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The Impact of Digital Leadership in Enhancing Teaching Capacity through Data-Driven Strategies Among Faculty in Education Programs in China

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ABSTRACT

Objective: This study investigates the impact of digital leadership on enhancing teaching capacity through data-driven strategies among faculty in education programs in China. It focuses on how three key digital competencies—digital communication skills, decision-making proficiency, and digital leadership training—affect critical educational outcomes, including the implementation of data-driven instructional methods, student academic performance, and faculty participation in curriculum design. **Methodology:** A quantitative research approach was adopted, involving an online survey administered to 250 faculty members using a convenience sampling technique. The data was analysed using SPSS software, and various tests were conducted, including descriptive statistics, reliability coefficients testing, and regression analysis. **Results:** The results indicated positive correlations between all the variables. Digital communication skills accounted for 75.2% of the variance in the dependent variable, demonstrating a significant influence on the faculty's ability to implement data-driven instruction. Additionally, digital decision-making proficiency emerged as the most impactful predictor, explaining 77.1% of the variance in student academic performance. The relationship between digital leadership training and faculty participation in data-driven curriculum design was also positive, with the training explaining 73.4% of faculty involvement in curriculum development. **Conclusion:** Among all predictor's, digital decision-making proficiency was found to be the most crucial factor, significantly impacting student academic performance. Digital leadership training positively influenced faculty participation in data-driven curriculum design, underscoring the importance of equipping faculty with the skills needed for evidence-based teaching and curriculum development. **Implications:** This research emphasizes the critical role of digital leadership in improving faculty competencies, supporting evidence-based teaching practices, and enhancing student outcomes. The findings provide valuable insights for policymakers and educational institutions, guiding the design of effective professional development programs and the integration of digital technologies into educational frameworks.

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Introduction

Background

The integration of advanced technologies into educational systems has significantly altered traditional pedagogical methods and learning processes in recent years. According to Chu et al. (2023), digital leadership in China is increasingly recognised as a key driver in enhancing teaching capabilities, particularly within higher education institutions. Digital leadership is defined as the ability of educational leaders to cultivate proficiency in using technology and data to improve both faculty and student performance. Additionally, Teng et al. (2022) note that the national educational agenda in China involves the modernisation and innovation of education, with digital leadership being pivotal in improving teaching quality through data-driven practices.

Moreover, Zhao et al. (2023) highlight that China's educational framework is undergoing rapid transformation due to national initiatives, such as the Education Modernisation 2035 policy, which promotes the use of ICT in both teaching and learning. Preservice teachers enrolled in educational faculties, who are the future educators, must embrace these technological advancements to enhance their teaching effectiveness. Digital leadership facilitates the use of tools such as big data, learning analytics, and other technological innovations to analyse and improve teaching methods. Furthermore, Zhang et al. (2023) demonstrate that by providing insights from student performance data, classroom participation, and other learning metrics, faculty members can refine their teaching practices and incorporate best instructional strategies. Through the use of data analytics, educators can identify learning deficiencies, offer targeted support, and assess the efficacy of their teaching methods. Du (2022) emphasises that this is especially important in catalogue course offerings within education programs, where faculty members are responsible for preparing future educators to navigate the challenges of modern learning environments.

Despite the potential benefits, challenges remain in advancing the concept of digital leadership and adopting data-driven approaches in Chinese education programmes. Bibri (2021) argues that a significant portion of faculty members may lack digital literacy or have not been adequately trained in interpreting and integrating data into their teaching practices. Additionally, systemic limitations, such as insufficient technological support and resistance to change, hinder the achievement of educational goals. Consequently, the role of digital leaders is crucial in fostering professional learning communities, encouraging the acquisition of digital skills among faculty members, and equipping them with the necessary tools to transform teaching through data-driven methods.

Problem Statement

The relatively recent integration of digital technologies into education has highlighted the necessity for instructors in Chinese education programmes to enhance their teaching capabilities through the effective utilisation of data. However, numerous faculty members face challenges, including insufficient digital communication skills, limited decision-making competence, and inadequate training in digital leadership, all of which impede their ability to implement these strategies effectively. This gap undermines efforts to improve instructional methodologies, student academic performance, and curriculum

development. While digital leadership is recognised as a pivotal driver of educational innovation, its role in addressing these challenges remains underexplored Saaida (2023). Consequently, this study aims to examine how digital leadership and associated competencies impact faculty members' adoption of data-driven practices in educational programmes across China.

Research Objectives

- To examine the impact of digital communication skills on faculty members' ability to implement data-driven instructional methods in education programs in China.
- To analyse the effect of digital decision-making proficiency on the academic performance of students as perceived by faculty in education programs in China.
- To investigate the impact of digital leadership training on faculty participation in data-driven curriculum design in education programs in China.

