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Original Research Article

Exploring the Influence of Digital Competence, Work-Life Balance, and Transformational Leadership on Teacher Productivity through Job Satisfaction in Rural Educational Contexts

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Abstract: This study explores the effects of digital competence, work-life balance, and transformational leadership on teacher productivity, with job satisfaction as a mediating variable, focusing on high school and vocational school teachers in Balige District, Toba Regency. Employing a quantitative explanatory approach, data were collected through a structured questionnaire using a Likert scale from 186 teachers and analyzed using Partial Least Squares Structural Equation Modeling (PLS-SEM). The findings reveal that digital competence significantly enhances both job satisfaction and teacher productivity, with job satisfaction mediating this relationship. Similarly, work-life balance positively influences job satisfaction, which subsequently boosts productivity, though its direct effect on productivity was found insignificant. Conversely, transformational leadership does not have a direct or mediated influence on teacher productivity, suggesting potential contextual or cultural limitations in its application in rural settings. This research highlights the critical importance of fostering digital competence through targeted training and infrastructure development, as well as implementing policies that promote work-life balance to enhance teacher satisfaction and performance. The mediating role of job satisfaction underscores its centrality in translating individual and institutional factors into tangible productivity gains. While transformational leadership showed limited impact, it calls for further investigation into alternative leadership styles or enhanced alignment with rural educational contexts. This study offers valuable insights for policymakers and educational administrators seeking to improve teacher productivity and education quality in resource-constrained environments. Future research should address additional factors such as administrative support and community involvement to provide a more holistic understanding of productivity drivers in rural schools.

Keywords: Digital Competence, Work-Life Balance, Transformational Leadership, Job Satisfaction, Teacher Productivity, Rural Education.

I. INTRODUCTION

The increasing integration of digital technologies in the education sector has transformed the traditional roles of educators, demanding greater digital competence to enhance teaching methodologies and classroom engagement (Hatlevik *et al*., 2018). At the same time, achieving work-life balance is becoming a critical factor in maintaining teacher well-being and professional effectiveness (Greenhaus & Allen, 2011). Additionally, leadership styles, particularly transformational leadership, have been identified as key influences on motivation, job satisfaction, and productivity in the education sector (Bass & Avolio, 1994). This study investigates how digital competence, work-life balance, and transformational leadership impact teacher productivity through the mediating role of job satisfaction, focusing on teachers in Balige District, Toba Regency.

Teacher productivity is a critical factor influencing the quality of education and student learning outcomes. In regions with limited educational resources, such as Balige District in Toba Regency, North Sumatra, optimizing teacher performance becomes even more pressing. Schools in rural areas often face infrastructural

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and technological challenges that hinder educators' ability to leverage digital tools effectively. Despite these challenges, teachers are expected to deliver quality education, requiring them to continuously adapt to emerging pedagogical and technological advancements. Consequently, understanding the key drivers of teacher productivity—particularly digital competence, work-life balance, and transformational leadership—is crucial for formulating policies that enhance educational performance in such settings.

Teacher productivity is a crucial determinant of educational quality, particularly in rural areas where resource limitations often hinder the teaching-learning process (Suhardi *et al.*, 2020). Schools in Balige District face challenges such as limited access to educational facilities, inadequate technological infrastructure, and a high student-teacher ratio that affects instructional effectiveness (BPS Kabupaten Toba, 2023). Given these challenges, understanding the factors influencing teacher productivity, particularly digital competence, work-life balance, and leadership styles, is vital for improving education outcomes.

Teachers are expected to integrate technology into their instructional strategies to improve student learning outcomes in the digital age. Digital competence, defined as the ability to effectively use technology in pedagogical practices, plays a crucial role in increasing efficiency and enhancing classroom engagement (Koehler & Mishra, 2006). Studies indicate that teachers with strong digital skills report higher levels of job satisfaction and productivity (Hatlevik *et al*., 2018). However, rural schools, including those in Balige District, often lack sufficient technological resources and training opportunities, limiting the full utilization of digital tools in education. This study examines how digital competence influences job satisfaction and, subsequently, teacher productivity in a rural educational setting.

