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Digital Leadership, Teacher Stress, Engagement, and Innovation Effects on Xaverius Foundation Performance in Sumatra

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Abstract
The purpose of this research is to examine the relationship between digital leadership, educational innovation, and stress in the workplace as they pertain to teachers' performance, with employment engagement serving as a mediator. A total of 301 instructors from around the Sumatra region participated in this study, which was funded by the Xaverius Foundation. The data collection technique was carried out through a survey using a closed questionnaire based on a Likert scale of 1–5, with instruments that had been validated and translated into Indonesian using the back-translation method. The methodology employed is a quantitative approach that employs the SEM-PLS analysis tool. Educational innovation and teacher performance are both impacted by digital leadership, according to the research. In the model of linkages between factors, work engagement is the key mediating variable and has the strongest influence on teacher performance. In fact, research has shown that stress in the workplace has no discernible effect on educators' productivity in the classroom. According to these results, innovation and leadership are not the only factors that contribute to better teacher performance; the level of engagement that teachers feel in their job also plays a major role. Hence, effective measures to improve teacher performance and assist relevant educational transformation in the digital era include generating planned educational innovations, boosting digital leadership, and promoting work engagement and stress management.

Keywords: Digital Leadership; Educational Innovation; Teacher Performance: Work Engagement; Work Stress

INTRODUCTION

The development of information and communication technology has driven various sectors, including the education sector, to undergo a comprehensive transformation. The world of education now faces significant challenges in adapting to the dynamics of the digital era, where adaptive and innovative abilities have become the primary competencies that every education stakeholder, especially teachers as the frontline in education, must possess. In this context, improving teacher performance has become the main focus of various educational policies because teacher performance greatly determines the quality of the learning process and student outcomes (Anshori et al., 2023; Ashlan & Hambali, 2022).

Education in Indonesia still faces various classic issues, such as disparities in school quality, low learning innovation, and high administrative burdens for teachers. These issues also affect the effectiveness of teachers in performing their professional duties. The Ministry of Education, Culture, Research, and Technology of the Republic of Indonesia encourages the transformation of education based on digital technology as one of the strategic steps to enhance the efficiency, innovation, and quality of education. In this digital era, leaders of educational institutions must be able to transform into digital leaders to keep up with developments and changes in the world of education. However, the implementation of this digital era strategy heavily depends on the quality of leadership in educational institutions and the readiness of human resources, including teachers.

Yayasan Xaverius is one of the Catholic educational foundations that has long been active in providing education in Indonesia, particularly in the South Sumatra region. The Xaverius Foundation Schools in Palembang have 64 schools spread across three provinces: South Sumatra, Jambi, and Bengkulu, ranging from kindergarten, elementary school, junior high school, senior high school, to vocational school. The schools under the auspices of the Xaverius Foundation are known for their strong tradition in shaping students' character and moral values, as well as emphasizing the importance of quality education services oriented towards Christian values. The schools under the auspices of the Xaverius Foundation Palembang also have prestigious achievements in all fields, and have become favored and respected schools. However, in recent years, Xaverius schools have also faced modernization challenges, both in terms of educational management and the learning process. Leadership at Xaverius School is required not only to prioritize spiritual and humanistic values but also to be able to integrate digital leadership in decision-making, learning management, and teacher development. Digital leadership is the skill of leaders to use technology in a smart way to run schools (Ilomäki & Lakkala, 2018; Fatima & Masood, 2024). In the case of Xaverius, it's crucial to connect the mission of Catholic education with the requirements of 21st-century learners. In addition, promoting educational innovation is part of the strategic efforts of the Xaverius Foundation to improve school quality. Teachers are required to continuously develop creative, contextual, and relevant learning approaches in line with the times. However, in practice, innovation is often hindered by a conservative organizational culture or limitations in facilities and training (Hambali et al., 2023; Koch et al., 2015). Paradigm shifts in education management must be accompanied by strengthening teachers' capacity for innovation.

In this transition process, work stress becomes an unavoidable challenge. Teachers face pressure from various aspects: administrative burdens, academic demands, parental expectations, and adaptation to new technologies (Ahmed, 2019; Xu & Jia, 2022). This makes a lot of instructors tired, burned out, and less motivated, which has a direct effect on how well they do their jobs. In private schools like Xaverius that are based on foundations, where resources are more limited than in public schools, managing job stress is very important for making the workplace healthy and productive. Amidst these dynamics, work engagement becomes an important indicator in assessing teachers' enthusiasm and commitment to their work. Teachers who are actively engaged demonstrate energy, dedication, and full concentration in carrying out their duties (Bakker & Bal, 2010). Work engagement serves as a mediating variable that bridges the influence of leadership, stress, and innovation on performance. In the context of Xaverius, teacher engagement is also influenced by the values of service, spirituality, and loyalty to the mission of Catholic education.