Research Questions

- What is the impact of digital communication skills on faculty members' ability to implement data-driven instructional methods in education programs in China?
- How does digital decision-making proficiency affect the academic performance of students, as perceived by faculty in education programs in China?
- What is the impact of digital leadership training on faculty participation in data-driven curriculum design in education programs in China?

Significance of the Research

This research holds significant value as it offers insights into the role of digital leadership in enhancing the teaching capacity of faculty within Chinese education programmes. By investigating how digital communication skills, decision-making proficiency, and leadership training influence the adoption of data-driven practices, the study addresses key gaps in educational innovation. The findings can inform institutional leaders in the design of professional development programmes and policies that promote digital competence, thereby improving instructional quality, student outcomes, and the preparation of future educators within a rapidly changing educational landscape.

Literature Review

Chapter Overview

This chapter seeks to explore the relationship between digital communication competencies, decision-making abilities, and leadership training in promoting evidence-based practices among the teaching staff of Chinese education programmes. It includes a review of the theoretical background, focusing on Distributed Leadership Theory and the TPACK framework, the identification of gaps in existing literature, and the formulation of hypotheses regarding the application of digital leadership.

Digital Communication Skills and Data-Driven Instruction in China

The level of digital communication competence possessed by faculty members in Chinese education programmes is deemed sufficient for the implementation of timely and relevant data-driven instructional approaches. The effectiveness of instructional methods relies on the digital communication competencies of the faculty. Chu et al. (2023) defined digital communication competence as the proficient use of tools such as email, collaborative technologies, video conferencing software, and learning management systems (LMS). These skills enable faculty members to collaborate in the acquisition, implementation, dissemination, and application of knowledge, as well as to communicate information and plans to both faculty colleagues and students. Furthermore, Simelane-Mnisi (2023) highlighted that data-driven instruction involves the use of learner performance data to identify learning patterns, thereby facilitating instructional adjustments. Rahman et al. (2021) noted that the effective utilisation of digital communication skills allows faculty to conduct research, process data, seek feedback from others, and share results. For example, cloud-based analytics assist faculty in collaborating to analyse trends in student performance, enabling more timely and informed decision-making in instructional approaches.

In China, where digital transformation has notably reshaped educational processes, experienced and digitally proficient educators can seamlessly integrate new technologies and effectively utilise innovations such as AI-supported learning analytics in their teaching practices. They are also instrumental in promoting data sharing within their institutions (Strielkowski et al., 2024). Furthermore, the enhancement of these skills fosters collaborative efforts among teachers, school leaders, and students, all working towards the achievement of shared, data-driven educational objectives (Luo & Hsiao-Chin, 2023). As the Chinese education system continues to evolve with a greater emphasis on embracing the digital environment, it is crucial for faculty development programmes to address the development of digital communication competencies to ensure the effective application of data-driven instructional approaches, thereby improving the quality of teaching and learning.

Effect of Digital Decision-Making Proficiency on Student Performance in China

Decision-making digital literacy refers to educators' ability to utilise digital tools and data when making instructional decisions. Xu et al. (2024) highlighted its strong influence on student outcomes among faculty in Chinese education programmes. Proficient educators use learning analytics, assessment platforms, and intelligent dashboards to assess students' strengths, weaknesses, and areas for development. Similarly, Pan et al. (2024) noted that real-time data allows timely adjustments in teaching methods and support, especially for struggling students. For instance, online quiz results or learning management system data can help identify disengaged learners, prompting targeted interventions. Given China's competitive, data-driven education system, faculty skilled in digital decision-making find such tools essential for improving student performance. They can identify effective instructional strategies, allocate resources efficiently, and implement learner-centred designs (He & Zhu, 2017). Conversely, those lacking this competence may struggle to interpret digital data, missing opportunities to enhance learning. As Mehrvarz et al. (2021) observed, data-informed decisions are vital for promoting student

achievement. Therefore, capacity-building programmes that enhance these skills among Chinese educators can significantly refine teaching practices in an increasingly digitalised educational landscape.

Digital Leadership Training and Curriculum Design in China

Professional development equips faculty with the skills and mindset to lead change by integrating technology and data into teaching. Wu et al. (2022) noted that it enhances their ability to drive innovation, engage stakeholders, and apply data in curriculum design, thereby increasing their involvement in shaping education programmes in China. According to Hou et al. (2024), faculty trained in digital leadership are better positioned to initiate curriculum development and set data-driven teaching objectives aligned with students' and institutional needs. In China's innovation-focused education reforms, faculty engagement with data in curriculum design is crucial to meeting policy goals. Digital leadership training helps overcome barriers such as resistance to change, limited technical skills, and insufficient data literacy (Zhang et al., 2017). Trained leaders can promote data-informed practices, support peers, and lead the creation of future-ready, research-based curricula. Furthermore, such training fosters a growth mindset, enabling educators to see curriculum design as a process of continuous improvement (Kang & Xu, 2024). Thus, investing in digital leadership development can help Chinese institutions cultivate faculty capable of crafting curricula that prepare students for an evolving global context.

