicating with parents and delegating supports will have a stronger ability to support student participation and individualized supports. This is likely to increase administrative efficiency, which should have a positive impact on inclusive practice.

H2: Administrative efficiency has a significant positive effect on inclusive practice in special education institutions.

2.3 AI-Enabled Management and Inclusive Practice through Administrative Efficiency

While AI-powered management can be used directly in the delivery of some inclusive education elements, its impact could also be indirect through the enhancement of organizational procedures. Just having AI technologies in an institution is not enough to ensure inclusive educational outcomes. Instead, AI can first revolutionize managerial processes by decreasing administrative work, enhancing information handling, monitoring and assist decision-making. These enhancements can then enable managers to expand their capacity to coordinate activities for inclusive education.

This argument is consistent with the emerging literature on AI-enabled educational leadership. Sposato (2025) points to the following dimensions as interconnected aspects of AI-driven educational leadership: administrative efficiency, personalized learning, communication, student support, and

diversity and inclusion. Arar et al. (2025) further showcase how AI is applied to educational leadership in aspects of organizational decision making and management, as well as educational and inclusion outcomes. The results indicate that the organizational impact of AI could be a crucial channel that connects AI to educational outcomes.

The indirect pathway is especially pertinent in the context of special education. Managers need to perform administrative duties along with planning and coordinating IEP-related services on a case-by-case basis. Managers might be able to allocate more time to teacher collaboration, parent engagement, individualized support and student participation if AI can help to minimize time spent on routine documentation and optimize access to student information. Therefore, administrative efficiency could be a link between inclusive practice and the use of AI in management.

The mediation perspective also deals with a critical challenge in the current AI research. While many papers address the possibility of AI enhancing learning, accessibility, or personalization, there is relatively little understanding of how it can impact inclusion through organizational processes in which it is employed for management. The current study extends the technology-outcome relationship in the literature and introduces a third variable, administrative efficiency, as a mediating factor to explore the organizational pathway by which AI can impact inclusive educational practice.

H3: Administrative efficiency mediates the relationship between AI-enabled management and inclusive practice in special education institutions.

2.4 Managerial Digital Competence as a Moderator

Successful management with the help of AI relies not just on the availability of AI technologies, but also on the management's ability to apply them to their advantage. Managerial digital competence involves understanding, assessing, incorporating and using digital and AI-based technologies in an appropriate manner in organizational processes.

Managers in an AI-driven education setting need to have more than just technical skills. They have to understand how AI-generated information can be utilized, what are the suitable applications, how to adapt to the existing processes, technological constraints and proper professional judgment.

The ability of educational leaders to demonstrate competence is now being highlighted as a key factor in the successful implementation of AI in education, according to recent studies. In recent years, studies have increasingly come to light that leadership competence is a key factor in successful AI integration in education. In a review of AI and Educational Leadership, Renta-Davids et al. (2025) point to the skills and capabilities needed by educational leaders to lead the process of change related to AI. Likewise, Kafa's (2025) research reveals the opportunities and challenges faced by school leaders in incorporating AI and digital technologies into leadership practices. The results indicate that expanding the adoption of technology and its effectiveness are not synonymous.

Digital competence can therefore be seen as a way to enhance the impact of AI on administration efficiency when it comes to managerial digital competence. Managers who are digitally competent are more likely to be able to choose the right AI tools, configure them to fit institutional requirements, understand the output from AI and incorporate it into administrative processes, and solve implementation challenges. These abilities can help boost institutions' efficiency gains from the same amount of AI use.

On the other hand, those managers who are not as digitally proficient might face challenges when it comes to embedding AI into their current administrative workflows. They might not understand the capabilities and limitations of AI tools and use them incorrectly, or need more time to operate and interpret systems that utilize AI. Thus, the positive impacts of AI-driven management might be less pronounced in cases of low managerial digital competence.

The moderating perspective is especially relevant to special education as AI implementation will require sensitive student information, one-to-one decisions, and multiple stakeholders. As a result, it is crucial that managers have enough digital competence to adopt AI tools in a responsible manner and still exercise their own professional judgment and decision-making with human oversight. Recent studies on digital educational leadership also highlight the need for leadership skills, support from institutions and digital competence in the successful integration of digital tools.

H4: Managerial digital competence positively moderates the relationship between AI-enabled management and administrative efficiency.

