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HUMAN-CENTRED AI LEADERSHIP AND TEACHER WELL-BEING IN DIGITALLY TRANSFORMED SCHOOLS: A QUANTITATIVE STUDY

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Abstract
This research examines school leadership in this process in-depth. It asks if a human-centred approach to AI, grounded in openness, fairness, active listening and ethical leadership fosters the protection and nurturing of teachers' well-being in the face of digital transformations. The study also considers the relationship between the climate of digital change in a school how supported, clear and trusted teachers feel as they navigate digital change and well-being outcomes, as they relate to leadership behaviour. The data were collected from the secondary school teachers by using a structured questionnaire and analysed by descriptive statistics, correlation and regression analysis techniques to understand these relationships in a clear measurable way. The results will reveal that schools with visible, person-centred AI leadership have teachers that experience less digital strain and more confidence and engagement in their work. The study provides real-world implications for school leaders, education policymakers, and teacher training institutions as they consider how intentional decisions about leadership can help ensure that technology integration is not a burden but can be welcoming for the educators who will be asked to do the daily work.

INTRODUCTION

Background of the Study

In today's educational landscape, AI is not just a dream; it's a reality in the classroom, offering assistance in lesson planning, grading, attendance tracking, and communication tools (Crawford et al., 2024). This means that school leaders are now called upon to implement these tools while at the same time safeguarding the wellbeing of their teaching staff, which was not the case to the same extent even five years ago. Recent reviews on the use of AI in education show that it is moving slowly towards a co-adaptive and human-centred paradigm, in which the success of any technology

is not as much about the technology but about how it is introduced to those who need to use it (ScienceDirect, 2025).

Schools in Pakistan have started to embrace the use of AI-driven tools for lesson planning, assessment, and parent engagement, with a growing number of schools implementing such tools, especially in urban areas like Karachi, Lahore, and Islamabad, but few investing in leadership development or teacher support

systems. Much like teachers, school leaders are also required to navigate the shifts AI technology introduces into their schools, but many are doing so without formal support (Adams & Thompson, 2025), as supported by international research in Leadership and Policy in Schools. This disconnect between fast technology adoption and slow readiness of leadership is the beginning point for this current study.

This shift has been particularly noticeable since 2023, when generative AI tools were readily available to teachers and administrators beyond the specialised technology teams. The use of AI tools has gone beyond any single teacher's experimentation and has become an expectation for many schools that teachers use these tools for lesson preparation, assessment planning, and even when communicating with a parent. This quick normalisation has outpaced the ability of many school leadership preparation programmes to revise their curriculum, leading many school leaders to figure out how to lead digital change on their own, typically by trial, watching other schools, or informal advice from education technology vendors who have a vested interest in adoption.

Research Gap

There has been a growing body of research that examines the impact of AI tools on teacher workload, teacher motivation and teacher burnout (Frontiers in Education, 2025) and separate research that looks at transformational and digital leadership and its impact on wellbeing of employees in a technology driven workplace (ScienceDirect, 2025). There is still very little quantitative evidence in secondary schools in Pakistan. Current AI research in education within Pakistan often has limited scope within either student learning outcomes or teachers' acceptance of technology, with the standpoints of leadership behaviours that play a role in experiencing the technology remaining under-explored. The present study aims to fill this gap by considering the leadership style, not only the technology features, as a variable of interest.

Significance of the study

This research is relevant to a number of communities. It is a tool for school leaders to provide concrete evidence for the practice of human-centred approaches to introducing and using AI that best support teacher well-being. It offers a foundation of local evidence for policymakers and education departments to inform their training for school leaders on digital transformation. To teacher training institutions, it indicates the well-being aspect of digital change, which is lacking in technical AI training. Lastly, it provides a leadership-oriented study from a Pakistani context: a field dominated by samples from the West and East Asia (Springer Nature, 2025).

