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Leadership Effectiveness, Competency Development, and Educational Staff Performance: Mediating Role of Job Satisfaction and Moderating Role of Digital Literacy

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The author(s) declares that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

ABSTRACT

Purpose: Digital transformation in higher education demands improved performance from educational staff who are adaptable and professional. However, there remains a gap between the demands of digitalisation and the readiness of human resources, particularly in terms of competencies, leadership, and digital literacy. This study aims to analyse the influence of effective leadership, competency development, and digital literacy on the performance of educational staff, both directly and indirectly through job satisfaction, as well as to test the moderating role of digital literacy.

Research Design and Methodology: This study employs a quantitative approach using explanatory research methodology. The study population consists of educational staff at private higher education institutions in West Java Province, with a sample size of 100 respondents selected via purposive sampling. Data collection was conducted using a questionnaire with a Likert scale, and data analysis utilised Structural Equation Modelling based on Partial Least Squares (SEM-PLS). The research was conducted between January and March 2025.

Findings and Discussion: The results indicate that competency development, effective leadership, and digital literacy play a role in enhancing job satisfaction and the performance of educational staff. Job satisfaction was found to be a key mediating factor in the relationship between organisational variables and performance, whilst digital literacy acts as a moderating factor in this relationship. These findings indicate that improved performance is determined not only by technical factors but also by psychological aspects and the ability to adapt to technology.

Implications: The implications of this research emphasise the importance of digital-based competency development strategies, adaptive leadership, and the strengthening of digital literacy to enhance the performance of educational staff in a sustainable manner.

Introduction

Digital transformation in the higher education sector demands a continuous improvement in the quality of educational staff performance. Educational staff performance is not only determined by technical aspects but is also influenced by psychological factors, leadership, and the ability to adapt to digital technology. Observations in the field indicate that there remains a gap between the demands of digitalisation and the readiness of human resources, particularly regarding digital literacy and competency development. This situation has the potential to reduce the effectiveness of academic services and the overall performance of the institution (Bakker & Demerouti, 2007; Gilster, 1997). On the other hand, the increasing complexity of work in the digital age demands that organisations immediately implement strategic interventions through competence enhancement, adaptive leadership, and the creation of optimal job satisfaction. Therefore, this research is important and

urgent to address the challenges of improving the performance of educational staff in the era of educational digitalisation.

The selection of private universities in West Java Province as the research subjects is based on their unique characteristics compared to other educational institutions. Private universities face higher levels of competition, both in terms of service quality and institutional sustainability, thereby demanding more optimal and adaptive performance from educational staff. Furthermore, private universities tend to have different policy flexibility compared to public universities, particularly in human resource management and the implementation of digital innovations (Afridi et al., 2020). These conditions make private higher education institutions a relevant subject for examining how leadership, competence, and digital literacy contribute to improving the performance of academic staff. Consequently, this study has a strong empirical context and is capable of providing a realistic picture of the dynamics of human resource management in the private higher education sector.

Conceptually, the performance of academic staff is influenced by various interrelated variables, including effective leadership, competency development, digital literacy, and job satisfaction. Effective leadership plays a role in establishing clear direction and work motivation, whilst competence development contributes to enhancing individuals' ability to perform tasks professionally (Bass & Avolio, 1994). Digital literacy is a crucial factor in the era of digital transformation as it determines individuals' ability to utilise technology to support performance (Ng, 2012). On the other hand, job satisfaction acts as a psychological variable that can strengthen the relationship between independent variables and performance (Herzberg et al., 1959). Furthermore, digital literacy also has the potential to act as a moderating variable that strengthens the influence of job satisfaction on performance. The relationships between these variables indicate a complex and multidimensional interconnection in explaining the performance of educational staff.

Although various studies have examined the factors influencing employee performance, there remains a research gap that requires further investigation. Some studies suggest that competence development and leadership have a significant influence on performance (Afridi et al., 2020; Bernarto et al., 2020), yet other research has found differing results, particularly within organisations undergoing digital transformation (Vial, 2019). Furthermore, the role of digital literacy as a moderating variable has been relatively under-researched empirically, particularly within the context of higher education in Indonesia (Sutrisno et al., 2023). Recent research also indicates that whilst job satisfaction influences performance, the extent of this influence may vary depending on contextual factors such as leadership and technological capability (Kim & Lee, 2021). Consequently, there is inconsistency in previous research findings, as well as limitations in integrating the digital literacy variable as a strategic factor within performance models.

Based on these gaps, this study offers a novel approach by integrating the variables of effective leadership, competency development, digital literacy, and job satisfaction into a single comprehensive structural model, whilst positioning digital literacy as a moderating variable. The novelty of this study lies in testing the moderating role of digital literacy in strengthening the relationship between job satisfaction and the performance of educational staff, a topic that has been rarely researched in the context of private higher education institutions in Indonesia. This study is expected to provide a theoretical contribution to the development of digital-based performance models, as well as a practical contribution to higher education administrators in formulating strategies to improve human resource performance. The objectives of this study are to analyse the influence of effective leadership, competency development, and digital literacy on the performance of educational staff, both directly and indirectly through job satisfaction, and to test the moderating role of digital literacy in this relationship.

Literature Review

Effective Leadership

Effective leadership is a leader's ability to influence, direct, and motivate subordinates to achieve organisational goals optimally. In the context of modern organisations, leadership is not only control-oriented but also focused on empowerment and the development of human resource potential (Northouse, 2019). Effective leadership is characterised by the ability to create a clear vision, open

communication, and adaptive decision-making in response to changes in the organisational environment.

Empirical research indicates that effective leadership plays a strategic role in enhancing employee job satisfaction and performance. Transformational Leadership emphasises the importance of inspiration, motivation, and individual attention in improving both individual and organisational performance. A study by Hoch et al. (2018) found that relationship-oriented and transformational leadership has a positive influence on team performance and job satisfaction. Furthermore, Banks et al. (2016) confirm that effective leadership is capable of creating a conducive working environment, thereby driving increased productivity.