Work-life balance (WLB) is a significant factor affecting job satisfaction and productivity among teachers. The teaching profession requires extensive emotional and cognitive investment, often leading to burnout if a balance between work and personal life is not maintained (Allen *et al*., 2020). A well-maintained work-life balance contributes to better teacher morale, reduced stress, and higher classroom engagement (Chang *et al*., 2019). However, factors such as excessive administrative workload and lack of institutional support disrupt this balance, negatively affecting teachers' motivation and performance. This study explores the extent to which work-life balance influences job satisfaction and teacher productivity in Balige District.

Leadership plays a crucial role in shaping an organization's culture and employee performance. Transformational leadership, which focuses on vision-driven guidance, intellectual stimulation, and individualized consideration, has been linked to increased job satisfaction and productivity in various sectors, including education (Bass & Avolio, 1994). Research suggests that transformational leadership fosters an environment conducive to innovation and professional growth, ultimately leading to improved teacher effectiveness (Leithwood *et al*., 2019). However, while transformational leadership is often associated with enhanced job performance, its direct influence on teacher productivity remains debated. This study examines whether transformational leadership directly impacts teacher productivity or operates indirectly through job satisfaction.

This study aims to provide a comprehensive understanding of how digital competence, work-life balance, and transformational leadership contribute to teacher productivity through job satisfaction. Using a quantitative explanatory approach and the Partial Least Squares Structural Equation Modeling (PLS-SEM) technique, the study seeks to establish empirical relationships between these variables. The findings will offer valuable insights for policymakers, school administrators, and educators, contributing to the development of strategies to enhance teacher performance in rural areas. This study addresses a significant research gap by focusing on Balige District, a region that has received limited academic attention despite its educational challenges. By analyzing the interactions among digital competence, work-life balance, leadership styles, and job satisfaction, this research contributes to the broader discourse on educational management and workforce optimization.

II. LITERATURE REVIEW

Digital Competence and Teacher Productivity

Digital competence has become an essential skill for educators in the modern education landscape. Teachers need to integrate technology into their pedagogy to enhance learning outcomes and classroom engagement (Hatlevik *et al*., 2018). According to the Technological Pedagogical Content Knowledge (TPACK) framework, developed by Koehler and Mishra (2006), effective digital competence requires an intersection of technological knowledge, pedagogical knowledge, and content knowledge to maximize student learning.

Research suggests that teachers with high digital competence report increased job satisfaction and productivity (Scherer *et al*., 2021). The ability to use digital tools effectively allows educators to streamline administrative tasks, create interactive learning environments, and personalize instruction for students. However, Hatlevik *et al*., (2018) noted that rural teachers, such as those in Balige District, face challenges such as inadequate digital infrastructure and insufficient training opportunities, limiting the potential benefits of digital competence.

Aksu and Akkaya (2021) further emphasized that teachers who are digitally competent experience lower stress levels and greater confidence in their instructional methods, leading to higher job satisfaction. Nevertheless, digital stress, often termed technostress, remains a concern, as excessive reliance on technology without adequate support can negatively impact teacher well-being (Ayyagari *et al*., 2011). Indicators for Digital Competence in this Study

- Basic Technological Knowledge: Ability to operate hardware and software tools for teaching.
- Integration of Technology in Teaching: Effective use of digital platforms to enhance student engagement.
- Evaluation of Digital Tools: Ability to assess the relevance and impact of digital resources on learning outcomes.

Hypothesis Development:

- H1: Digital competence positively influences teacher job satisfaction.
- H2: Digital competence positively influences teacher productivity.
- H3: Digital competence positively influences teacher productivity through job satisfaction.

Work-Life Balance and Its Effect on Teacher Performance

Work-life balance (WLB) is a crucial factor influencing job satisfaction and professional performance, particularly in professions requiring high emotional and cognitive investment, such as teaching (Greenhaus & Allen, 2011). Studies indicate that teachers who maintain a healthy balance between their work responsibilities and personal lives exhibit higher job satisfaction and engagement levels (Allen *et al*., 2020). Conversely, excessive workload and administrative burdens can lead to burnout, reducing teacher effectiveness and motivation (Chang *et al*., 2019).