Research Objectives

- To explore the extent of human-centred AI leadership school leaders demonstrate as seen by teachers.
- To explore the correlation between Human-Centred AI leadership and teacher wellbeing in digital transformed schools.
- To find out if this relationship is strengthened or weakened by a digital change climate in a school.

Research Questions

- What is the extent of human-centred AI leadership of school leaders as seen by teachers?
- Does the human-centred AI leadership show a strong association with well-being of teachers in digitally transformed schools?
- Does the digital change climate of a school have an impact on this relationship?

Literature Review

AI and Digital transformation in Schools

Today, digital transformation in schools goes beyond just computer labs and projectors, and encompasses AI-powered grading, intelligent scheduling, automated communication, and adaptive learning platforms (Mapping the evolution of AI in education, ScienceDirect, 2025). This is an evolution that has been taking place rapidly since 2023 and for which schools have not yet established training and support

infrastructures robust enough to make effective use of them, particularly in Pakistan. During this transition, researchers observe that there are certain benefits in terms of lessening some administrative workload, but also new stressors, as teachers can feel unprepared and unsupported (as cited in Frontiers in Education, 2025 by Hashem et al., 2024).

Human Centred Leadership in the Age of AI

This focus on human-centred leadership, which is characterized by empathy, transparency and inclusion of employees in decisions impacting their day-to-day work, becomes even more relevant when leaders are implementing new technology in the workplace (Stahl & Schoenwald, 2024). In schools, these manifest as leaders providing clear rationale for the use of a tool, addressing concerns while recognizing the limitations of AI systems, and avoiding portraying them as infallible. AI in Education at Oxford (2025) states that AI should never be treated as a substitute for the human judgement and emotional support a great leader offers, but as something that should be carefully steered by a human leader.

Teacher Well-Being During Digital Change

During times of digital transformation, teacher well-being is an emerging topic of research, and researchers have created specific measuring instruments for digital burnout, which are based on the stressor-strain-outcome theory (Frontiers in Psychology, 2025). Research consistently reveals that, in addition to the digital requirements, there is a factor that is crucial in whether digital change is perceived as manageable or overwhelming, which is organisational and leadership support (Transforming work in the digital era, ScienceDirect, 2025). In a related study of primary school teachers who use AI in teaching, high levels of use were associated with higher wellbeing and satisfaction, but leadership support was a significant moderating variable in the relationship between AI use and wellbeing (AIMS Press, 2025).

Leadership Support as a Protective Resource

Leadership support has been identified as a protective factor in recent research that helps teachers and other professionals deal with the stressors associated with digital and AI-facilitated change. AI-infused transformational leadership was also identified as a meaningful intervention to reduce burnout among Chinese IT practitioners, by building trust in the adoption of novel AI tools (ScienceDirect, 2025). AI-induced anxiety among teachers in China was found to be mediated by both digital literacy and supportive school environments, particularly in the realm of education (BMC Public Health, 2025). These are also findings that point to the fact that often, it's the way the technology is used, rather than the technology itself, that can make or break whether or not it supports staff well-being.

Pakistani School Context

The implementation of digital transformation in Pakistani schools is grappling with its unique set of challenges such as disparities in access to infrastructure, limited formal AI training for school leaders, and a workforce of teachers who are already grappling with heavy workloads and large class sizes. International research on under-resourced school settings suggests that the importance of human-centred approaches to introducing AI is even greater, where infrastructure and training support is limited, as the behaviour of leadership becomes one of the few consistent sources of support in the classroom for teachers (arXiv, 2025). Therefore, the current study is especially pertinent to school systems in a process of digital transformation with limited resources such as most of the public and private secondary school community in Pakistan.