In the context of higher education, effective leadership is a key factor in managing complex organisational dynamics, including in addressing the challenges of digitalisation and changes to working systems. Consequently, effective leadership is regarded as a crucial variable contributing to improved job satisfaction and the performance of academic staff.

Competency Development

Competency development is a systematic process of enhancing an individual's knowledge, skills, and work attitudes so that they are able to perform tasks effectively and efficiently. Competencies encompass not only technical aspects but also interpersonal skills and the ability to adapt to change (Spencer & Spencer, 1993).

From the perspective of Human Capital Theory, competency development is viewed as an investment capable of enhancing the productivity of both individuals and organisations. A study by Noe et al. (2020) demonstrates that structured training and development programmes can improve work capabilities and strengthen employees' commitment to the organisation. Furthermore, research by Salas et al. (2012) confirms that competency-based training has a significant impact on improving individual performance.

Furthermore, competency development also plays a role in enhancing job satisfaction. Individuals with high competencies tend to feel more confident and capable of performing tasks effectively, thereby increasing their satisfaction with the work they undertake. Consequently, competency development is a key factor in improving the quality of performance among educational staff.

Digital Literacy

Digital literacy is an individual's ability to access, understand, evaluate, and utilise information through digital technology effectively and responsibly. In the era of digital transformation, digital literacy has become an essential competency that every individual within an organisation must possess (Eshet, 2012).

The concept of digital literacy encompasses not only technical skills but also cognitive and social abilities in using technology. According to van Laar et al. (2020), digital literacy encompasses critical thinking skills, problem-solving, and the ability to collaborate in a digital environment. Furthermore, a study by Helsper and van Deursen (2017) indicates that a high level of digital literacy contributes to increased productivity and work efficiency.

In the context of educational organisations, digital literacy is a key factor in supporting the performance of educational staff, particularly when dealing with technology-based administrative systems. Digital literacy also has the potential to strengthen the link between job satisfaction and performance, as individuals who are able to make good use of technology tend to be more productive and adaptable to change.

Job Satisfaction

Job satisfaction is an emotional state that reflects an individual's feelings towards their work, whether positive or negative. Job satisfaction is influenced by various factors, such as the work environment, relationships with superiors, reward systems, and opportunities for self-development (Locke, 1976).

Within the framework of the Two-Factor Theory, job satisfaction is influenced by motivator factors (intrinsic) and hygiene factors (extrinsic). Motivator factors such as achievement and

recognition can enhance job satisfaction, whilst hygiene factors such as working conditions and organisational policies play a role in preventing dissatisfaction.

Research by Judge et al. (2017) indicates that job satisfaction has a positive relationship with employee performance. Furthermore, job satisfaction also acts as a mediating variable linking various organisational factors to performance. In this context, job satisfaction becomes a key variable explaining how the influence of leadership and competence can translate into improved performance.

Educational Staff Performance

Educational staff performance refers to the work outcomes achieved by individuals in carrying out their duties and responsibilities in accordance with standards set by the organisation. Performance encompasses aspects of quality, quantity, timeliness, and effectiveness in task completion (Campbell & Wiernik, 2015).

From the perspective of Performance Theory, performance is influenced by various factors, such as individual ability, motivation, and organisational support. Research by Koopmans et al. (2014) suggests that employee performance comprises three main dimensions: task performance, contextual performance, and adaptive performance.

Furthermore, a study by DeNisi and Smith (2014) indicates that improved performance depends not only on individual ability but also on organisational factors such as leadership and job satisfaction. In the context of higher education, the performance of academic staff serves as a key indicator in determining the quality of academic and administrative services.

HYPOTHESIS DEVELOPMENT

The Influence of Effective Leadership on Job Satisfaction

Effective leadership is a key factor in creating a conducive working environment and enhancing employees' psychological well-being. From an organisational behaviour perspective, the quality of the relationship between leaders and subordinates determines the level of job satisfaction, as leaders play a role in providing support, role clarity, and organisational justice. Effective leadership is capable of creating a positive work environment through open communication and the empowerment of individuals (Hoch et al., 2018). Furthermore, relationship-oriented leadership has been shown to enhance job satisfaction by fulfilling employees' psychological needs, such as recognition and appreciation (Inceoglu et al., 2018).

Empirical research also indicates that leadership has a significant influence on job satisfaction, particularly within dynamic and complex educational organisations (Aboramadan et al., 2021). Leaders who can manage change and provide support to staff will enhance positive perceptions of the job.

Thus, effective leadership plays a crucial role in enhancing job satisfaction among educational staff.

H1: Effective leadership has a positive influence on job satisfaction.

The Influence of Competency Development on Job Satisfaction

Competency development is a strategic process for enhancing the quality of human resources through the improvement of knowledge, skills, and work attitudes. Based on Human Capital Theory, investment in competency development increases an individual's value within the organisation and has a positive impact on job satisfaction (Salman et al., 2020).

Individuals with high competencies tend to be more confident in performing their duties, thereby reducing work-related stress and increasing satisfaction. Furthermore, competency development programmes also signal that the organisation values employees' contributions, which can enhance emotional attachment to the job (Kallerhult Hermansson et al., 2024).

Previous research indicates that competency enhancement has a positive relationship with job satisfaction as it enhances individuals' sense of achievement and self-efficacy (Kleszewski et al., 2023).

Thus, competency development is a key factor in enhancing job satisfaction among educational staff.

H2: Competence development has a positive effect on job satisfaction.

The Influence of Digital Literacy on the Performance of Educational Staff

Digital literacy is an individual's ability to utilise technology effectively to support work activities. In the era of digitalisation, digital literacy has become a key determinant of performance as it is directly linked to efficiency, accuracy, and the speed of task completion.

According to van Laar et al. (2020), digital literacy encompasses technical and cognitive skills that enable individuals to manage information effectively within a digital work environment. Individuals with high digital literacy are more adaptable to changes in systems and technology, thereby enhancing work productivity.