Although many studies have examined the effects of digital leadership, work stress, work engagement, and educational innovation on teacher performance, most of them have analyzed these variables separately and not within a comprehensive integrated model, particularly in the context of foundation-based educational institutions. Moreover, empirical studies that specifically focus on schools under the Xaverius Foundation in Sumatra Island remain very limited, creating a significant gap in locally relevant evidence. At the same time, the demands of the digital era require strong technology-based leadership, continuous instructional innovation, high teacher engagement, and effective stress management as strategic factors for improving teacher performance. Therefore, this

study is urgently needed to provide comprehensive empirical evidence and serve as a basis for strategic policy formulation for the Xaverius Foundation in strengthening digital leadership, fostering an innovation culture, enhancing work engagement, and managing work stress sustainably to improve teacher performance, as well as to produce an integrated relational model that can be used as a reference for educational management and policy development in the digital era.

LITERATURE REVIEW

Digital Leadership Style (DL)

Digital leadership has come about because information technology is moving so quickly in the digital age. In the field of education, digital leaders are expected to use technology in smart ways to improve the quality of learning and the management of organizations. Digital leadership is the ability of leaders in education to use digital tools to promote innovation, efficiency, and ongoing development. Digital leaders not only use technology in the classroom, but they also create a culture in the workplace that is open to change (Pribadi et al., 2024; dela Rosa, 2022). Fatima and Masood (2024) emphasize that digital leadership significantly contributes to open innovation, especially when accompanied by clear communication and organizational support. Rikkerink et al. (2016) and Agélii Genlott et al. (2023) demonstrate that effective leaders in the digital era must be able to facilitate organizational learning and technology-based leadership distribution. Saeed and Kang (2024) as well as Timan et al. (2022) also show a positive correlation between digital leadership and teacher performance, where technology-savvy leaders can drive efficiency, collaboration, and continuous professional development. Ilomäki & Lakkala (2018) and Rikkerink et al. (2016) add that digital leadership correlates with the success of educational innovation and a technology-based learning culture. Quaicoe et al. (2023) also note the importance of leaders' ability to face the challenges of school digital transformation. Digital leadership directly contributes to the improvement of organizational effectiveness, particularly in driving innovation, teacher engagement, and the transformation of learning systems. The ability of leaders to adapt to technological advancements becomes a determining factor for the success of educational organizations in the digital era.

Teachers' Stress (TS)

Work stress among teachers is a condition of psychological pressure that arises from the imbalance between job demands and the individual's ability to cope with them. This often has a negative impact on teachers' performance and mental health. Teacher work stress is often caused by administrative burdens, performance pressures, and high expectations from various parties. Ahmed (2019) and Blase (1986) found that sustained stress negatively impacts teachers' physical and mental health as well as their performance in the classroom. Research by Hanif et al. (2011) and Khan et al. (2012) shows that stress can be reduced with organizational support and the provision of adequate resources. Xu and Jia (2022) also said that teacher self-efficacy can help protect against the detrimental effects of stress on work engagement. Kassymova et al. (2019) also say that stress can make it hard to adapt new ideas. They underline how important it is to train instructors and give them systematic support so they don't feel overwhelmed when things change. Teresia et al. (2022) also underline that the workplace is a major cause of stress. Stress at work is a big problem in the education field that can make teaching less effective. So, schools need to make sure that their workplaces are healthy, that students don't have too much work to do, and that they may get psychological help to deal with stress.

Work Engagement (WE)

Work engagement is a good mental state that includes being enthusiastic, dedicated, and fully focused on work. In the field of education, teacher work engagement is very important for making instruction more effective. Work engagement is a good mental state in which you are enthusiastic, dedicated, and focused on getting things done. Bakker and Bal (2010) say that teachers who are engaged

at work do better, especially in the start of their careers. Mișu et al. (2022) and Hermanto and Srimulyani (2022) found that teachers who are very engaged in their work are more effective and do more extra effort. Al-Malky et al. (2022) emphasize that work engagement also drives individual innovation in the educational context. Li et al. (2021, 2024) and Mérida-López et al. (2017, 2023) explain that stress and work engagement influence each other and are moderated by factors such as self-efficacy and teachers' emotional intelligence. Ornaghi et al. (2023) mention that teachers' emotional intelligence helps reduce stress and increase engagement. Work engagement is an important mediating factor between working conditions and performance outcomes. Educational organizations need to build a supportive work culture and pay attention to teachers' well-being to enhance their work engagement.