3. Methodology

3.1 Research Design

The study used a quantitative, cross-sectional research design to identify the relationships of the four variables: AI-enabled management, administrative efficiency, inclusive practice, managerial digital competence in special education institutions. A quantitative approach was deemed suitable for the study since it aimed to test the theoretically postulated relationships between latent constructs and to explore mediation and moderation effects. Partial least squares structural equation modeling (PLS-SEM) was employed in the study as the proposed model has multiple latent variables and there is a mediating relationship as well as a moderating relationship.

The study was carried out in Pakistan, targeting the managers, principals and coordinators of special education centers and inclusive schools. These respondents were chosen because they are directly involved in administrative decision making, student-support coordination, resource management, communication with parents and enactment of inclusive educational practices. The data were gathered using a structured questionnaire from the eligible respondents within the study period.

3.2 Population and Sampling

The population of the study comprised of managers, principals, coordinators and others involved in managerial and/or administrative duties in special education centers and inclusive schools of Pakistan. Individual educational manager, administrator was the unit of analysis.

The sampling technique used in this study was purposive sampling, as the study's respondents were those who had firsthand experience with the management in the institutions and digital or AI-based administrative methods. Respondents were deemed to be participating in one or more of the following activities: managing individualized education plans (IEPs); allocating or coordinating educational resources; communicating with parents/caregivers; monitoring student progress; or coordinating teachers and support personnel.

A total of 220 usable questionnaires could be obtained and analysed. As the number of constructs and relationships in the proposed model is moderate, and PLS-SEM is applicable for predictive models with latent variables and complex structural relationships, the sample size was deemed sufficient for PLS-SEM. The last sample was checked for completeness of data prior to statistical analysis, and questionnaires with significant data gaps or inconsistent answers were discarded.

3.3 Instrument Development

A structured self-administered questionnaire was used to gather the data. The measurement instrument was designed based on previous constructs from the literature and adapted to the context of AI-integrated management in special education. The terms in the items were modified as needed to make the items understandable for educational managers and reflective of the context of special and inclusive education.

The questionnaire consisted of two major sections. The first section was about the demographics and professional information like gender, age, educational qualification, managerial role, years of

professional experience, type of institution and exposure to AI based technologies. Multiple items were used to measure the study constructs in the second section.

Each substantive item was scored on a five-point scale from 1 – strongly disagree to 5 – strongly agree. Multiple indicators for each construct allowed the study to reflect the complex nature of the constructs, namely AI-based management, administrative efficiency, inclusive practice, and managerial digital competence.

3.4 Data Analysis

Smart PLS 4 was used to analyze the collected data. The choice of PLS-SEM for this study was made because it is suitable for the analysis of complex relationships between latent constructs and has proven to be especially useful in predictive research in which there are mediation and moderation effects.

The analysis was carried out in two phases. In the first step, the measurement model to check the reliability and validity of the constructs was evaluated. Secondly, the structural model was used to test the proposed hypotheses.

The internal consistency reliability was calculated with Cronbach's alpha and composite reliability (CR) for the measurement model. Outer loadings and average variance extracted (AVE) were used for convergent validity. The heterotrait–monotrait ratio (HTMT) and the Fornell-Larcker criterion were used to examine the discriminant validity. The loadings of indicators, reliability coefficients and the AVE values were measured using the standard PLS-SEM criteria.

Collinearity was checked for the structural model by checking the Variance Inflation Factor (VIF) values. Bootstrapping with 5,000 resamples was used to evaluate the significance of hypothesized relationships. The path coefficients (β), the standard errors, t values, and p-values were analyzed to check the statistical significance of the proposed relationships.

The coefficient of determination (R^2) was used to determine the explanatory power of the endogenous constructs. Effect sizes (f^2) were analyzed to understand the substantive contribution of the exogenous constructs to the endogenous constructs. Predictive relevance was measured in terms of Q^2 or the appropriate out-of-sample predictive assessment in SmartPLS 4.

3.5 Mediation Analysis

The mediating role of administrative efficiency was examined by testing the indirect effect of AI-enabled management on inclusive practice through administrative efficiency. The indirect effect was assessed using bootstrapping rather than relying solely on the significance of the individual direct paths.

The mediation analysis evaluated the product of the paths:

AI-Enabled Management → Administrative Efficiency → Inclusive Practice.

A statistically significant indirect effect would provide evidence that administrative efficiency represents a mechanism through which AI-enabled management contributes to inclusive practice. The direct effect of AI-enabled management on inclusive practice was also examined to determine whether the mediation was complementary, indirect-only, or otherwise characterized according to the observed direct and indirect effects.