Theoretical Framework

This study is grounded in Distributed Leadership Theory and the Technological Pedagogical Content Knowledge (TPACK) framework, which explain how digital leadership and related competencies influence the levels of data utilisation and engagement by faculty members in Chinese education programmes.

Distributed Leadership Theory

Distributed Leadership Theory underscores the collaborative and shared nature of leadership within an organisation, rather than concentrating power in the hands of a single leader. This theory is particularly relevant to digital leadership, as it emphasises the importance of empowering faculty members to assume leadership roles in the implementation of data-driven strategies (Lu, 2022). By distributing leadership responsibilities, institutions cultivate collective ownership of digital transformation, enabling faculty to actively engage in decision-making, curriculum design, and the integration of data-driven instructional approaches.

TPACK Framework

The TPACK Framework offers a basis for understanding the integration of technology, pedagogy, and content knowledge to improve teaching. Faculty competence in data-driven approaches relies on effectively merging these domains. For instance, digital decision-making (technology) should align with sound pedagogy to achieve subject-specific objectives (content) (Depew, 2015).

Research Hypothesis

The hypotheses of this study are presented in Table 1.

Table 1

Research Hypothesis

Hypothesis (H1)	Null Hypothesis (H0)
H1.1: Digital communication skills positively impact faculty members' ability to implement data-driven instructional methods in education programs in China.	H0.1: Digital communication skills do not significantly impact faculty members' ability to implement data-driven instructional methods in education programs in China.
H1.2: Digital decision-making proficiency positively affects the academic performance of students, as perceived by faculty in education programs in China.	H0.2: Digital decision-making proficiency does not significantly affect the academic performance of students, as perceived by faculty in education programs in China.
H1.3: Digital leadership training positively impacts faculty participation in data-driven curriculum design in education programs in China.	H0.3: Digital leadership training does not significantly impact faculty participation in data-driven curriculum design in education programs in China.

Literature Gap

Despite extensive research on the integration of digital tools in education, there is a lack of in-depth exploration regarding how digital communication skills, decision-making proficiency, and leadership training collectively influence faculty adoption of data-driven strategies in Chinese education programmes. Existing studies typically concentrate on individual components, rather than examining the interrelationship between these factors. This gap underscores the necessity of investigating how digital leadership enhances faculty capacity to implement data-driven practices, thereby improving teaching quality and student outcomes.

Research Methodology

Overview

This chapter outlines the methodology adopted to examine how digital leadership enhances teaching capacity through data-driven strategies among faculty in Chinese education programmes. It details the research approach, data collection methods, sampling techniques, data analysis procedures, and ethical considerations.

Research Method

This study employed a quantitative approach to collect numerical data, allowing the effects of digital communication skills, decision-making abilities, and digital leadership training on data-driven teaching practices to be measured and compared. This method facilitated hypothesis testing and statistical inference regarding the influence of digital leadership on teaching capacity among faculty in Chinese education programmes. The

primary objective was to gather first-hand data from faculty members concerning their attitudes towards and use of online technologies and quantitative methods in education and training. In this regard, Mohajan (2020) described quantitative research as a structured process focused on collecting and analysing numerical data to identify patterns, relationships, and phenomena. It supports hypothesis testing, data measurement, and evaluation of findings, with emphasis on accuracy, reliability, and objectivity, enabling generalisation of results to broader populations.

Research Design

The study adopted a primary research design, using an online survey to collect data directly from participants. This approach was suitable for capturing insights from individuals involved in education programmes or institutions, allowing them to share their experiences voluntarily. According to Schoonenboom and Johnson (2017), primary research involves the collection of original data from first-hand sources through methods such as questionnaires, interviews, focus groups, observations, or experiments, depending on the research question. The choice of a quantitative, qualitative, or mixed-methods design depends on the study's aims, target audience, and data requirements. A well-structured design is essential to ensure the reliability, validity, and relevance of the data collected.

Data Collection

Data were collected using an online, self-administered questionnaire. The survey items aimed to assess faculty members' self-perceived digital communication skills, decision-making abilities involving digital tools in teaching, and participation in technology-related leadership training. A 5-point Likert scale was employed to quantify responses ranging from Strongly Disagree to Strongly Agree. This scale allows subjective attitudes, opinions, and perceptions to be measured statistically. As noted by Khan (2024), online questionnaires are valuable tools due to their convenience, cost-effectiveness, and ability to reach large and diverse populations. They facilitate efficient data collection without geographic constraints.