Empirical research indicates that digital literacy has a positive influence on employee performance, particularly within organisations that rely on technology-based systems (Mardiana, 2024; Kabakus et al., 2025). The ability to utilise technology optimally enables employees to work more effectively and efficiently.

Consequently, digital literacy is a key factor in improving the performance of educational staff.

H3: Digital literacy has a positive influence on the performance of educational staff.

The Influence of Job Satisfaction on the Performance of Educational Staff

Job satisfaction is an emotional state reflecting the extent to which an individual feels satisfied with their work. In motivation theory, job satisfaction acts as a primary driver in enhancing individual performance. Satisfied individuals tend to have high work motivation and commitment to the organisation.

Meta-analyses indicate that job satisfaction has a significant positive relationship with performance (Katebi et al., 2022). This suggests that satisfied staff are more productive, have lower absenteeism rates, and demonstrate better performance.

In the context of higher education, job satisfaction is a key factor in improving the quality of service provided by academic staff. Satisfied staff are more responsive to the organisation's needs and able to make an optimal contribution.

Thus, job satisfaction plays a vital role in improving the performance of educational staff.

H4: Job satisfaction has a positive effect on the performance of educational staff.

The Impact of Competency Development on Performance through Job Satisfaction

Competency development not only has a direct impact on performance but also exerts an indirect influence via job satisfaction. From an organisational psychology perspective, enhanced competencies boost an individual's self-efficacy, which in turn increases job satisfaction.

Job satisfaction subsequently acts as a psychological mechanism that encourages individuals to work more effectively. Research indicates that the relationship between competence and performance becomes stronger when mediated by job satisfaction (Sabuhari et al., 2020).

This indicates that an increase in competence not only enhances technical ability but also improves the emotional state that supports performance.

Thus, job satisfaction acts as a mediating variable in the relationship between competence development and performance.

H5: Competence development has a positive effect on the performance of educational staff through job satisfaction.

The Influence of Effective Leadership on Performance through Job Satisfaction

Effective leadership has an indirect influence on performance via job satisfaction. Leaders who are able to provide support and role clarity will increase employees' job satisfaction, which ultimately impacts performance.

Research indicates that job satisfaction mediates the relationship between leadership and performance (Gılıç et al., 2024). This suggests that leadership not only has a direct impact on performance but also through improvements in staff psychological well-being.

In the context of higher education, effective leadership creates a supportive working environment, thereby enhancing job satisfaction and the performance of academic staff.

Thus, job satisfaction acts as a mediator in the relationship between effective leadership and performance.

H6: Effective leadership has a positive effect on the performance of educational staff through job satisfaction.

The Moderating Role of Digital Literacy in the Relationship between Job Satisfaction and Performance

Digital literacy acts as a moderating variable that can strengthen the relationship between job satisfaction and performance. From the perspective of contingency theory, the effectiveness of a relationship is influenced by certain conditions, including individual capabilities.

Employees with high job satisfaction do not necessarily demonstrate optimal performance without being supported by adequate capabilities. Digital literacy enables employees to translate job satisfaction into more productive performance.

Research indicates that digital literacy can strengthen the relationship between psychological factors and performance (Jang et al., 2021; Suryadi & Setyono, 2024). This suggests that digital literacy functions as a reinforcing factor in the relationship between job satisfaction and performance.

Thus, digital literacy strengthens the relationship between job satisfaction and the performance of educational staff.

H7: Digital literacy moderates the effect of job satisfaction on the performance of educational staff, such that this effect becomes stronger at higher levels of digital literacy.

Research Design and Methodology

This study employs a quantitative approach using explanatory research, which aims to explain causal relationships between variables through the testing of pre-formulated hypotheses. The quantitative approach was chosen because it provides an objective and measurable picture of the relationships between variables using statistical analysis (Creswell & Creswell, 2018). In this study, the variables analysed include effective leadership, competency development, digital literacy, job satisfaction, and the performance of educational staff.

The analysis method used is Structural Equation Modelling based on Partial Least Squares (SEM-PLS). This method was chosen because it is capable of analysing complex relationships between latent variables simultaneously, including direct, indirect (mediation), and moderating effects within a single research model. Furthermore, SEM-PLS does not require a normal data distribution and can be applied to relatively small sample sizes, making it suitable for the characteristics of this study (Hair et al., 2021).

Research Location and Time

This study was conducted at a private university in West Java Province. The choice of research location was based on the consideration that private universities have a high level of organisational dynamism and face demands to adapt to increasingly complex digital transformation. These conditions make academic staff a crucial element in supporting the effectiveness of organisational performance.

The research was carried out between January and March 2025. The research stages included the development of instruments, the distribution of questionnaires, data collection, and data analysis. This timeframe was deemed sufficient to obtain representative data in line with the research objectives.

Population and Sample

The population in this study comprises all educational staff working at private higher education institutions in West Java Province. Educational staff were selected as the research subjects because they play a strategic role in supporting operational and academic services within higher education institutions.

The sampling technique used was purposive sampling, which involves selecting a sample based on specific criteria relevant to the research objectives (Sugiyono, 2019). The criteria for respondents in this study included educational staff who are currently active, have a minimum of one year's service,

and are involved in the use of digital systems in the performance of their duties. Based on these criteria, the sample size used in this study was 100 respondents. This number is considered to meet the minimum criteria for SEM-PLS analysis, which recommends a sample size of between 30 and 100 for complex research models (Hair et al., 2021).

A sample size of 100 respondents is considered to meet the minimum criteria for SEM-PLS analysis. The PLS-SEM method is known to have a relatively high tolerance for small sample sizes compared to covariance-based SEM, whilst still being able to produce stable and accurate estimates (Hair et al., 2021). Consequently, the sample size in this study is sufficient to test complex research models, including mediation and moderation relationships.