Educational Innovation (IN)

Educational innovation refers to systematic efforts to update the learning process, teaching approaches, and school management to improve the quality of education. Innovation becomes the key to adapting to the needs of the times. Educational innovation is the process of renewal within the education system through new approaches, strategies, and technologies aimed at improving the quality of learning. Hambali et al. (2023) and Rodiyah et al. (2022) mention that innovation in learning, such as the use of technology and creative methods, plays an important role in improving teacher performance. Ilomäki and Lakkala (2018) introduced an innovative digital school model that shows that sustainable innovation requires teacher involvement in the design and development of learning technology. In addition, Quaicoe et al. (2023) talk on the problems that schools have when they try to go digital, especially when it comes to getting the right resources and making sure teachers are qualified. Sliwka et al. (2024) also stress that transformational leadership is important for creating new ways of doing things in schools that improve deep learning for students and teacher performance. Agélii Genlott et al. (2023) highlight the importance of leadership in disseminating science-based digital innovations in schools. Koch et al. (2015) also found that the involvement of school leaders significantly influences the emergence of innovation in the learning environment. Li & Zhu (2022) highlight the importance of work autonomy in driving innovation through temporal leadership. Educational innovation is a key factor in building adaptive and competitive educational organizations. Support from leadership and an organizational culture that is open to change is crucial for the success of innovation.

Teachers' Performance (TP)

Teacher performance is the individual achievement in carrying out their professional duties effectively, which includes teaching activities, administration, and contributions to the school organization. Teacher performance refers to the effectiveness of teachers in planning, implementing, and evaluating learning, as well as fulfilling other professional responsibilities. Anshori et al. (2023) and Arifin et al. (2014) state that leadership style and work engagement are dominant factors influencing teacher performance. Ashlan and Hambali (2022), as well as Said Ashlan and Hambali (2022), emphasize that visionary leadership and learning innovation are crucial in determining teacher performance outcomes. Employee buy-in and positive work environments are two other factors that might boost retention and productivity in the classroom, according to Gozon and Yango (2023). In order to help teachers perform better during emergencies like pandemics, a study by Novitasari et al. (2020) stresses the significance of building innovation capacities, hard and soft skills. Saeed & Kang (2024) also highlight the role of digital leadership in driving teacher performance through digital transformation. Teacher performance is the end result of the interaction of various factors such as leadership, work engagement, innovation, and stress management. Improving teacher performance means strengthening those elements systematically and sustainably.

Figure 1 Illustrates the proposed model. Each factor is configured as an endogenous or exogenous variable depending on the hypothesized relationships in the model. The exogenous factors consist of digital leadership, while the endogenous factors include educational innovation behavior, work engagement, work stress, and teacher performance. This model shows the complex interactions between variables. By presenting these relationships visually, this image aids in understanding the

dynamics present in the educational context, as well as providing a solid foundation for further analysis and hypothesis testing in this research.