Sampling Technique and Sample Size

A convenience sampling method was used to recruit participants for the study. This approach was chosen due to its practicality, as faculty members within the target population were generally accessible and willing to complete the questionnaire. The sample included faculty from teacher training institutions and education departments in Chinese universities and colleges, all with prior experience using digital tools and data in their teaching. A total of 250 participants were selected to ensure sufficient statistical power and variability for generalisation of the findings. The survey was administered with participants' consent, based on their relevance to the research focus. Convenience sampling is a non-probability technique where participants are selected based on their availability, ease of access, and willingness to participate. It is commonly used in exploratory studies or when resources such as time, funds, or access to a larger sample are limited (Stratton, 2021). This method is simple to implement, cost-effective, and efficient, making it suitable for pilot or feasibility studies.

Data Analysis

The data collected were analysed using the SPSS software. SPSS facilitates both descriptive and inferential statistical analyses, ensuring the validity of the results. Descriptive statistics were employed to generate frequency distributions for the demographic data of participants, providing an overview of their characteristics. Reliability testing was conducted using Cronbach's alpha to assess the internal consistency of the survey items. Regression analysis was utilised to determine the correlations between the independent variables—namely, digital communication skills, decision-making proficiency, and leadership training—and the dependent variables, including data-driven instruction, student outcomes, and curriculum development. Furthermore, regression analysis was applied to measure the strength and direction of the relationships between these variables. These statistical procedures provide the necessary evidence to support or refute the research hypotheses, thereby enabling valid conclusions to be drawn.

Ethical Considerations

The ethical standards for this research were meticulously followed to ensure the study's objectives were achieved without compromising participant rights. To mitigate any bias, informed consent was obtained from all participants, who were made fully aware of the study's purpose and procedures. Participation was voluntary, and participants had the right to withdraw at any point during the study without facing any negative consequences.

Results

Overview

This chapter outlines the statistical tests employed in the study to evaluate the proposed research hypotheses, including descriptive analysis, reliability analysis, normality analysis, correlation analysis, and regression analysis.

Descriptive Analysis

The survey in Table 2 yielded 250 valid responses for each variable (Age Group, Gender, and Years of Experience) with no missing values. This ensures a comprehensive and reliable dataset for accurate analysis and interpretation across all three demographic categories. Moreover, the majority of participants (32.4%) are aged 30–39, followed by 40–49 (26.8%) and 20–29 (25.2%). Only 15.6% are 50 or older. This age distribution suggests that the sample consists primarily of younger and middle-aged professionals, with fewer older participants. Table 3 indicates a higher representation of early and mid-career professionals in this study.

Table 2

Descriptive Statistics

		Statistics		
		Age Group	Gender	Years of Experience
N	Valid	250	250	250
	Missing	0	0	0

Table 3

Age Group

Age Group					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	20–29	63	25.2	25.2	25.2
	30–39	81	32.4	32.4	57.6
	40–49	67	26.8	26.8	84.4
	50 and Above	39	15.6	15.6	100.0
	Total	250	100.0	100.0	

The sample is almost evenly divided between males (48.4%) and females (46.4%), with 5.2% choosing not to disclose their gender. This reflects a balanced gender distribution, with a small proportion of participants opting for anonymity, as shown in Table 4. Furthermore, the majority of respondents reported having 5–10 years of experience (30.0%), followed by those with over 15 years (25.2%), under 5 years (22.8%), and 11–15 years (22.0%). The data presented in Table 5 reflects a varied spectrum of professional experience, with substantial representation from both early-career educators and more experienced practitioners.

Table 4

Gender

Gender					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Female	116	46.4	46.4	46.4
	Male	121	48.4	48.4	94.8
	Prefer not to say	13	5.2	5.2	100.0
	Total	250	100.0	100.0	

Table 5

Experience

Years of Experience					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	11–15 Years	55	22.0	22.0	22.0
	5–10 Years	75	30.0	30.0	52.0
	Less than 5 Years	57	22.8	22.8	74.8
	More than 15 Years	63	25.2	25.2	100.0
	Total	250	100.0	100.0	

Reliability Analysis

The instrument used to evaluate digital communication skills exhibits strong reliability, as evidenced by a Cronbach's Alpha coefficient of 0.861 across five items. As shown in Table 6, this indicates a high degree of internal consistency, confirming that the items effectively assess the same underlying construct. Such reliability enhances the trustworthiness of the results, rendering the scale appropriate for measuring individuals' proficiency in digital communication.