Data Sources and Collection Techniques

The data sources in this study consist of primary and secondary data. Primary data were obtained directly from respondents via the distribution of questionnaires, which were used to measure educational staff's perceptions of the variables under investigation. Meanwhile, secondary data were obtained from various literature sources such as scientific journals, books, and other supporting documents relevant to the research topic.

Data collection was carried out using a questionnaire as the primary research instrument. The questionnaire was designed based on indicators for each of the pre-determined variables. Measurements were taken using a Likert scale ranging from 1 to 4, which reflects the respondents' level of agreement with the statements presented. The use of the Likert scale is considered effective in systematically measuring respondents' attitudes, perceptions, and opinions (Sekaran & Bougie, 2016).

Research Instrument

The research instrument used in this study is a questionnaire systematically designed based on the indicators of each research variable. Each statement item is designed to reflect the construct being measured, thereby possessing strong conceptual validity. The design of the instrument draws upon theory and previous research findings to accurately depict empirical conditions.

Prior to data collection, the research instrument was tested for validity and reliability. Validity testing was conducted to ensure that each indicator was capable of measuring the intended construct, whilst reliability testing aimed to assess the instrument's internal consistency. In SEM-PLS analysis, an instrument is deemed valid if it has an outer loading value above 0.70, and reliable if the Cronbach's alpha and composite reliability values exceed 0.70 (Hair et al., 2021).

Operational Definitions of Variables

The operational definitions of the variables in this study are presented in tabular form to provide clarity regarding the concepts, indicators, and measurements of each variable used in the study. The formulation of operational definitions aims to ensure that each variable can be measured empirically and is consistent with the research objectives.

Table 1. Operational Definitions of Variables

Variable	Operational Definition	Indicator	Scale
Effective Leadership (X1)	A leader's ability to influence and guide employees	Communication, motivation, decision-making, individual attention	Likert
Competency Development (X2)	Efforts to improve employees' work performance	Knowledge, skills, training, adaptation	Likert
Digital Literacy (M)	Ability to use technology effectively	Use of technology, information processing, digital adaptation	Likert
Job Satisfaction (Z)	Level of satisfaction with work	Task satisfaction, work environment, recognition	Likert
Performance (Y)	Work output in line with organisational standards	Quality, quantity, timeliness, effectiveness	Likert

Data Analysis Techniques

The data analysis technique used in this study employs a Structural Equation Modelling approach based on Partial Least Squares (SEM-PLS) with the aid of SmartPLS software. The analysis was conducted to test the relationships between latent variables simultaneously and to test the hypotheses formulated previously.

The analysis process begins with an evaluation of the measurement model (outer model) to test the construct validity and reliability. Next, an evaluation of the structural model (inner model) is carried out to test the relationships between variables, which includes testing the coefficient of determination (R-squared), significance tests using t-statistics and p-values, as well as testing for mediation and moderation effects. In addition, an effect size analysis (f^2) is also conducted to determine the magnitude of each independent variable's contribution to the dependent variable.

The use of SEM-PLS in this study was deemed appropriate as it is capable of providing comprehensive analytical results for complex research models, and possesses good predictive power in explaining the phenomena under investigation (Hair et al., 2021).

Findings and Discussion

Findings

Respondent Characteristics

The respondent characteristics in this study aim to provide a general overview of the profile of the educational staff who were the subjects of the research. This information is important for understanding the respondents' background and ensuring that the data obtained represent empirical conditions relevant to the research objectives. The respondent characteristics in this study include gender, age, educational level, and length of service.

The presentation of respondent characteristics is integrated into a single table to facilitate reading and provide a comprehensive overview of the distribution of respondents. The results of the data analysis on respondent characteristics are presented as follows:

Table 2. Respondent Characteristics

Characteristics	Category	Frequency (People)	Percentage (%)
Gender	Male	42	42.0
	Female	58	58.0
Age	< 25 years	12	12.0
	25–35 years	46	46.0
	36–45 years	28	28.0
	> 45 years	14	14.0
Highest Level of Education	Secondary school/Diploma	18	18.0
	Bachelor's degree	62	62.0
	Master's	20	20.0
Length of Service	< 2 years	15	15.0
	2–5 years	38	38.0
	6–10 years	27	27.0
	> 10 years	20	20.0

Based on Table 2, it can be seen that the majority of respondents in this study were women, accounting for 58.0%, whilst male respondents accounted for 42.0%. This indicates that educational staff in private higher education institutions tend to be dominated by women, reflecting a general characteristic of the educational administration sector.

In terms of age, the majority of respondents were in the 25–35 age group (46.0%), followed by those aged 36–45 (28.0%). This indicates that educational staff are predominantly from the productive age group, who possess a reasonably good ability to adapt to change, including in coping with digital transformation in the workplace.

In terms of highest level of education, the majority of respondents held a Bachelor's degree (S1), accounting for 62.0%, followed by Master's degree (S2) holders at 20.0%. This indicates that

educational staff possess a sound educational background, thereby supporting their ability to perform their duties professionally.

Meanwhile, based on length of service, the majority of respondents had between 2 and 5 years' work experience (38.0%), indicating that they possess sufficient experience to understand the organisation's operational systems. Additionally, 20.0% of respondents had over 10 years' service, reflecting a mix of experienced staff and relatively new employees.

Overall, the characteristics of the respondents in this study reveal a fairly diverse and representative composition, in terms of age, education, and work experience. This situation provides a strong foundation for analysing the relationship between the research variables, as the respondents possess backgrounds relevant to the research context, particularly in addressing the dynamics of educational staff performance in the digital era.

Data Analysis

Assessing the *Outer Model* or *Measurement Model*

In the application of data analysis techniques using SmartPLS, the assessment of the outer model is based on three main criteria, namely Convergent Validity, Discriminant Validity, and Composite Reliability. These three criteria are used to ensure that the indicators used are able to accurately reflect the constructs, clearly distinguish between constructs, and demonstrate internal consistency among indicators within a single latent variable.