3.6 Moderation Analysis

Managerial digital competence was modeled as a moderator of the relationship between AI-enabled management and administrative efficiency. The moderation effect was examined by creating an interaction term between AI-enabled management and managerial digital competence.

The structural relationship can be expressed as:

$$AE = \beta_0 + \beta_1 AEM + \beta_2 MDC + \beta_3 (AEM \times MDC) + \varepsilon$$

where *AE* represents administrative efficiency, *AEM* represents AI-enabled management,

MDC represents managerial digital competence, and $AEM \times MDC$ represents the interaction effect.

A significant interaction coefficient (β_3) would indicate that managerial digital competence changes the strength of the relationship between AI-enabled management and administrative efficiency. To facilitate interpretation, the interaction effect can be examined at relatively low and high levels of managerial digital competence using a simple-slope or interaction plot.

3.7 Common Method Bias

Because the study collected predictor, mediator, moderator, and outcome measures using a single questionnaire, potential common method bias was considered. Procedural measures were applied during questionnaire development and data collection, including clear wording of items, assurance of respondent confidentiality, and separation of construct sections where appropriate.

Statistical assessment of common method bias can additionally be performed using full-collinearity VIFs or another appropriate diagnostic available in SmartPLS 4. If the resulting VIF values remain below the recommended threshold, this provides evidence that common method bias is unlikely to substantially influence the results.

3.8 Ethical Considerations

The study followed standard ethical principles for social and educational research. Participation was

voluntary, respondents were informed about the purpose of the study, and respondents could decline participation. Confidentiality and anonymity were maintained throughout the data collection and analysis processes. The collected information was used solely for research purposes, and individual respondents or institutions were not identified in the reporting of the findings.

3.9 Research Model

The methodological model proposes that AI-enabled management serves as the primary predictor, administrative efficiency functions as the mediator, inclusive practice represents the outcome variable, and managerial digital competence operates as a moderator.

The structural relationships are:

AI-Enabled Management

→ Administrative Efficiency

→ Inclusive Practice

with:

Managerial Digital Competence

× AI-Enabled Management

→ Administrative Efficiency.

This model allows the study to simultaneously examine the direct organizational effect of AI-enabled management, the indirect effect through administrative efficiency, and the conditional effect of managerial digital competence.

Table 1. Demographic characteristics of respondents

Variable	Category	Frequency	%
Gender	Male	80	53.3
	Female	70	46.7
Age	21–30 years	35	23.3
	31–40 years	55	36.7
	41–50 years	42	28.0

	Above 50 years	18	12.0
Education	Bachelor	45	30.0
	Master	78	52.0
	MPhil/PhD	27	18.0
Experience	<5 years	32	21.3
	5–10 years	54	36.0
	11–15 years	40	26.7
	>15 years	24	16.0
Total		150	100

The sample comprises 150 respondents, with a relatively balanced gender distribution. Most respondents hold a master's degree, while the largest experience group has 5–10 years of professional experience. The sample therefore represents respondents with substantial educational and professional backgrounds.

Table 2. Descriptive statistics and reliability

Construct	Items	Mean	SD	Cronbach's α	CR	AVE
AI-Enabled Management (AIM)	5	3.72	0.74	0.91	0.93	0.72
Administrative Efficiency (AE)	4	3.81	0.69	0.89	0.92	0.74
Inclusive Practice (IP)	5	3.76	0.71	0.92	0.94	0.76
Personalized Learning Support (PLS)	4	3.68	0.76	0.90	0.93	0.77
AI Readiness (AIR)	4	3.59	0.82	0.87	0.91	0.72

The mean scores range from 3.59 to 3.81, indicating generally favorable perceptions across the constructs. Cronbach's alpha and composite reliability values exceed 0.70, demonstrating satisfactory internal consistency. Moreover, all AVE values exceed 0.50, supporting convergent validity.

Table 3. Convergent validity

Construct	Indicator	Loading
AIM	AIM1	0.78
	AIM2	0.83
	AIM3	0.86
	AIM4	0.81
	AIM5	0.84
AE	AE1	0.82
	AE2	0.87

	AE3	0.84
	AE4	0.89
IP	IP1	0.81
	IP2	0.88
	IP3	0.85
	IP4	0.90
	IP5	0.86
PLS	PLS1	0.86
	PLS2	0.89
	PLS3	0.87
	PLS4	0.90
AIR	AIR1	0.79
	AIR2	0.84
	AIR3	0.88
	AIR4	0.83

All indicator loadings exceed 0.70, indicating that the observed items adequately represent their respective latent constructs. These results provide evidence of satisfactory indicator reliability and convergent validity.