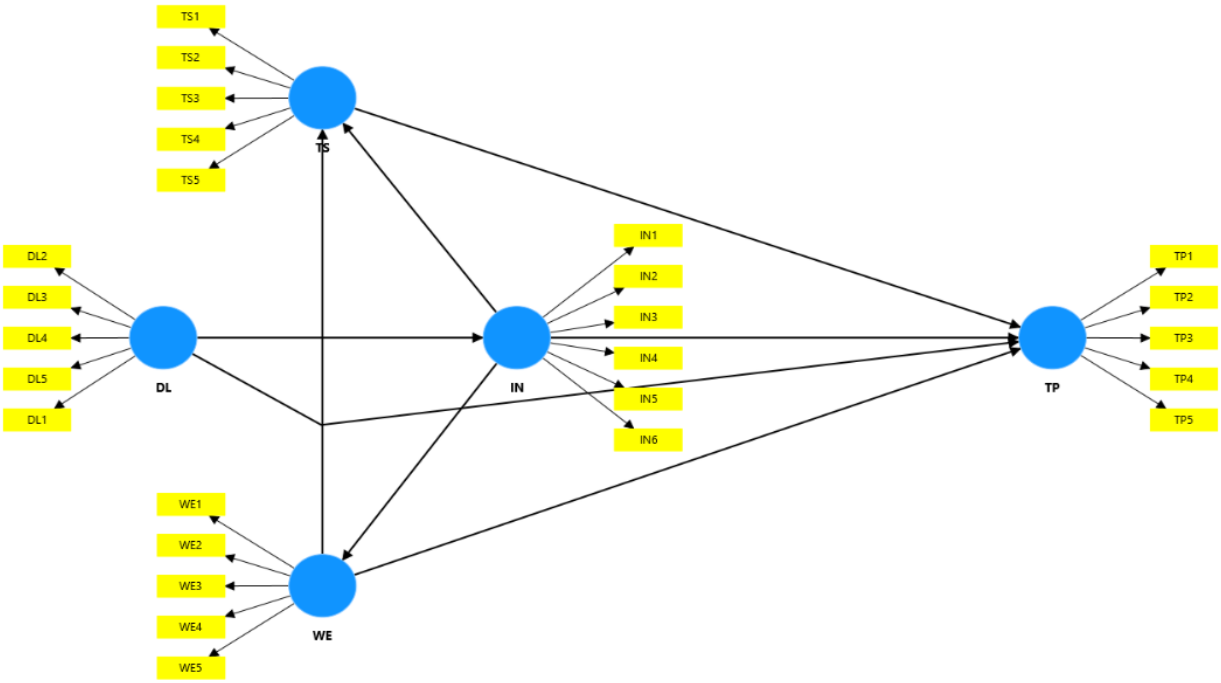

Figure 1. Research Model

RESEARCH METHODS

This study employs a quantitative approach to its investigation. According to a source (https://vervalyayasan.data.kemdikbud.go.id/, 2025), 776 teachers from Yayasan Xaverius Palembang schools distributed across Palembang, Jambi, and Bengkulu provinces make up the target population of this study. When the population is known, the sample size can be determined using the Krecjie & Morgan Method, a popular statistical tool. By inserting those values into the formula, a sample size of approximately 257 people was obtained. During the distribution of the questionnaire, a sample of 301 teachers was obtained. This shows that the sample is more than sufficient to represent the entire population with a high level of confidence.

The instrument used for data collection is a Google Form-based questionnaire. This questionnaire is systematically designed to gather information according to the variables being studied. Data were collected from various schools between March and April 2025. Eight hypotheses were proposed in this study:

- H1: There is a possibility that digital leadership has an influence on educational innovation.
- H2: It is expected that digital leadership has a positive influence on teacher performance.
- H3: It is expected that educational innovation has a positive impact on teacher performance.
- H4: It is suspected that educational innovation may affect work stress.
- H5: There is a possibility that educational innovation can influence work engagement.
- H6: It is expected that work stress can have a positive impact on teacher performance.
- H7: It is expected that work engagement can have a positive impact on teacher performance.
- H8: It is suspected that work engagement may affect work stress.

Measures

The formulation of the questionnaire items refers to theoretical indicators that have been previously validated by earlier research, thus possessing good reliability and validity. Respondents' answers use a Likert Scale from 1-5 to measure the level of perception or attitude towards a question. Validated instruments are used to measure digital leadership, innovation, engagement at work, stress in the workplace, and performance. According to various sources, this measurement tool can be used to assess digital leadership (Anwar & Saraih, 2024), educational innovation (Gill, Moya, & Bellido, 2018), work engagement (Schaufeli, Bakker, & Salanova, 2006), work stress (Klassen, 2010), and performance (Koopmans et al., 2015).

Table 1. Examples of items per variable

Variable	Example of item
Digital leadership	My principal facilitates changes that maximize learning objectives using digital resources.
Teacher Stress	Maintaining classroom discipline is a huge source of stress for me.
Work Engagement	In my work, I feel strong and passionate.
Innovation	My school provides opportunities for teachers to learn and develop their skills to the fullest.
Teacher Performance	I managed to plan my work so that it was finished on time.

Information about the respondent's demographics is requested in the questionnaire's first section, while the second part included 26 items in order to measure the constructs of the research model. Questionnaire items were adopted from previously published literature. Adjustments were made to these items to meet this study's setting. A five-point scale from 1 "strongly agree" to 5 "strongly disagree" was used to assess each item. Indonesian versions of the questionnaire were made accessible to respondents. We followed the back-translating procedure to ensure that the meanings of the questionnaire items remained consistent after being translated from English to Indonesian.