Convergent Validity

Convergent validity in a measurement model with reflective indicators is evaluated based on the strength of the correlation between the item scores or component scores generated by the SmartPLS software and the construct being measured. A reflective indicator is considered to have good convergent validity if its correlation value exceeds 0.70. This indicates that the indicator is capable of adequately explaining the latent variable, as its contribution to the construct is sufficiently strong and consistent.

Table 3. *Outer Loadings (Measurement Model)*

	Competency Development (X2)	Digital Literacy (M)	Education Personnel Performance (Y)	Effective Leadership (X1)	Job Satisfaction (Z)	Digital Literacy (M) × Job Satisfaction (Z)
M.1		0.945				
M.2		0.946				
M.3		0.925				
M.4		0.947				
M.5		0.939				
X1.1				0.925		
X1.2				0.947		
X1.3				0.940		
X1.4				0.947		
X1.5				0.936		
X2.1	0.923					
X2.2	0.946					
X2.3	0.947					
X2.4	0.925					
X2.5	0.944					
Y.1			0.894			
Y.2			0.906			
Y.3			0.919			
Y.4			0.919			
Y.5			0.891			
Z.1					0.941	
Z.2					0.941	
Z.3					0.941	

Z.4	0.938	
Z.5	0.935	
Digital Literacy (M) × Job Satisfaction (Z)		1,000

Based on these data, all indicators for each variable show very high factor loadings (≥0.89), indicating excellent convergent validity within the measurement model. The Digital Literacy (M) variable has loadings between 0.925–0.947, Effective Leadership (X1) between 0.925–0.947, and Competency Development (X2) between 0.923–0.947, indicating that each indicator is able to strongly represent its construct. Similarly, the variables Education Personnel Performance (Y) (0.891–0.919) and Job Satisfaction (Z) (0.935–0.941) also fall within the highly valid category. The interaction coefficient for Digital Literacy (M) × Job Satisfaction (Z) of 1.000 indicates that the moderation construct is perfectly established within the model. Overall, these results indicate that the research instrument has met the criteria for an excellent outer model, making it suitable for further analysis of the structural model (inner model).

Discriminant Validity

A discriminant validity test was conducted to ensure that each construct of the latent variables is truly unique and does not overlap with other constructs. A model is said to have good discriminant validity if each indicator has the highest loading value on the construct it measures compared to the loadings on other constructs. The results of the discriminant validity test are shown as follows:

Table 4. Discriminant Validity Values (*Fornell-Larcker*)

	Competency Development (X2)	**Digital Literacy (M)**	**Education Personnel Performance (Y)**	**Effective Leadership (X1)**	**Job Satisfaction (Z)**
Competency Development (X2)	0.937				
Digital Literacy (M)	0.995	0.940			
Education Personnel Performance (Y)	0.929	0.930	0.906		
Effective Leadership (X1)	0.971	0.971	0.971	0.939	
Job Satisfaction (Z)	0.975	0.974	0.933	0.958	0.939

Composite Reliability.

The validity and reliability of a construct can also be evaluated through the construct reliability value and the Average Variance Extracted (AVE) value for each construct. A construct is considered to have adequate reliability if its reliability value reaches at least 0.70 and its AVE value exceeds 0.50. This indicates that the construct is not only consistent in measuring what it is intended to measure but is also capable of explaining the majority of the variance in its indicators, thereby serving as a valid representation of the concept in question.

Table 5. *Composite Reliability* Values

	Cronbach's alpha	**Composite reliability (rho_a)**	**Composite reliability (rho_c)**	**Average Variance Extracted (AVE)**

Competency Development (X2)	0.965	0.966	0.973	0.878
Digital Literacy (M)	0.967	0.969	0.975	0.884
Educational Staff Performance (Y)	0.945	0.948	0.958	0.821
Effective Leadership (X1)	0.967	0.967	0.974	0.882
Job Satisfaction (Z)	0.967	0.967	0.974	0.883

Referring to Table 5, based on the data, all variables demonstrate excellent levels of reliability and validity. The Cronbach's alpha values for all constructs are above 0.94, indicating very high internal consistency. This is reinforced by the composite reliability values for both rho_a and rho_c, all of which exceed 0.94, meaning the constructs are deemed highly reliable. Furthermore, the Average Variance Extracted (AVE) values for all variables are above 0.80, far exceeding the minimum threshold of 0.50, meaning each construct possesses very strong convergent validity as it explains more than 80% of the variance in its indicators. Overall, these results indicate that the measurement model has met the criteria for excellent reliability and validity, making it suitable to proceed to the structural equation modelling stage.

Structural Model Testing (*Inner Model*)

Testing of the inner model or structural model aims to assess the relationships between constructs, the level of significance, and the R-squared value of the constructed model. Evaluation of the structural model is carried out by examining the R-squared value for the dependent construct, as well as testing the t-statistic values and significance of the path coefficients linking the latent variables.