In addition to infrastructure, the Pakistani context also has significant difference between the private and public schools in terms of how digital change is communicated to staff members. The implementation of new platforms in both private and public sector school networks is often implemented via a centralised directive with little consultation, and in the public sector, often as a result of a circular from the provincial education department with minimal explanation and training. In both cases the individual, the principal or the head teacher, is the primary interpreter of the significance of the changes for the daily life of

the school. In what ways this local interpretive role is enacted on the ground, or not, is of a nature that is of far greater influence on how digital transformation is experienced than what is written in policy documents at the provincial or national level.

The difference in the AI-related strain for groups of teachers

Previous research also suggests there are differences between teacher groups in their experiences of AI demands. While the younger teachers might be more comfortable with digital tools, they may also be less experienced in classroom management, where more senior teachers can assess when and how to push back against the use of AI and when to embrace it. More experienced teachers, on the other hand, have at times expressed a sense that AI tools devalue skills acquired over many years, and hence, there is a need for careful, human-centred, teacher-focused communication to address this concern by positioning AI as a tool that supports, rather than replaces, the teacher's professional judgement. Workload distribution, for instance, how in many Pakistani schools' teachers have both teaching and administrative coordination responsibilities, may also influence the experience of digital requirements, but this is a space that needs to be explored.

Based on this, the present study aims to synthesize and position the following:

Reviewed literature in this section as a whole delineates three points that set the present study in perspective. For one, the adoption of AI in educational institutions is outpacing the development of leadership and training frameworks to ensure that effective integration and implementation take place. Second, a leadership style that has been shown to be a protective factor against the strain of digital change is one that is human-centred, based on transparency, empathy, and shared decision-making, and is consistently found in leadership behaviour across sectors and countries. Third, although this is a consistent finding, very few empirical quantitative evidence exists that directly examines this relationship in the context of secondary school in Pakistan. To fill this gap, the present study quantitatively tests the relationship between human-centred AI leadership and teacher well-being, and considers the broader digital change climate of the school, thus providing context-specific evidence to a literature that remains heavily dominated by western, and Chinese and other East Asian samples.

The conceptual and theoretical framework

Theoretical Framework

Two complementary theories are used to guide this study. Human-Centred Leadership Theory (Stahl & Schoenwald, 2024) provides an understanding of how leaders establish trust and shared ownership in guiding staff through an unfamiliar change process, which focuses on empathy, transparency, and actual involvement of staff, rather than instructions from the top. Job Demands-Resources Model (Demerouti et al., 2001; Bakker & Demerouti, 2024) Well-being is considered a result of a balance between the demands imposed on the employee and the resources provided to help them deal with these demands. Overall, these theories indicate that human-centred leadership serves as a vital tool in supporting teachers as they navigate the novel demands of AI-powered digital transformation, safeguarding their well-being amidst evolving workloads and expectations.