Table 6

Digital Communication Skills

Reliability Statistics	
Cronbach's Alpha	N of Items
.861	5

Scale: Faculty's Ability to Implement Data-Driven Instructional Methods

The scale demonstrates high reliability, as indicated by a Cronbach's Alpha coefficient of 0.862 across five items, as presented in Table 7. This elevated value reflects the scale's precision in assessing faculty competence in employing data-driven instructional strategies.

Table 7

Faculty's Ability to Implement Data-Driven Instructional Methods

Reliability Statistics	
Cronbach's Alpha	N of Items
.862	5

Scale: Digital Decision-Making Proficiency

The reliability values for the digital decision-making proficiency scale are strong, with a Cronbach's Alpha value of 0.861 for the five-item scale. As shown in Table 8, this suggests that the scale effectively measures the intended factor and demonstrates its validity in assessing decision-making ability in digital environments.

Table 8

Digital Decision-Making Proficiency

Reliability Statistics	
Cronbach's Alpha	N of Items
.861	5

Scale: Academic Performance of Students

This scale exhibits high reliability, evidenced by a Cronbach's Alpha value of 0.866 across five items. The strong internal consistency coefficient indicates the scale's suitability for accurately assessing students' academic performance, thereby supporting its effective application in the analysis presented in Table 9. In addition to this, the scale measuring digital leadership training demonstrates acceptable reliability, with a Cronbach's Alpha coefficient of 0.864 across five items. As indicated in Table 10, this reflects strong internal consistency and construct validity, confirming that the items effectively measure the same underlying concept and yield coherent results. Moreover, this scale also demonstrates high reliability, with a Cronbach's Alpha coefficient of 0.859 across five items. As shown in Table 11, this internal consistency minimises ambiguity in assessing the extent of faculty engagement in the development of data-informed curricula, thereby supporting the research reliability of the instrument.

Table 9

Academic Performance of Students

Reliability Statistics	
Cronbach's Alpha	N of Items
.866	5

Table 10

Digital Leadership Training

Reliability Statistics	
Cronbach's Alpha	N of Items
.864	5

Table 11

Faculty Participation in Data-Driven Curriculum Design

Reliability Statistics	
Cronbach's Alpha	N of Items
.859	5

Normality Analysis

Normality was assessed using both the Kolmogorov-Smirnov and Shapiro-Wilk tests across six measurement scales. For all scales, the significance values (Sig.) were .000 in both tests, indicating a statistically significant deviation from normality at $p < .05$. The Kolmogorov-Smirnov statistics ranged from .151 to .176, while the Shapiro-Wilk statistics varied between .907 and .917. As presented in Table 12, the findings indicate that the datasets for Digital Communication Skills, Faculty's Capacity to Implement Data-Driven Instructional Methods, Digital Decision-Making Proficiency, Academic Performance of Students, Digital Leadership Training, and Faculty Involvement in Data-Driven Curriculum Design deviate from a normal distribution. Therefore, the application of non-parametric methods may be more suitable for subsequent analyses.

Table 12

Tests of Normality

Tests of Normality						
	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Digital Communication Skills	.163	250	.000	.912	250	.000
Faculty's Ability to Implement Data-Driven Instructional Methods	.156	250	.000	.908	250	.000
Digital Decision-Making Proficiency	.176	250	.000	.907	250	.000
Academic Performance of Students	.156	250	.000	.911	250	.000
Digital Leadership Training	.151	250	.000	.915	250	.000
Faculty Participation in Data-Driven Curriculum Design	.160	250	.000	.917	250	.000

a. Lilliefors Significance Correction

Correlation and Regression Analysis

Impact of Digital Communication Skills on Faculty's Ability to Implement Data-Driven Instructional Methods

The model reveals a strong relationship between Digital Communication Skills and Faculty's Ability to Implement Data-Driven Instructional Methods, with an R value of 0.867. The R Square value of 0.752 indicates that 75.2% of the variance in the dependent variable is explained by Digital Communication Skills, highlighting substantial predictive power. The Adjusted R Square (0.751) confirms the model's stability, while the low standard error (0.593) suggests precise predictions. Overall, the results in Table 13 demonstrate that Digital Communication Skills are a robust predictor of faculty's ability to implement data-driven methods.

Table 13

Model Summary

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.867[a]	.752	.751	.593

a. Predictors: (Constant), Digital Communication Skills

The analysis of variance confirms the statistical significance of the regression model, evidenced by an F value of 750.625 and a p-value less than 0.001. This indicates a strong and significant association between Digital Communication Skills and the Faculty's Capacity to Implement Data-Driven Instructional Methods. The high F value reflects the robustness of the model, suggesting that a substantial proportion of the variance in the dependent variable can be explained by the predictor. As illustrated in Table 14, these findings support the hypothesis that Digital Communication Skills serve as a significant and dependable predictor. The unstandardized coefficient (B = 0.864) indicates that for every unit change in Digital Communication Skills, Faculty's Ability to Implement Data-Driven Instructional Methods will increase by 0.864 units. The standardized Beta value (0.867) strengthens the evidence of a strong positive effect of the predictor. Both the constant ($p < 0.001$) and Digital Communication Skills ($p < 0.001$) are statistically significant, confirming the model's robustness. The high t-value (27.398) further supports the predictor's strong influence. These results in Table 15 confirm that Digital Communication Skills are a crucial factor in predicting faculty's ability to implement data-driven instructional methods.