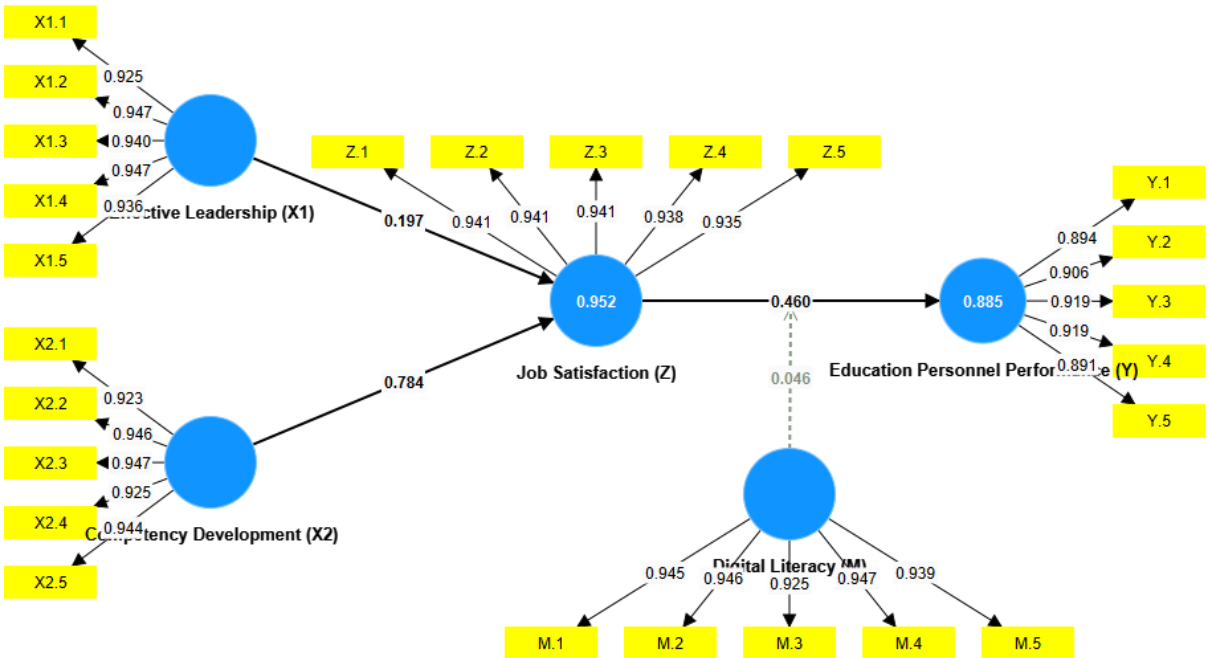

Figure 2. The tested structural model

When assessing a model using PLS, the process begins by examining *the R-squared value* for each dependent latent variable. Table 8 presents the estimated *R-squared* values using SmartPLS.

Table 6. *R-Square Values*

	R-squared	**Adjusted R-squared**
Education Personnel Performance (Y)	0.885	0.884
Job Satisfaction (Z)	0.952	0.952

Based on the R-square analysis results, the Educational Staff Performance (Y) variable has an R-square value of 0.885 and an adjusted R-square of 0.884, indicating that 88.5% of the variation in educational staff performance can be explained by Effective Leadership (X1), Competency Development (X2), Job Satisfaction (Z), and Digital Literacy (M), whilst the remaining 11.5% is influenced by other variables outside the model. Meanwhile, the Job Satisfaction (Z) variable has an R-square and adjusted R-square value of 0.952, meaning that 95.2% of the variation in job satisfaction can be explained by the variables Effective Leadership, Competency Development, and Digital Literacy. This value indicates that the model has very strong explanatory power (substantial), so that overall the research model in the context of optimising the performance of educational staff at private universities in West Java Province is classified as very good and has high predictive ability.

Hypothesis Test Results
Direct (Partial) Effect

Table 7. Hypothesis Testing Results (Direct/Partial Effects)

	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T-statistic (|O/STDEV|)	P-values	Alpha	Conclusion
Competency Development (X2) -> Job Satisfaction (Z)	0.784	0.786	0.054	14.487	0.000	0.05	Significant Positive Significant
Digital Literacy (M) -> Education Personnel Performance (Y)	0.517	0.524	0.087	5.939	0.000	0.05	Significantly Positive Influence
Effective Leadership (X1) -> Job Satisfaction (Z)	0.197	0.195	0.054	3.616	0.000	0.05	Significantly Positive Effect
Job Satisfaction (Z) -> Education Personnel Performance (Y)	0.460	0.455	0.082	5.596	0.000	0.05	Significantly Positive Effect
Digital Literacy (M) x Job Satisfaction (Z) -> Education Personnel Performance (Y)	0.046	0.047	0.015	2.966	0.003	0.05	Significantly Positive

Table 7 demonstrates that all hypothesized relationships in the partial (direct) effect model are statistically significant, as evidenced by t-statistics exceeding the critical value of 1.968 and p-values below 0.05. Competency development exhibits a strong and positive effect on job satisfaction, indicating that improving the competencies of educational personnel substantially enhances their level of job satisfaction. Furthermore, digital literacy shows a positive and significant influence on the performance of educational staff, suggesting that the ability to effectively utilize digital technologies plays an important role in improving work outcomes. Effective leadership also has a positive impact on job satisfaction, implying that higher-quality leadership practices contribute to greater employee satisfaction, although the magnitude of its effect is relatively smaller compared to competency development. In addition, job satisfaction significantly influences the performance of educational personnel, confirming that employees who experience higher satisfaction tend to demonstrate better performance. Lastly, the moderating effect reveals that digital literacy strengthens the relationship between job satisfaction and performance. Although the magnitude of this interaction effect is

relatively modest, it indicates that digital literacy enhances the positive impact of job satisfaction on performance, making it an important supporting factor in optimizing the performance of educational staff.

Mediating Effect

In this analysis, we will examine the magnitude of both direct and indirect influence coefficients. A mediation test is conducted to explore in greater depth whether the mediating variable successfully mediates the influence of the independent variable on the dependent variable. If *the P-value* is less than 0.05, the independent variable influences the dependent variable; this can be explained in the *indirect effect* output, if the influence on the dependent variable occurs via the mediating variable. Results of the path analysis in *the indirect effect output*: if *the P-value* is less than 0.05, mediation occurs (Sofyani, 2013:27).

Table 8. Results of the Hypothesis Test on Mediation Effects

	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T-statistic (|O/STDEV|)	P-values	Notes
Competency Development (X2) -> Education Personnel Performance (Y)	0.361	0.355	0.055	6.586	0.000	Mediating
Effective Leadership (X1) -> Education Personnel Performance (Y)	0.090	0.091	0.037	2.442	0.015	Mediating

Based on the results presented in the table, the indirect (mediating) effects indicate that job satisfaction plays a significant role in linking the independent variables to the performance of educational personnel. Competency development is found to have a positive and significant indirect effect on performance through job satisfaction, suggesting that improving the competencies of educational staff not only directly enhances their capabilities but also increases their level of job satisfaction, which in turn leads to better performance outcomes. This highlights the importance of competency development as a key driver that operates both directly and indirectly in improving performance.