Table 2. Participants' profile

Demographic		Frequency	%
Gender	Male	120	39.87
	Female	181	60.13
Education level	D3	2	0.66
	S1	266	88.37
	S2	33	10.96
Education level	Preschool	51	16.94
	Elementary School	61	20.27
	Junior high school	84	27.91
	Senior High school	105	34.88
Teaching period	< 3 year	62	20.60
	3 – 6 year	72	23.92
	7 – 10 year	79	26.25
	> 10 year	88	29.24
Province	Bengkulu	64	21.26
	Jambi	97	32.23
	Sumatera Selatan	140	46.51

The first draft of the questionnaire was pilot tested on 30 teachers to assess the internal consistency of each construct. The outcomes showed that each construct in the research model acquired an acceptable Cronbach's Alpha >0.7 (Hair et al., 2019). Furthermore, a panel of experts consisting of five academics with a significant experience in educational technology and information systems was recruited to assess the content validity of the questionnaire (Artino et al., 2014). Based on the feedback of the panel, minor modifications were made to a few items.

Data Analysis Technique

The data analysis technique uses SEM-PLS (Structural Equation Modeling Partial Least Squares) with the SMART-PLS software. 4. Structural Equation Modelling (SEM) method Partial Least Square (PLS) is an alternative method in SEM that complements the previous SEM method (Budiarsi, 2020). You can estimate models with reflective or formative indicators using Partial Least Square (PLS), an alternate method in Structural Equation Modeling (SEM). The shortcomings of the SEM approach were the impetus for the development of PLS (Nusrang, 2023). Collecting data and estimating parameters to get relevant coefficients are the first steps in the analytical process, which is focused on developing a conceptual model using preexisting theories and hypotheses (Memon & Rahman, 2014). One great thing about this method is that it can handle numerous variables at once and still give you good estimates, no matter how small your sample is.

In fact, PLS-SEM is a flexible approach that may be employed in a broad variety of settings, and whose sample size and distribution requirements are less conservative than those of other modeling techniques (Hair et al., 2019). We used the SmartPLS 4 software (Ringle et al., 2022) to analyze the data of this study. As instructed, we conducted the data analysis in two steps (Anderson & Gerbing, 1988). In step one, we evaluated the measurement model by assessing the internal consistency and convergent and discriminant validities. Since the data from the previous step were acceptable, we applied the structural model to verify our hypothesis in step two.

RESULTS AND DISCUSSION

Result

Preliminary Data Analysis

The possibility of multicollinearity and common method bias (CMB) was examined before the data analysis began. For the purpose of assessing multicollinearity, we use the "variance inflation factor - VIF." Each VIF value must be <5. (Hair et al., 2022). As a result, there is no evidence of multicollinearity because the VIFs range from 1.000 to 4.551 (see Table 3). The single factor Harman is then used to test for the presence of CMB.

Table 3. R-Squere

Item	R-square	R-square adjusted
IN	0.610	0.608
TP	0.639	0.635
TS	0.780	0.779
WE	0.506	0.504

Overall, the R-square values ranging from 0.506 to 0.780 indicate that the research model demonstrates moderate to strong explanatory power, particularly in explaining teacher stress and teacher performance. These results confirm that digital leadership, innovation, and work engagement play significant roles in shaping teacher outcomes within schools supported by the Xaverius Foundation in Sumatra.

Table 4 Q-Squere

Item	Q^2predict
IN1	0.419
IN2	0.237
IN3	0.447
IN4	0.496
IN5	0.472
IN6	0.498
TP1	0.194
TP2	0.103
TP3	0.212
TP4	0.230
TP5	0.450
TS1	0.247
TS2	0.200
TS3	0.109
TS4	0.171
TS5	0.144
WE1	0.219
WE2	0.316
WE3	0.142
WE4	0.104
WE5	0.229

Since all Q^2predict values are greater than zero, it can be concluded that the research model demonstrates adequate to strong predictive relevance. This confirms that the structural model is not only capable of explaining the relationships among variables but is also effective in predicting innovation, teacher performance, teacher stress, and work engagement among teachers in schools under the Xaverius Foundation in Sumatra.

Table 5 Multi-collinearity assessment

Item	DL	IN	TP	TS	WE
DL	-	1.000	2.572	-	-
IN	-	-	4.163	2.023	1.000
TP	-	-	-	-	-
TS	-	-	4.551	-	-
WE	-	-	3.977	2.023	-

The multicollinearity test results indicate that all VIF values are below 5, ranging from 1.000 to 4.551. This confirms that there is no multicollinearity issue among the variables, and the model is free from collinearity problems.