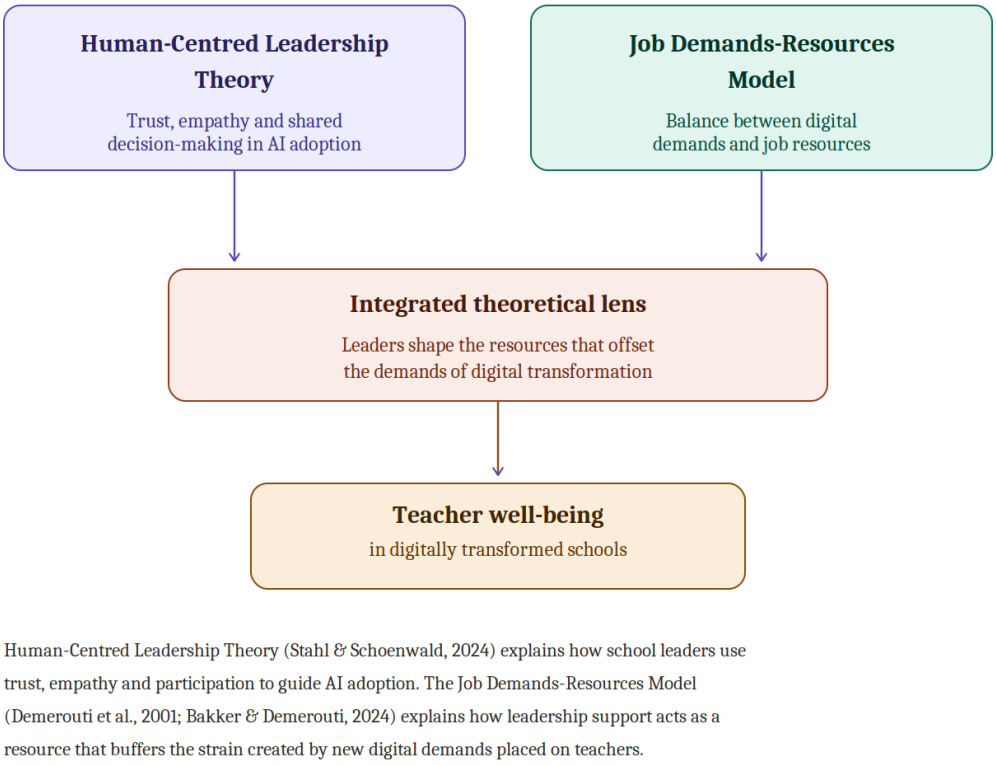


Figure 1. *Theoretical framework of the study, integrating Human-Centred Leadership Theory and the Job Demands-Resources Model.*

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Conceptual Framework

Building on this theoretical base, the conceptual framework positions human-centred AI leadership practices as the independent variable, the digital change climate of the school as a connecting (mediating) variable, and teacher well-being as the dependent variable. School-level factors such as school type, digital maturity, and teacher experience are included as moderating influences that may strengthen or weaken these relationships across different school settings. This framework guides the data collection instrument and the analysis presented in later sections of this article.

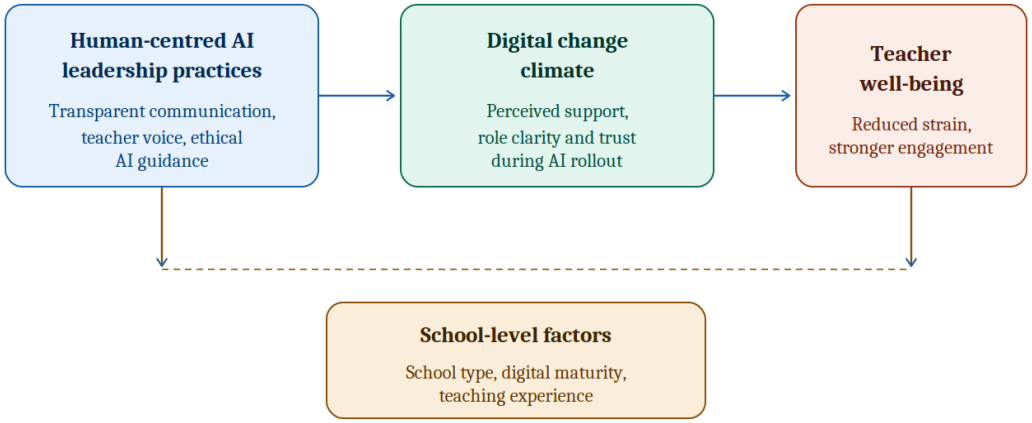


Figure 2. ***Conceptual framework showing the relationship between human-centred AI leadership, digital change climate, and teacher well-being, moderated by school-level factors.***

Methodology

Research Design

The design of this study is quantitative, with a cross-sectional survey design, which enables the relationships between human-centred AI leadership, digital change climate, and teacher well-being to be measured at one point in time and in a large sample of teachers.