Similarly, effective leadership also demonstrates a positive and significant indirect effect on performance through job satisfaction. This finding implies that leadership practices that are perceived as effective can foster higher levels of job satisfaction among educational staff, which subsequently contributes to improved performance. However, the magnitude of this mediating effect is relatively smaller compared to that of competency development, indicating that while leadership remains an important factor, its indirect contribution through job satisfaction is not as strong. Overall, these results confirm the crucial mediating role of job satisfaction in strengthening the relationship between organizational factors and employee performance.

Effect Size (f^2)

Effect size (f^2) is used to assess the magnitude of the specific influence of an independent variable on the predictive power of the dependent variable. The evaluation is carried out by comparing the change in the R^2 value when an independent variable is removed from the model. The f^2 value is interpreted as follows:

- $f^2 < 0.02$ indicates a very small or insignificant effect
- $0.02 \leq f^2 < 0.15$ indicates a small effect
- $0.15 \leq f^2 < 0.35$ indicates a moderate effect
- $f^2 \geq 0.35$ indicates a large effect

Based on the analysis results, the effect sizes for each variable were obtained as follows:

Table 9. Results of the Hypothesis Test on Mediation Effects

	f-square
Competency Development (X2) -> Job Satisfaction (Z)	0.728
Digital Literacy (M) → Education Personnel Performance (Y)	0.11
Effective Leadership (X1) → Job Satisfaction (Z)	0.046
Job Satisfaction (Z) -> Education Personnel Performance (Y)	0.091
Digital Literacy (M) × Job Satisfaction (Z) → Education Personnel Performance (Y)	0.043

Based on the results presented in the table, the effect size (f^2) analysis reveals varying levels of influence among the variables in the model. Competency development has a very large effect on job satisfaction, indicating that it is the most dominant factor in enhancing the satisfaction of educational personnel. This finding emphasizes that improving employee competencies is a crucial driver in fostering higher job satisfaction, which ultimately supports better performance outcomes. In contrast, digital literacy shows a small to moderate effect on the performance of educational staff, suggesting that although it contributes positively, its role is still supportive rather than dominant. Effective leadership also demonstrates a small effect on job satisfaction, indicating that while leadership quality does play a role in shaping employee satisfaction, its contribution is relatively limited compared to competency development. Furthermore, job satisfaction has a small effect on the performance of educational personnel, implying that it contributes to performance improvement but not as a primary determinant, instead functioning more as an intervening or mediating variable. Lastly, the moderating effect of digital literacy on the relationship between job satisfaction and performance is also classified as small, indicating that digital literacy only slightly strengthens this relationship. Overall, these results highlight that competency development stands out as the most influential variable, while the other variables contribute in a more complementary and supportive capacity within the model.

Discussion

The Effect of Competency Development on Job Satisfaction

The research findings indicate that competency development has a positive influence on the job satisfaction of educational staff. Theoretically, this finding can be explained through the Human Capital Theory perspective, which states that an increase in individual competencies will enhance self-worth, self-confidence, and perceptions of success in the workplace. When individuals feel capable of performing their duties well, their level of job satisfaction will increase significantly.

This finding is consistent with research showing that competency development through training and skills enhancement can improve job satisfaction by providing a sense of achievement and recognition of individual abilities (Salman et al., 2020). Furthermore, recent research by Kallerhult, Hermansson et al. (2024) also confirms that competence has a strong relationship with job satisfaction, particularly in the context of work requiring a high level of professionalism.

However, other studies indicate that competence development does not always have a significant impact on job satisfaction, particularly when improvements in competence are not accompanied by adequate rewards or career opportunities (Kleszewski et al., 2023). This discrepancy may arise due to differing organisational contexts. In this study, competence development appears to be followed by optimal utilisation in the workplace, thereby effectively enhancing job satisfaction.

The novelty of this study lies in the context of academic staff at private universities facing the demands of digitalisation, where competencies not only enhance work performance but also serve as a source of satisfaction in navigating changes to the work system.

The Influence of Effective Leadership on Job Satisfaction

The research findings indicate that effective leadership has a positive influence on the job satisfaction of educational staff. From a leadership theory perspective, leaders who are able to provide direction, support, and good communication will create a conducive working environment and enhance employees' psychological well-being.

This finding aligns with research stating that leadership plays a crucial role in enhancing job satisfaction through emotional support and role clarity (Aboramadan et al., 2021). Furthermore,

research by Hoch et al. (2018) also indicates that relationship-oriented leadership has a significant influence on job satisfaction.

On the other hand, some studies have found that the influence of leadership on job satisfaction tends to be weak, particularly in organisations with well-structured work systems where the leader's role becomes less dominant (Inceoglu et al., 2018). This aligns with the findings of this study, which show that although significant, the influence of leadership is relatively smaller compared to competency development.

The distinction between this study and previous research lies in the integration of the digital literacy variable, wherein leadership functions not only as a guide but also as a facilitator in navigating technology-driven change.

The Influence of Digital Literacy on the Performance of Educational Staff

The research results indicate that digital literacy has a positive influence on the performance of educational staff. In the era of digitalisation, the ability to utilise technology is a key factor in enhancing work efficiency and productivity.

This finding is supported by research stating that digital literacy has a significant influence on individual performance, particularly within organisations that have adopted technology-based systems (Mardiana, 2024). Furthermore, research by Kabakus et al. (2023) also indicates that digital skills enable individuals to work more effectively and adapt to change.

However, some research indicates that digital literacy does not always have a direct impact on performance, particularly when organisations do not fully support the use of technology or when staff do not receive adequate training (Jang et al., 2021). In this study, the influence of digital literacy is significant due to the context of private universities that have begun integrating digital systems into their operations.

The novelty of this study lies in the positioning of digital literacy not only as an independent variable but also as a moderating variable that strengthens the relationship between job satisfaction and performance.