Measurement Model

Before examining the proposed hypothesis, the reliability and validity of the measurement items (indicators) and scale (construct) are tested (Hair et al., 2019). First, the loading of each indicator is assessed. An outer loading value > 0.7 is acceptable. Meanwhile, outer loading values < 0.4 are always eliminated from the analysis process. An outer loading value > 0.7 means that $0.72 \approx 50\%$ of the variability of an indicator can be explained or absorbed by its latent variable. In general, an outer loading value of 0.4-0.7 can be considered for elimination when its removal increases the composite reliability or average variance (Setiabudhi et al., 2025). Table 6 shows that the loading of each item is higher than the recommended value, indicating that all

items have adequate item reliability. Second, two measures are used to evaluate internal consistency: Cronbach's Alpha (α) and composite reliability (CR). The minimum acceptable value for α and CR is recommended to be 0.7 and should not be ≥0.95. This condition is met by all constructs (see Table 6), indicating that internal consistency is present in all constructs. Third, convergent validity is determined by examining the "average variance extracted - AVE." the minimum acceptable AVE value is 0.5. As can be seen in Table 6, the AVE value of each construct substantially exceeds 0.5, indicating that convergent validity is present

Table 6. Internal and convergent validity assessment

Construct	Item	Outer loadings	Cronbach's alpha	Composite reliability (rho_a)	Composite reliability (rho_c)	Average variance extracted (AVE)
Digital Leadership Style (DL)	DL1	0.874	0.911	0.914	0.934	0.738
	DL2	0.856				
	DL3	0.903				
	DL4	0.830				
	DL5	0.830				
Educational Innovation (IN)	IN1	0.856	0.918	0.923	0.937	0.713
	IN2	0.725				
	IN3	0.894				
	IN4	0.871				
	IN5	0.858				
	IN6	0.851				
Teachers' Performance (TP)	TP1	0.857	0.904	0.906	0.929	0.725
	TP2	0.868				
	TP3	0.910				
	TP4	0.834				
	TP5	0.782				
Teachers' Stress (TS)	TS1	0.708	0.810	0.818	0.868	0.570
	TS2	0.727				
	TS3	0.815				
	TS4	0.708				
	TS5	0.808				
Work Engagement (WE)	WE1	0.932	0.924	0.933	0.943	0.769
	WE2	0.878				
	WE3	0.919				
	WE4	0.846				
	WE5	0.803				

The final test at this stage is to check for discriminant validity. The AVE of a construct must be greater than the correlation of that construct with other constructs. As shown in Table 7, this condition is met, concluding that discriminant validity exists (Fornell & Larcker, 1981). Additionally, the results of the "Heterotrait–Monotrait Ratio-HTMT" test show that all HTMT values are <0.85 (Henseler et al., 2015), supporting the findings in terms of the Fornell and Larcker criteria.