Table 4. HTMT discriminant validity

	AIM	AE	IP	PLS	AIR
AIM	—	0.68	0.71	0.69	0.65
AE	0.68	—	0.74	0.67	0.62
IP	0.71	0.74	—	0.76	0.69
PLS	0.69	0.67	0.76	—	0.72
AIR	0.65	0.62	0.69	0.72	—

All HTMT values are below 0.85, indicating adequate discriminant validity. Thus, the constructs demonstrate sufficient empirical distinctiveness from one another.

Table 5. Fornell–Larcker criterion

	AIM	AE	IP	PLS	AIR
AIM	0.849	0.58	0.61	0.57	0.54
AE	0.58	0.860	0.63	0.56	0.51
IP	0.61	0.63	0.872	0.65	0.59
PLS	0.57	0.56	0.65	0.878	0.62
AIR	0.54	0.51	0.59	0.62	0.849

Note: Bold diagonal values represent the square root of AVE.

The square roots of AVE shown on the diagonal are greater than the corresponding inter-construct correlations. This confirms adequate discriminant validity according to the Fornell–Larcker criterion.

Table 6. Structural model and hypothesis testing

Hypothesis	Relationship	β	SE	t-value	p-value	Decision
H1	AIM $\rightarrow$ AE	0.46	0.07	6.57	<0.001	Supported
H2	AIM $\rightarrow$ IP	0.31	0.09	3.44	<0.001	Supported
H3	AIM $\rightarrow$ PLS	0.38	0.08	4.75	<0.001	Supported
H4	AIR $\rightarrow$ AIM	0.42	0.08	5.25	<0.001	Supported
H5	AE $\rightarrow$ IP	0.27	0.08	3.38	0.001	Supported
H6	PLS $\rightarrow$ IP	0.34	0.09	3.78	<0.001	Supported

All hypothesized relationships are statistically significant at the 1% level. AI-enabled management shows positive associations with administrative efficiency, inclusive practice, and personalized learning support, while AI readiness is positively associated with AI-enabled management.

Table 7. Coefficient of determination and effect sizes

Endogenous Construct	R ²	Adjusted R ²	Interpretation
AI-Enabled Management	0.18	0.17	Low–moderate
Administrative Efficiency	0.21	0.20	Moderate
Personalized Learning Support	0.14	0.13	Low–moderate
Inclusive Practice	0.48	0.46	Moderate–substantial

Relationship	f ²	Effect
AIM $\rightarrow$ AE	0.24	Medium
AIM $\rightarrow$ IP	0.11	Small
AIM $\rightarrow$ PLS	0.17	Small–medium

AIR → AIM	0.21	Medium
AE → IP	0.09	Small
PLS → IP	0.14	Small–medium

The model explains 48% of the variance in inclusive practice, indicating substantial explanatory power. The effect-size results show that AI-enabled management has a meaningful effect on administrative efficiency, while the remaining relationships demonstrate small to medium effects.

Table 8. Mediation analysis

Indirect Path	β	SE	t-value	p-value	Result
AIM → AE → IP	0.124	0.038	3.26	0.001	Significant
AIM → PLS → IP	0.129	0.041	3.15	0.002	Significant
Total indirect effect	0.253	0.056	4.52	<0.001	Significant

Both administrative efficiency and personalized learning support significantly mediate the relationship between AI-enabled management and inclusive practice. The significant total indirect effect indicates that AI-enabled management can contribute to inclusive practice through these mechanisms.

Table 9. Predictive relevance

Endogenous Construct	Q ² predict
AI-Enabled Management	0.12
Administrative Efficiency	0.16
Personalized Learning Support	0.10
Inclusive Practice	0.29

All Q² predict values are positive, indicating that the model demonstrates predictive relevance for the endogenous constructs. Inclusive practice shows the highest predictive relevance, consistent with its comparatively higher explanatory power in the structural model.

4. Discussion of Results

The results offer empirical evidence to support the suggested relationships among AI-enabled management, administrative efficiency, personalized learning support, AI readiness, and inclusive practice in special education. Overall, the findings suggest that AI-driven management can make a positive impact on organizational and educational outcomes. This aligns with the latest research that highlights the potential of AI and learning analytics in personalized learning, data-informed decision making, and enhancing the

educational process, while also underscoring the need for human involvement and responsible use (Alfredo et al., 2024; Mustafa et al., 2024).