The Influence of Job Satisfaction on the Performance of Educational Staff

The research findings indicate that job satisfaction has a positive influence on the performance of educational staff. Theoretically, this aligns with motivation theory, which states that individuals who are satisfied with their work will have higher motivation to perform optimally.

This finding is consistent with a meta-analysis study showing that job satisfaction has a positive relationship with performance (Katebi et al., 2022). Furthermore, research by Sabuhari et al. (2020) also indicates that job satisfaction is a key factor in enhancing employee performance.

However, research indicates that the relationship between job satisfaction and performance is not always strong, particularly in situations where external factors such as work pressure or organisational systems are more dominant (DeNisi & Smith, 2014). In this study, job satisfaction continues to demonstrate a significant influence, although not as the primary factor.

The distinction between this study and previous research lies in the context of educational staff facing changes to a digital-based work system, where job satisfaction is a key factor in maintaining performance stability.

The Mediating Role of Job Satisfaction

The research findings indicate that job satisfaction mediates the relationship between competency development and effective leadership on the performance of educational staff. This suggests that job satisfaction acts as a psychological mechanism bridging the influence of independent variables on performance.

This finding aligns with research indicating that job satisfaction is an important mediator in the relationship between organisational factors and performance (Gılıç et al., 2024). However, other studies suggest that job satisfaction mediation does not always occur, particularly in organisations oriented towards target-based performance (Johari et al., 2022).

In this study, the mediation that occurs is partial, meaning that the independent variables still have a direct influence on performance. This indicates that job satisfaction is not the sole mechanism explaining this relationship, but it still plays a significant role.

The Moderating Role of Digital Literacy

The research findings indicate that digital literacy is capable of strengthening the relationship between job satisfaction and the performance of educational staff. This suggests that digital competence acts as a reinforcing factor in optimising the influence of job satisfaction on performance.

This finding is supported by research showing that digital literacy can enhance individual work effectiveness by optimally utilising technology (Suryadi & Setyono, 2024). However, some studies indicate that the moderating role of digital literacy tends to be weak when digital literacy levels are not evenly distributed among staff (van Laar et al., 2020).

In this study, the moderating effect was classified as small, indicating that although significant, digital literacy has not yet become a dominant factor. This may be due to differences in digital competence levels among respondents.

The novelty of this study lies in testing digital literacy as a moderating variable within the context of educational staff, a topic that has been rarely explored in previous research.

Conclusion

Based on the results of this study, it can be concluded that the performance of educational staff at private universities in West Java Province is influenced by various interrelated factors , both directly and indirectly. Competency development has proven to be a key factor in enhancing job satisfaction among educational staff. This indicates that improving an individual's abilities, skills, and readiness to meet job demands fosters self-confidence and job satisfaction.

Furthermore, effective leadership also plays a role in enhancing job satisfaction, albeit with a more limited degree of influence. Leadership that is able to provide direction, support, and good communication has been shown to create a conducive working environment for educational staff. On the other hand, digital literacy plays a crucial role in improving the performance of educational staff, indicating that the ability to utilise technology is a key requirement in the era of digital transformation.

Furthermore, job satisfaction has been shown to contribute to improving the performance of educational staff, indicating that psychological factors play a strategic role in driving work productivity. In this context, job satisfaction also functions as a mediating variable bridging the influence of competency development and effective leadership on performance. Moreover, digital literacy has been shown to strengthen the relationship between job satisfaction and performance, although its role remains limited to that of a supporting factor.

Overall, this study confirms that improvements in the performance of educational staff do not depend on a single factor, but are the result of the interaction between competence, leadership, job satisfaction, and the ability to adapt to digital technology.

Theoretically, this study contributes to the development of organisational behaviour research, particularly within the context of higher education, by integrating the variables of effective leadership, competency development, digital literacy, and job satisfaction into a comprehensive structural model. This study also reinforces the role of job satisfaction as a mediating variable and introduces digital literacy as a relevant moderating variable in the era of digital transformation. Thus, this study enriches the literature examining the multidimensional relationship between individual, organisational, and technological factors in enhancing performance.

In practical terms, the findings of this study have implications for private higher education institution managers to focus their human resource development strategies more on enhancing the competencies of academic staff through continuous training relevant to digital needs. Furthermore, it is important for organisational leaders to adopt an adaptive, communicative, and supportive leadership style to foster optimal job satisfaction. Strengthening digital literacy must also be a priority, given its role in improving work effectiveness and supporting overall organisational performance.

This study has several limitations that should be noted when interpreting the research results. Firstly, this study was conducted only at private universities in West Java Province; consequently, the findings cannot yet be broadly generalised to different contexts, such as public universities or other organisational sectors. Secondly, the sample size used in this study remains limited; whilst it met the criteria for SEM-PLS analysis, it still has limitations in representing a larger population.

Furthermore, this study employed only a quantitative approach using a survey method, and thus was unable to explore in depth the more complex aspects of individual behaviour and perceptions. The variables used in this study were also limited to several key factors, meaning there remains the possibility of other variables influencing the performance of educational staff, such as organisational culture, workload, or reward systems.

Based on the results and limitations of this study, several recommendations can be proposed for future research. Future researchers are advised to broaden the scope of their research by involving various types of educational institutions or other organisational sectors so that the research results can have a higher level of generalisation. Furthermore, the use of a larger sample size is also recommended to enhance the analytical power and accuracy of the research findings.

Further research is also advised to develop a research model by incorporating other relevant variables, such as organisational culture, work-life balance, or reward systems, to gain a more comprehensive understanding of the factors influencing performance. Furthermore, the use of a mixed-methods approach could serve as an alternative to delve deeper into aspects of individual behaviour and experience.

From a practical perspective, future research could also place greater emphasis on developing implementation strategies to enhance digital literacy and the competencies of educational staff, ensuring that research findings are not merely academic but also make a tangible contribution to organisational development.

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