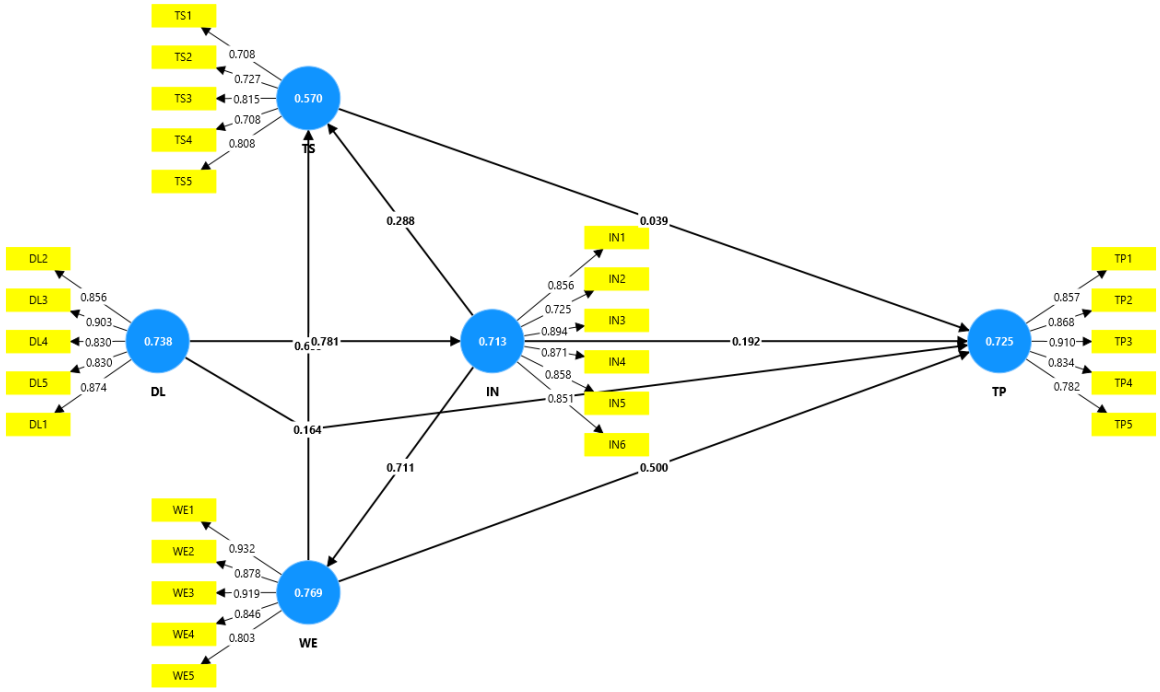

Figure 2. Outer Loading, Path Coefficients & AVE

Structural Model

After obtaining a satisfactory evaluation of the measurement model, assessing the structural model is the next step. The significance of the path coefficients (β) is evaluated first (Table 8). The results show that all effects are significant except for the effect of TS on TP. WE produced the strongest positive effect on TP (β=0.500, p value<0.001), followed by IN (β=0.192, p value<0.003), and DL (β=0.164, p value<0.018), indicating that these factors are the main drivers of teacher performance. Surprisingly, TS has no effect on TP (β=0.039, p value<0.581). As expected, WE has a large impact on both TS (β=0.655, p value<0.001) and IN (β=0.288, p value<0.001), making it the primary driver of TS. IN has a substantial impact on WE (β=0.711, p value<0.001), while DL has a strong impact on IN (β=0.781, p value<0.001).

Table 7. Discriminant validity

Item	DL	IN	TP	TS	WE
DL	0.859	-	-	-	-
IN	0.781	0.844	-	-	-
TP	0.600	0.705	0.851	-	-
TS	0.565	0.754	0.706	0.755	-
WE	0.528	0.711	0.757	0.860	0.877

Fornell–Larcker criterion (below the main diagonal) and Heterotrait–Monotrait Ratio (HTMT) (above the main diagonal). Main diagonal: in bold, square root of the AVE.

Table 8. Hypotheses testing

H	Item	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistics (|O/STDEV|)	P values	Supported
H1	Digital Leadership (DL) → Inovation (IN)	0.781	0.779	0.034	23.129	0.000	YES
H2	Digital Leadership (DL) → Teacher Performance (TP)	0.164	0.164	0.069	2.362	0.018	YES
H3	Inovation (IN) → Teacher Performance (TP)	0.192	0.194	0.064	2.983	0.003	YES
H4	Inovation (IN) → Teacher Stres (TS)	0.288	0.291	0.045	6.375	0.000	YES
H5	Inovation (IN) → Work Engagement (WE)	0.711	0.708	0.045	15.725	0.000	YES
H6	Teacher Stres (TS) → Teacher Performance (TP)	0.039	0.043	0.070	0.552	0.581*	NO
H7	Work Engagement (WE) → Teacher Performance (TP)	0.500	0.501	0.069	7.286	0.000	YES
H8	Work Engagement (WE) → Teacher Stres (TS)	0.655	0.651	0.044	14.976	0.000	YES

*Insignificant effect

In terms of assessing the effect size (f2), while the highest effect size on TP is produced by DL (0.614), IN (0.711) produced the highest effect size on WE. The most impactful, the effect size of IN on TS is substantial (0.754) (see Table 9).

Table 9 Effect size assessment

Item	DL	IN	TP	TS	WE
DL	-	0.781	0.614	0.589	0.555
IN	-	-	0.577	0.754	0.711
TP	-	-	-	-	-
TS	-	-	0.039	-	-
WE	-	-	0.526	0.655	-

Indirect effect assessment

The significance of the indirect effects of the research model constructs is shown in Table 10. The results show that out of 12 indirect effects. 7 indirect effects are significant and 5 indirect effects are not. DL on WE produces the strongest indirect effect through IN (β=0.555. p value<0.001). while DL produces the weakest on TP through IN (β=0.150. p value<0.003). Interestingly. TS has an insignificant direct effect on TP. and similarly. in this indirect effect. everything that goes to TP but through TS beforehand also does not produce an indirect effect.