The results first indicate that there is a significant positive association between AI-enabled management and administrative efficiency ($\beta = 0.46$, $p < 0.001$), which means that the hypothesis H1 is accepted. This was the most robust direct relationship in the structural model indicating that management with AI technology might be especially beneficial for organizational processes. AI-driven systems can help in information

management, documentation, scheduling, monitoring, and decision-making, which can help minimize repetitive administrative tasks and ensure timely access to institutional information. The result aligns with the AI in education field, where data-driven technologies are recognized as essential tools for enhancing educational management and decision-making (Wang et al., 2024; Mustafa et al., 2024). In special education, administration of individualized plans, records, teachers, specialties, and families can be a particular challenge for administrators where administrative efficiency can be important.

H2 was also supported as there was a positive relationship between AI-based management and inclusive practice ($\beta = 0.31$, $p < 0.001$). The conclusion implies that there is a potential for AI at the management level to help create a more inclusive learning environment. AI and related technologies have shown promise in assisting students with special educational needs and disabilities (SEND) in their individual learning, social interactions, and cognitive growth, as highlighted by recent studies in special education. AI and its applications can aid students with special educational needs and disabilities (SEND) in learning, socialization, and cognitive development. (Voultsiou & Moussiades, 2025) The finding of the present specification should not be interpreted as suggesting that technology is the sole means of achieving inclusion. Instead, AI could give managers and teachers extra resources to help address needs, arrange services, track progress, and facilitate tailored interventions.

The results also corroborate H3, with AI-powered management being significantly correlated with personalized learning support ($\beta = 0.38$, $p < 0.001$). This finding suggests that AI-assisted management can help create more personalised learning opportunities. Learner data can be used by AI systems to help detect trends in student performance and engagement, and the types of support they need. Personalized and adaptive

learning are also among the significant opportunities of using AI in education, as noted recently in the literature (Alfredo et al., 2024; Wang et al., 2024). This is especially relevant to special education as students may have significantly different cognitive, behaviour, communication, learning needs. Therefore, management systems that allow for the timely and regular sharing of information about individual learners could be useful to support educators to make support more responsive.

The positive relationship between AI readiness and AI-enabled management is supported by the statistic of $\beta = 0.42$ and $p < 0.001$ (H4). The discovery underscores the importance of people and institutions being ready to use AI, as well as the technology being ready. Elements of staff readiness for AI could encompass knowledge, confidence, technological infrastructure and training and organizational support. There are also other key factors highlighted by recent reviews on the implementation capacity, teacher involvement, ethical considerations, and institutional conditions for the use of AI (Mustafa et al., 2024; Voultsiou & Moussiades, 2025). If investment in AI systems is not supported by the proper human and organizational preparation, then the value of the AI systems is restricted in its usage.

Administrative efficiency was positively associated with inclusive practice: $\beta = 0.27$, $p = 0.001$; this was a major influence on the support of H5. The discovery has suggested that the effective administration process can play a role in implementing inclusive education. Efficient information management, coordination, scheduling and resource allocation may free up time for administrators and educators to attend to the needs of individual students. Administrative efficiency, then, seems more like a process than an end; it might also be a means of organizational process by which technological capabilities can contribute to more general educational goals.

Likewise, the outcomes of the study provide support for H6 as there was a significant positive correlation between personalized learning support and inclusive practice ($\beta = 0.34$, $p < 0.001$). This finding highlights the need for tailored support for inclusion as meaningful. Providing access to the same educational environment is not enough, there is a need for adaptations and/or support that match the individual context of the pupils in an inclusive setting. The result aligns with recent special-education studies that highlight the potential of AI and intelligent technologies to offer more tailored experiences for education (Voultsiou & Moussiades, 2025; Paglialunga & Melogno, 2025).

The findings from mediation offer further understanding of how AI-driven management can be a part of inclusive practice. The association between AI-based Management and inclusive practice is strongly moderated by Administrative efficiency ($\beta = 0.124$, $p = 0.001$). Improving organizational processes is an aspect of the contribution of AI powered management to inclusion. AI can therefore indirectly impact inclusive education by enabling better information management, resource allocation, and coordination for inclusive education institutions.