Population and Sample

The population in this study is the secondary school teachers in schools that have used AI tools for teaching, administration, or communication. The sample size consisted of 318 teachers from secondary schools in Karachi and was drawn through stratified random sampling to ensure representation of schools by type (public and private) and by varying levels of digital maturity. This sample size is aligned with similar recent studies in the field that have investigated similar leadership and well-being relationships with samples ranging from approximately 300 to 420 teachers.

Schools were initially classified by sector (public and private) and then by a general indicator of the level of digital maturity derived by the presence or absence of formal introduction of at least one AI-supported platform over the previous year. The schools were then randomly selected within each stratum and teachers within the selected school were invited to participate through staff meeting announcements and direct invitation from the research team, with no school representing more than 15 percent of the schools to avoid over-representation of the particular leadership style or culture of any school.

Research Instrument

To gather data, a structured, self-administered questionnaire consisting of four sections (demographic data, human-centred AI leadership practices, digital change climate, teacher well-being) was used. The scale for measuring the items was 1 (strongly disagree) to 5 (strongly agree). The leadership and climate items were adapted from existing human-centred leadership and

organisational change climate scales, and the well-being items were adapted from existing occupational well-being scales, with wording changed for clarity and to ensure relevance to the school and AI context.

Summarises the structure of the questionnaire used in this study, including the number of items in each section and a representative sample item.

Structure of the Research Instrument

Section	Items	Sample Item
Demographic Information	5	Gender, school type, years of teaching experience
Human-Centred AI Leadership	8	My school leader explains clearly why new AI tools are being introduced
Digital Change Climate	7	I feel supported by my school during digital transitions
Teacher Well-Being	8	I feel confident managing the digital demands of my role

Note. *All items rated on a five-point Likert scale from 1 (strongly disagree) to 5 (strongly agree).*

To determine content validity, the items were reviewed by three academics with specialization in educational leadership and occupational psychology who confirmed that the items were appropriate for each construct. Before data collection was conducted, a pilot test was conducted for 30 teachers, the Cronbach's alpha value of all three scales was greater than 0.70 which is generally accepted as the value that produces consistent and reliable results in social science research.

Data Collection Procedure

To ensure maximum response and to make the questionnaires accessible, they were distributed in person as well as using a secure online form. The participation was voluntary, and the respondents were informed on the purpose of the study before consenting to participate. The data collection was conducted over a six-week period with reminder communications to ensure that schools that had agreed to participate completed the data collection.

Data Analysis

Data collected were analysed using the statistical software suitable for social science research. The level of each variable was summarised using descriptive statistics (means and standard deviations). Pearson correlation analysis was used to explore the magnitude and direction of the relationships between human centred AI leadership, digital change climate and teacher well-being. A multiple regression analysis was then used to determine the combined effect of leadership practices and digital change climate on teacher well-being, and an independent samples t-test was used to compare teacher well-being between public and private school teachers.

Results and Analysis

The findings from the data analysis are clearly and systematically shown in this section. Descriptive statistics are first presented, followed by the demographic profile of respondents, followed by the correlation analysis relating to the relationships between the study variables, followed by the regression analysis that explains the amount of variance in teacher well-being that is accounted for by leadership and climate, and finally a comparison of well-being levels across school types.

Demographic Profile of Respondents

Table 1 presents the demographic characteristics of the 318 teachers who took part in the study.

Table 1. *Demographic Profile of Respondents (N = 318)*

Variable	Category	Frequency	Percentage
Gender	Male	142	44.7%
	Female	176	55.3%
School Type	Public	151	47.5%
	Private	167	52.5%
Teaching Experience	Less than 5 years	96	30.2%
	5–10 years	114	35.8%
	More than 10 years	108	34.0%

Note. N = 318. Percentages may not sum exactly to 100 due to rounding.

Descriptive Statistics of Study Variables

Table 2 presents the mean scores and standard deviations for the three main study variables, measured on a five-point scale.