Table 14

ANOVA

ANOVA[a]						
	Model	Sum of Squares	df	Mean Square	F	Sig.
1	Regression	264.776	1	264.776	750.625	.000[b]
	Residual	87.480	248	.353		
	Total	352.256	249			

a. Dependent Variable: Faculty's Ability to Implement Data-Driven Instructional Methods

b. Predictors: (Constant), Digital Communication Skills

Table 15

Coefficients[a]

Coefficients[a]						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.437	.108		4.037	.000
	Digital Communication Skills	.864	.032	.867	27.398	.000

a. Dependent Variable: Faculty's Ability to Implement Data-Driven Instructional Methods

Impact of Digital Decision-Making Proficiency on Academic Performance of Students

The model presented in Table 16 illustrates a robust positive correlation between Digital Decision-Making Proficiency and students' Academic Performance, with an R value of 0.878. The R Square value of 0.771 indicates that 77.1% of the variation in students' academic performance is accounted for by digital decision-making proficiency. The Adjusted R Square of 0.770 confirms the model's consistency, and the low standard error (0.593) highlights the model's precision in forecasting academic performance based on digital decision-making capabilities. The ANOVA results in Table 17 further confirm the statistical significance of the regression model, with an F value of 834.158 and a p-value below 0.001. The high F statistic reflects the model's substantial explanatory power, indicating that Digital Decision-Making Proficiency is a key predictor of academic performance. The breakdown of the sum of squares shows that most of the variation in students' academic achievement can be attributed to the independent variable.

Table 16

Model Summary

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.878[a]	.771	.770	.592754532338325

a. Predictors: (Constant), Digital Decision-Making Proficiency

Table 17

ANOVA

ANOVA[a]						
	Model	Sum of Squares	df	Mean Square	F	Sig.
1	Regression	293.088	1	293.088	834.158	.000[b]
	Residual	87.137	248	.351		
	Total	380.225	249			

a. Dependent Variable: Academic Performance of Students
b. Predictors: (Constant), Digital Decision-Making Proficiency

The unstandardised coefficient (B = 0.920) indicates that each unit increase in Digital Decision-Making Proficiency corresponds to a 0.920-unit rise in students' Academic Performance. The standardised Beta coefficient (0.878) reinforces the substantial positive effect of the predictor. Both the constant ($p = 0.035$) and the predictor variable ($p < 0.001$)

are statistically significant, while the high t-value (28.882) further substantiates the predictor's influence. These results, as shown in Table 18, affirm that Digital Decision-Making Proficiency plays a significant role in enhancing students' Academic Performance.

Table 18

Coefficients

Coefficients[a]						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.229	.108		2.119	.035
	Digital Decision-Making Proficiency	.920	.032	.878	28.882	.000

a. Dependent Variable: Academic Performance of Students

Impact of Digital Leadership Training on Faculty Participation in Data-Driven Curriculum Design

The model in Table 19 reveals a strong positive relationship between Digital Leadership Training and Faculty Participation in Data-Driven Curriculum Design, with an R value of 0.857. The R Square value of 0.734 shows that 73.4% of the variance in faculty participation is explained by digital leadership training. The Adjusted R Square (0.733) affirms the model's reliability, while the low standard error (0.616) indicates that the predictions are accurate and precise. Moreover, the ANOVA results presented in Table 20 show that the regression model is highly significant ($F = 683.651$, $p < 0.001$). The substantial F value highlights the model's strong explanatory power, with Digital Leadership Training serving as a significant predictor of Faculty Participation in Data-Driven Curriculum Design. The predictor accounts for most of the variability in the dependent variable.

Table 19

Model Summary

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.857[a]	.734	.733	.616017077211463

a. Predictors: (Constant), Digital Leadership Training

Table 20

ANOVA

ANOVA[a]						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	259.430	1	259.430	683.651	.000[b]
	Residual	94.110	248	.379		
	Total	353.540	249			

a. Dependent Variable: Faculty Participation in Data-Driven Curriculum Design
b. Predictors: (Constant), Digital Leadership Training

The unstandardized coefficient (B = 0.845) in Table 21 indicates that for every unit increase in Digital Leadership Training, Faculty Participation in Data-Driven Curriculum Design increases by 0.845 units. The standardized Beta value (0.857) further confirms the

strong positive impact of this predictor. Both the constant ($p < 0.001$) and Digital Leadership Training ($p < 0.001$) are statistically significant, and the high t-value (26.147) supports the predictor's substantial influence, establishing Digital Leadership Training as a crucial factor in enhancing faculty involvement in data-driven curriculum design.