Table 10 Indirect effects assessment

Item	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistics (|O/STDEV|)	P values
DL → IN → TP	0.150	0.150	0.050	3.010	0.003
DL → IN → TS	0.225	0.226	0.038	5.985	0.000
DL → IN → WE	0.555	0.552	0.050	11.201	0.000
WE → TS → TP	0.025	0.028	0.046	0.552	0.581*
DL → IN → WE → TS → TP	0.014	0.015	0.026	0.551	0.582*
IN → WE → TS → TP	0.018	0.019	0.033	0.552	0.581*
DL → IN → WE → TP	0.278	0.277	0.047	5.923	0.000
IN → WE → TP	0.356	0.355	0.054	6.555	0.000
DL → IN → TS → TP	0.009	0.009	0.016	0.542	0.588*
DL → IN → WE → TS	0.364	0.359	0.039	9.233	0.000
IN → TS → TP	0.011	0.012	0.021	0.543	0.587*
IN → WE → TS	0.466	0.461	0.041	11.338	0.000

*Insignificant effec

Discussion

The findings show that DL significantly positively affects IN and TP, supporting H1 and H2. The finding that DL affects IN is consistent with the research by Fatima and Masood (2024), while DL affects TP is consistent with the research by Saeed and Kang (2024) and Timan et al. (2022). This shows that well-managed digital leadership will have a significant impact on the development of innovation in schools. Thus, schools can create new things in school activities, including learning, which can support the process and achieve better results. In addition, good digital leadership will create good teacher performance. The quality of education and student success depend on the performance of teachers.

Next, the findings in this study reveal that IN affects TP, TS, and WE, indicating that H3, H4, and H5 are supported. These results are consistent with previous research on IN to TP (Hambali et al., 2023; Rodiyah et al., 2022). Teachers who are able to innovate and use the latest technology to enhance teaching can improve their performance. IN influences TS according to the research (Kassymova et al., 2019). The high demands of innovation, constantly keeping up with developments, will become a separate workload for teachers and impact their work stress, so innovation must also be managed in such a way as not to cause work stress. IN also affects WE in line with the research (Ilomäki and Lakkala, 2018). Good innovation will involve teacher collaboration, thereby increasing work engagement. Teachers will collaborate with each other through exchanging ideas, discussing, and sharing to create innovative advancements in the field of education.

An interesting finding from this research is that it reveals TS does not significantly affect TP, indicating that H6 is not supported. According to the researchers, work stress does not affect teacher performance. From these results, it can be interpreted that increased teacher stress or work-related stress actually has a negative impact on teacher performance. If it can be controlled or suppressed, it will have a positive impact on teacher performance.

Furthermore, the results of this study reveal that WE has an influence on TP, which also indicates that H7 is supported. In accordance with the research (Yao et al., 2022) which reveals a substantial correlation between work engagement and job performance. High work engagement can also be ensured to improve teachers' performance, as there is good cooperation and communication among teachers. With this involvement, it can be ensured that teachers will often transfer knowledge to each other and together will always develop themselves towards positive changes in the world of education.

Finally, this study reveals that WE has an influence on TS, indicating that H8 is also supported. This is consistent with the research (Li et al., 2021, 2024; Mérida-López et al., 2017, 2023). Work engagement is also an active activity in the world of education, which means that the more involved a teacher is, the more responsibilities and roles they have in an activity or process within teaching or the educational world. Thus, work involvement will increase work stress. From this, it can be interpreted that work stress must be controlled so that positive aspects like work involvement do not burden teachers.

CONCLUSION

This study found that schools in Sumatra supported by the Xaverius Foundation had significantly higher teacher performance when digital leadership styles and instructional innovation were used. When it comes to improving teachers' efficiency and fostering innovation in the classroom, digital leadership has shown to be important. Despite the potential for increased stress in the workplace, educational innovation has a net beneficial effect on teacher engagement and performance. There is a positive correlation between educational innovation and the results of teachers' work, and the most important mediator between the two is teachers' level of engagement in their work. What this means is that students benefit from having professors who are actively involved in their lessons and who demonstrate passion, excitement, and concentration. Nevertheless, this study found no significant direct effect of work-related stress on teacher performance. This suggests that instructors are able to keep up their work performance even when faced with stressful situations. Given the possible long-term effects on teachers' health, this does not, however, absolve them of responsibility for dealing with stress on the job. As a result, enhancing digital-based leadership, cultivating a positive innovation culture, enabling work participation, and adopting effective and sustainable stress management measures are all necessary for raising teacher performance.

From a theoretical perspective, this study contributes to the development of educational leadership and organizational behavior literature by confirming the central mediating role of work engagement in linking digital leadership and educational innovation to teacher performance within a foundation-based school context. This integrated model enriches existing theories by demonstrating that leadership and innovation do not operate solely through direct effects, but primarily through psychological engagement mechanisms. For future research, it is recommended to expand the model by including additional variables such as organizational culture, job satisfaction, resilience, or technological readiness, as well as to apply longitudinal or mixed-method approaches to better capture causal dynamics over time. Further studies across different regions, educational levels, and institutional types are also encouraged to strengthen the generalizability and robustness of these findings.

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