Table 2. *Descriptive Statistics for Study Variables*

Variable	Mean	SD	Level
Human-Centred AI Leadership	3.74	0.61	High
Digital Change Climate	3.58	0.67	Moderate
Teacher Well-Being	3.66	0.58	High

Note. Mean scores interpreted as: 1.00–2.33 = Low, 2.34–3.66 = Moderate, 3.67–5.00 = High.

Correlation Analysis

Table 3 presents the Pearson correlation coefficients among the three study variables, addressing the second research question regarding the relationship between human-centred AI leadership and teacher well-being.

Table 3. Correlation Matrix of Study Variables

Variable	1	2	3
1. Human-Centred AI Leadership	1.00	—	—
2. Digital Change Climate	0.58**	1.00	—
3. Teacher Well-Being	0.61**	0.55**	1.00

Regression Analysis

Table 4 presents the results of the multiple regression analysis examining how much of the variation in teacher well-being is explained by human-centred AI leadership and digital change climate together.

Table 4. Multiple Regression Analysis Predicting Teacher Well-Being

Predictor	B	SE	β	p
Human-Centred AI Leadership	0.39	0.05	0.41	< .001
Digital Change Climate	0.27	0.05	0.29	< .001

Note. R^2 = .43, Adjusted R^2 = .42, F(2, 315) = 118.64, p < .001. Both predictors made a statistically significant, positive contribution to teacher well-being.

Comparison Across School Types

Table 5 presents an independent samples t-test comparing teacher well-being scores between public and private school teachers, addressing whether school context influences reported well-being levels.

Table 5. Independent Samples t-test for Teacher Well-Being by School Type

School Type	N	Mean	t	p
Public	151	3.59		
Private	167	3.72	2.04	.042

Note. p < .05. Private school teachers reported slightly but significantly higher well-being scores than public school teachers, a difference that may reflect differences in available digital infrastructure and support.

6. Discussion

The results of this study address all three of the research questions that directed this study. Regarding the first question, the overall mean score for teachers indicated a high level of human-centred AI leadership in their schools (3.74 out of 5), suggesting that many school leaders are already embodying some aspects of transparent and participative leadership during the process of digital change, even if they have not been trained in this area.

As for the second question, the correlation and regression results indicate a strong and statistically significant positive link between human-centred AI leadership and well-being of teachers. This contributes to the main argument of the theoretical framework, namely that human-centred leadership serves as a meaningful resource in the Job Demands-Resources Model, enabling teachers to handle the demands brought forth by the digital transformation with AI. This discovery is consistent with the previous study that demonstrated AI has an impact on reducing burnout in professionals during technology change (ScienceDirect, 2025) and its specific application to the school leadership context (Zou et al., 2026).

The digital change climate of the school was also significantly related to teacher well-being in relation to the third question, and it contributed independently in the regression model, meaning that together with the leadership behaviour, it does not represent two separate contributors, but is a joint mechanism. This aligns with the results from educational anxiety studies concerning AI, which revealed that supportive school climates contribute to mitigating the adverse impact of digital stressors on teachers' well-being (BMC Public Health, 2025). Further, the relatively small but meaningful gap in well-being between public and private school teachers indicates that school level resources and infrastructure continue to be important moderating variables as detailed in the conceptual framework in Section 3.

Interpreting the Strength of the Relationships

The proportion of the variance in teacher well-being that was accounted for by the regression

model was quite large, accounting for approximately 43 percent of the variance, in comparison with the usual result for a regression model in social science research where well-being is usually influenced by many overlapping personal and organisational factors. That means that human centred AI leadership and digital change climate are by no means the only factors that have an impact on teacher well-being, but they are among the more significant and more actionable levers at school administrators' disposal. Leadership behaviour and organisational climate are not like the personal characteristics of a teacher or the family background of a staff member; they are aspects of school life that a school could set out to change through training, policy and practice (Zou et al., 2026).