Table 21

Coefficients

Coefficients[a]						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.487	.110		4.422	.000
	Digital Leadership Training	.845	.032	.857	26.147	.000
a. Dependent Variable: Faculty Participation in Data-Driven Curriculum Design						

Discussion

This research demonstrates a significant relationship between Digital Communication Skills and faculty readiness to implement Data-Driven Instructional Methods. Specifically, the independent variable explains 75.2% of the variation in the dependent variable ($R^2 = 0.752$). The strong positive relationship is further supported by a standardized Beta value of 0.867, indicating that faculty with higher digital communication skills are better positioned to incorporate data into their instructional practices. These findings align with those of Fodor et al. (2021), who emphasized the critical role of digital media in helping educators interpret and apply data to improve instructional quality. IT competencies enable instructors to engage with technologies, collaborate with peers, and share information, which is essential for fostering data-based instructional practices.

Additionally, Botvin et al. (2023) argued that the integration of leadership and digital communication skills enhances faculty capacity to share and apply data insights, facilitating decision-making in curriculum development and teaching strategies. Rahman et al. (2021) also highlighted that training interventions focused on these competencies improve faculty preparedness to use data tools, enabling more effective teaching in technology-driven environments. These results underscore the importance of strengthening digital communication skills as a key strategy for equipping faculty to effectively use data in their teaching practices. Consequently, institutions should ensure that their faculty members receive targeted training in digital communication to enhance their ability to use data meaningfully. Based on these findings, the hypothesis that "Digital Communication Skills positively impact Faculty's Ability to Implement Data-Driven Instructional Methods" is accepted.

This research demonstrates that Digital Decision-Making Proficiency is a significant and influential variable, accounting for 77.1% of the variance in students' academic performance ($R^2 = 0.771$). The results further indicate that digital decision-making has a strong and positive impact, as evidenced by the high standardized Beta value of 0.878. This suggests that faculty members with strong digital decision-making skills leverage student performance data as a valuable insight to enhance teaching effectiveness. These findings

align with the research of Cabero-Almenara et al. (2022), who argue that a data-driven decision-making approach is essential for supporting student achievement. Faculty proficient in digital decision-making can assess learning analytics, identify appropriate interventions, and design instructional strategies to address diverse student needs. This capability enables educators to intervene effectively, monitor areas of student activity and achievement, and refine educational processes, leading to more effective teaching strategies (Mengash, 2020). The real-time use of student performance data facilitates the promotion of student-centred learning approaches, which have been shown to improve retention and performance. Additionally, the growing importance of technology in education highlights the need to equip educators with decision-making skills. Educational institutions must invest in professional development programmes to support faculty in making informed decisions regarding the use of digital tools in student education (Mehrvarz et al., 2021). Based on these findings, the hypothesis that Digital Decision-Making Proficiency positively impacts students' academic performance is accepted.

The results of this study indicate a positive correlation between Digital Leadership Training and Faculty Participation in Data-Driven Curriculum Design, with the explained variance being notably high at 73.4% ($R^2 = 0.734$). The mean Beta estimate of 0.857 suggests a strong standardized Beta value, demonstrating that as the level of digital leadership proficiency increases, so does the likelihood of faculty members incorporate data-driven approaches into curriculum design. These findings are consistent with the study by Thelma et al. (2024), which highlighted the essential role of leadership training in preparing educators to facilitate data-driven instructional improvements. The present results align with this literature, demonstrating that digital leadership training enhances faculty involvement in decision-making processes, particularly in interdisciplinary settings, by increasing their confidence and competencies. Furthermore, faculty members who have undergone digital leadership training are more adept at integrating data trends into curriculum development, learning outcomes, and institutional objectives, as well as promoting the use of data within their respective departments.

Additionally, Lacerenza et al. (2017) argued that leadership training not only enhances collaboration among faculty but also strengthens their ability to advocate for innovative, evidence-based teaching methodologies. This study contributes to the growing body of evidence that underscores the importance of digital leadership in improving faculty participation in curriculum development. Furthermore, Lu (2020) emphasized that when institutions prioritize leadership training, they foster a culture of data use, which enhances the quality and relevance of education and curriculum. Consequently, leadership development programs should be integrated into institutional strategies to promote faculty engagement in evidence-based practices. Based on these findings, the hypothesis that Digital Leadership Training positively impacts Faculty Participation in Data-Driven Curriculum Design is accepted as depicted in the Table 22. Considering these findings, all three hypotheses are accepted.