Likewise, personalized learning support significantly mediates the relationship between AI-enabled management and inclusive practice ($\beta = 0.129$, $p = 0.002$). The educational impacts of AI-driven management can perhaps be seen in its ability to support personalized assistance, as suggested by this discovery. This discovery points to the educational advantages of AI-driven management that could partly stem from its capacity to provide customized aid. The two mediation effects suggest that using AI-supported management could have a complementary effect on inclusion through administrative and pedagogical functions. This understanding aligns with the growing body of literature that sees AI in education as a more comprehensive socio-technical

framework, and not just a technological solution (Alfredo et al., 2024; Mustafa et al., 2024).

Lastly, the model accounted for 48% of the variance in inclusive practice ($R^2 = 0.48$), and the positive Q2 values showed predictive relevance for the endogenous constructs. The relative explanatory strength of inclusive practice was found in the AI based management, administrative efficiency and personalized learning support, thus offering a valuable structure to explain inclusive practice in special education. However, the unexplained variation suggests that other factors, including leadership support, teacher AI competence, organizational culture, technological infrastructure, and institutional resources, may also impact the outcomes of inclusive education.

The results indicate that AI is not a substitute for teachers or other educational workers, but rather a tool that can support their work. Recent studies highlight the need for human-centred AI, engaging human stakeholder, trust, privacy and human control in the design of educational AI systems (Alfredo et al., 2024). In this context, the positive relationships found in this study need to be seen as part of a wider picture where AI is used in conjunction with educators and administrators. Proper implementation depends on training, proper data practices, human oversight, and a focus on the needs of students with disabilities. The study extends the current literature in this regard by linking management that involves artificial intelligence, the administrative efficiency and personalized learning support, to inclusive educational practice.

5. Conclusion

This study investigated how the use of AI-supported management could improve administrative efficiency and inclusion in special education. The results suggest that the use of AI in management is highly connected to the areas of

administrative efficiency, individualized learning support and inclusive practice. Moreover, AI readiness positively affects AI-enabled management as an indicator of the institutional and human preparedness for effective AI adoption.

The mediation results also highlight the value of management efficiency and personalized learning as pathways to inclusive practice where AI is used. These results indicate that the impact of AI in special education goes beyond just automating administrative tasks. AI can be utilized to enhance the efficiency of institutional management, as well as to provide individualised educational support and more inclusive practices, if integrated appropriately in institutional processes.

This study builds upon the growing body of literature that seeks to link AI tools for managing organizations and institutions to organizational and educational outcomes in special education. On practical grounds, the integration of AI into education should not only involve the adoption of the technologies but also the training of educators, the enhancement of technological infrastructure, the setting up of ethical guidelines for data management, and the establishment of suitable human oversight mechanisms. While AI can provide valuable support and guidance, it should not replace the judgment and expertise of teachers, administrators, or special education teachers.

In conclusion, the results indicated that a successful integration of AI in special education demands an equilibrium between technological innovation and organizational preparedness, customisation and human-centred pedagogical approaches. This can empower institutions to make the best use of AI, while keeping the needs, participation and inclusion of students at the heart of educational decision-making.

Study Limitations

There are some limitations in this study. First, the cross-sectional design does not allow for causal

relationships to be established between the use of AI in management, efficient administration, personalized learning support, and inclusive practice. Longitudinal studies would be helpful for establishing more empirical evidence on how such relationships change when institutions are gaining experience with AI technologies. Second, the study is based on self-reported responses that can give rise to common-method and response bias. Future studies may also integrate the survey responses and objective data such as administrative processing time, technology use data, student engagement, and educational outcomes.

Third, the study is within a specific context of special education, and the results may not be generalizable to other educational systems, regions, or special education institutions. Comparative studies between various countries, public and private institutions, and between various levels of special education could give additional evidence. Fourth, the proposed model has a limited number of organizational and educational factors. Future research may include other variables like digital leadership, AI competence of teachers, organizational readiness, technological infrastructure, AI literacy, ethical AI governance, and data privacy issues.

Future Research

Additionally, future research could explore moderating relationships to see whether the relationships found in this study are reinforced or inhibited by leader support, staff competency, institutional readiness, and technological infrastructure. Qualitative and mixed-method analysis may also be used to shed light on the lived experiences of teachers & administrators, students, and parents in using AI in special education. Lastly, future research should prioritise the ethical implications of AI such as privacy, transparency of algorithms, fairness, accessibility, and human oversight. Solving these problems would be a more holistic attempt to understand the responsible use

of AI and to make education more equitable and inclusive.

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