Human-centred AI leadership has a standardised beta of 0.41, compared to digital change climate (0.29), indicating that individual school leader behaviour is slightly more important than the school's overall climate, but both are significant. This has a practical implication: in schools with limited use of digital devices and/or resources, or with limited digital support, it seems that those who practise transparency, empathy and genuine consultation can exercise meaningful consideration of the well being of their teachers, at least to some degree, without being overly dependent on the broader school environment. It is a heartening result in resource-poor settings like much of the public school system in Pakistan, where investment in digital infrastructure can take years to come to fruition, but behaviour of leaders can change much quicker (Amin et al., 2024).

Public and Private School Results

It is important to interpret the statistically significant but small gap in well-being scores for public and private school teachers. Average well-being was marginally higher for private school teachers, but the difference (over a tenth of a point on a five-point scale) was much less than would be expected given the known funding, infrastructure and class size differentials in Pakistan. This is a rather small margin, and may in itself provide the substantiation for the central theme of this study: that the behaviour of the leader can partly compensate for structural disadvantages. Public school leaders who are implementing good human-centred AI leadership might be closing what is otherwise a much bigger well-being gap based on the availability of resources (Amjad & Aslam, 2025).

Linking findings to the theoretical framework

The findings of the results support the theoretical framework presented in Section 3 which was integrated. There is a high positive correlation between the leadership and the well-being of staff and Human-Centred Leadership Theory predicted that those who demonstrated empathy and transparency were more likely to be able to lead staff through the unknown of change. The Job Demands-Resources Model assumed that supportive leadership as well as positive digital change climate would buffer the strain caused by the new demands, and both of these predictors had significant regression coefficients, thereby supporting this buffering interpretation. Overall, the findings indicate that the two theories fit together in understanding how teacher well-being is impacted in the midst of digital change through AI—providing support for the conceptual model that shows digital change climate as a bridge between AI-driven digital change and teacher well-being (Alghamdi & Amjad, 2026).

Conclusion

Summary of Findings

This study aimed to explore the relationship between human-centred AI leadership and teacher well-being in digitally transformed schools, and the role of the digital change climate in these schools on this relationship. The results indicated that teachers generally rate the school leaders' human-centred leadership high, and that this was meaningfully, and positively, connected with higher teacher well-being. The digital change climate of the school is also a very significant supporting factor: well-being in digital change depends not only on the individual leadership behaviour, but also on the digital change climate produced by the leadership.

Practical Recommendations

1. When implementing new AI solutions, school leaders must focus on two-way, open communication and be honest about both the opportunities and the constraints – do not over-sell the technology as the solution.
2. The education departments and school networks need to invest in leadership training that is particularly focused on leading staff through the process of digital change with empathy and fairness, as well as technical competence.
3. To enhance the digital change climate for AI adoption, schools, especially those with fewer digital resources, should establish structured support mechanisms, like peer mentoring or dedicated help channels.
4. One of the more visible aspects of human-centred leadership mentioned in this study is regular (low pressure) consultation with teachers before policies are solidified.
5. Teacher training institutions, that prepare future school leaders, should include change-management and well-being content in addition to technical changes in AI, because leadership behaviour during rollout is of equal importance as the actual choice of tool.
6. Public sector education authorities should first seek to pilot structured leadership guidance to lower resourced schools based on the evidence that the right leadership behaviour can mitigate the infrastructure disadvantage.

Limitations and Future Research

Some limitations of this study should be noted. The cross-sectional design implies that the data was gathered at one time only and the relationships found represent association and not causal relationships over time. The sample was also restricted to secondary schools in one major city, and the degree of confidence with which the results can be extrapolated to rural schools, or to primary or higher education schools, where digital transformation processes may be different, is limited. Future studies may focus on resolving these limitations by tracking the same set of teachers across more extended timeframes to measure changes in well-being as AI implementation develops, as well as by recruiting rural schools and other grade levels. Possible variables to consider in future research include teacher digital competency or teacher previous AI training.

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