Table 22

Hypothesis Results

Hypothesis	Result	Conclusion
H1: Digital Communication Skills positively impact Faculty's Ability	Accepted	Digital Communication Skills explain 75.2% of the variance in

to Implement Data-Driven Instructional Methods.		faculty's ability to implement data-driven methods.
H2: Digital Decision-Making Proficiency positively impacts Academic Performance of Students.	Accepted	Digital Decision-Making Proficiency explains 77.1% of the variance in students' academic performance.
H3: Digital Leadership Training positively impacts Faculty Participation in Data-Driven Curriculum Design.	Accepted	Digital Leadership Training explains 73.4% of the variance in faculty participation in data-driven curriculum design.

Conclusion

This study examined the impact of digital leadership on improving teaching proficiency through data-driven practices among faculty in education programmes in China. The results revealed positive correlations between digital competencies (communication, decision-making, and leadership training) and key educational outcomes. Digital Communication Skills were found to be crucial in enabling faculty to integrate data-driven teaching approaches, explaining 75.2% of the variation in this ability. This suggests that improving digital communication enhances faculty's capacity to access, analyse, and apply data to refine teaching pedagogy. Similarly, Digital Decision-Making Proficiency had a significant effect on student performance, accounting for 77.1% of the variance. Faculties with stronger decision-making skills were better able to leverage data analytics to adjust teaching strategies and improve student outcomes. Digital Leadership Training was also significantly linked to faculty participation in data-driven curriculum design, explaining 73.4% of the variance. Faculty members with digital leadership training were more adept at applying data trends to course design, leading change, and fostering evidence-based educational practices.

These findings align with previous studies emphasising the role of digital competencies in enhancing data-driven learning. Consequently, it is crucial for faculty development programmes in Chinese colleges to focus on strengthening digital communication, decision-making, and leadership skills to better equip faculty for implementing data-led strategies. As educational practices evolve, the adoption of technology and data-driven solutions is vital, making digital leadership essential for addressing emerging teaching and learning needs. This study contributes to the ongoing discussion about technology integration in education and highlights the need for professional development to improve faculty digital literacy. Hypothesis testing confirmed the relationship between digital leadership and educational outcomes. Educational institutions that refine faculty's digital communication, decision-making, and leadership abilities can improve teaching quality and student performance. Additionally, digital leadership training helps educators drive change, overcome resistance, and foster collaborative cultures in curriculum development.

Recommendations

Professional Development Programs: It is recommended that academic institutions invest in enhancing faculty development programmes focused on communication, decision-making, and leadership in relation to technology use. These programmes should

integrate the application of skills related to data-driven teaching and learning, as well as the use of advanced tools such as artificial intelligence and learning analytics.

Digital Literacy Initiatives: Monitoring and improving the digital competence of faculty members in higher education institutions is essential. Specific training sessions should be provided to address areas of lower performance, incorporating technologies like learning management systems and collaborative platforms into these initiatives.

Policy Support: The Chinese government and educational policymakers should create policies that prioritise digital leadership as part of professional development. Incentives, such as rewards, should be offered to faculty members who effectively incorporate data analysis into their teaching and lead in educational development.

Collaboration and Peer Learning: Establishing learning communities where teachers can share experiences, strategies, and challenges related to teaching and learning data literacy is highly beneficial. These communities can provide opportunities for peer learning and collaborative problem-solving.

Technology Integration: Ensuring that faculty have access to sufficient physical resources, such as data analytical tools and smart dashboards, is crucial for the effective use of technology in education. Institutions should also establish technical support teams to assist faculty in managing and utilising these tools effectively.

Leadership Pathways: Institutions should assess potential leaders within the faculty and provide opportunities for these individuals to engage in leadership training programmes. This approach will help develop a pipeline of digital leaders capable of driving educational change based on best practices.

Limitations

Firstly, the reliance on self-administered questionnaires for data collection introduces the possibility of biases or inaccuracies in the responses due to the nature of self-reporting. Secondly, the use of convenience sampling limits the ability to generalize the findings to the broader population of faculty across China. Thirdly, the research focused exclusively on faculty from education departments, excluding other faculties that may also be engaged in or receptive to digital leadership practices. Lastly, the study did not account for regional variations in the adoption of digital practices across different provinces in China.

Future Directions

Future studies should consider extending the duration of training programmes to assess the long-term impact on faculty members and explore a broader range of student learning outcomes. Additionally, incorporating qualitative methods such as interviews or focus groups would provide valuable insights into faculty perceptions and the barriers to integrating digital competencies. Researchers should also investigate how institutional culture, funding, and support for digital leadership initiatives can be fostered.

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