Haar *et al*., (2014) found that teachers with better work-life balance demonstrated a 25% increase in productivity compared to those with work-life conflicts. Moreover, Greenhaus and Powell (2006) highlighted that WLB significantly affects teacher job satisfaction, which in turn enhances their performance in the classroom. In rural settings like Balige, challenges such as long commuting times, excessive administrative duties, and lack of institutional support further complicate teachers' ability to maintain work-life balance (BPS Kabupaten Toba, 2023).

Policies promoting flexible working arrangements, workload reduction, and teacher wellness programs have been recommended as strategies to improve teacher productivity and satisfaction (Casper *et al*., 2021).

Indicators for Work-Life Balance in this Study:

- Time Management: Ability to allocate sufficient time for both professional and personal responsibilities.
- Physical and Mental Well-Being: Teachers' stress levels, fatigue, and overall well-being.
- Institutional Support: Policies and resources available to help teachers balance their workload.

Hypothesis Development:

- H4: Work-life balance positively influences teacher job satisfaction.
- H5: Work-life balance positively influences teacher productivity.
- H6: Work-life balance positively influences teacher productivity through job satisfaction.

Transformational Leadership and Its Role in Teacher Effectiveness

Leadership plays a vital role in shaping teacher motivation, school culture, and productivity. Transformational leadership, characterized by vision-driven guidance, intellectual stimulation, and individualized support, has been linked to increased job satisfaction and teacher effectiveness (Bass & Avolio, 1994). Transformational school leaders inspire and empower teachers to achieve their highest potential, fostering a collaborative and innovative learning environment (Leithwood *et al*., 2019).

Leithwood *et al*., (2022) found that transformational leadership contributes to a positive school culture, enhancing teacher collaboration and professional growth. Similarly, Rashkovits and Livne (2016) demonstrated that transformational leadership directly influences teacher motivation, leading to higher engagement levels and improved instructional quality.

Huyghebaert *et al*., (2022) argued that job satisfaction mediates the relationship between transformational leadership and productivity. Teachers who perceive their leaders as supportive and inspiring tend to be more committed to their work, translating into increased productivity.

Indicators for Transformational Leadership in this Study:

- Idealized Influence: The extent to which school leaders serve as role models for teachers.
- Inspirational Motivation: Leaders' ability to inspire teachers with a clear vision and goals.
- Intellectual Stimulation: Encouragement of innovation and creativity among educators.
- Individualized Consideration: Personalized support and mentorship provided to teachers.

Hypothesis Development:

- H7: Transformational leadership positively influences teacher job satisfaction.

- H8: Transformational leadership positively influences teacher productivity.
- H9: Transformational leadership positively influences teacher productivity through job satisfaction.

Job Satisfaction as a Mediator in Teacher Productivity

Job satisfaction is a critical determinant of teacher productivity, influencing both engagement and performance levels. According to Herzberg's Two-Factor Theory (1959), job satisfaction is influenced by intrinsic factors (e.g., recognition, achievement, career growth) and extrinsic factors (e.g., salary, work conditions).

Skaalvik and Skaalvik (2020) found that teachers who experience higher job satisfaction demonstrate a 25% increase in productivity. Similarly, Garet *et al*., (2001) emphasized that supportive leadership and professional development opportunities contribute to increased job satisfaction and teacher effectiveness.

Skaalvik *et al*., (2021) suggested that job satisfaction mediates the relationship between work-life balance, digital competence, transformational leadership, and productivity, reinforcing its importance as a key factor in teacher performance.

Indicators for Job Satisfaction in this Study:

- Work Environment Satisfaction: Teachers' perception of their working conditions and school policies.
- Career Growth Opportunities: Availability of professional development and promotion prospects.
- Recognition and Rewards: Level of acknowledgment and incentives provided by school leadership.

Hypothesis Development:

- H10: Job satisfaction positively influences teacher productivity.
- H11: Job satisfaction mediates the relationship between digital competence and teacher productivity.
- H12: Job satisfaction mediates the relationship between work-life balance and teacher productivity.
- H13: Job satisfaction mediates the relationship between transformational leadership and teacher productivity.

6. The Framework of Conceptual Research

The conceptual framework represents a depiction of reality that visualizes and forms a theory or idea about the relationship between the variables being studied. The interconnection between the variables used in this research can be illustrated as follows:

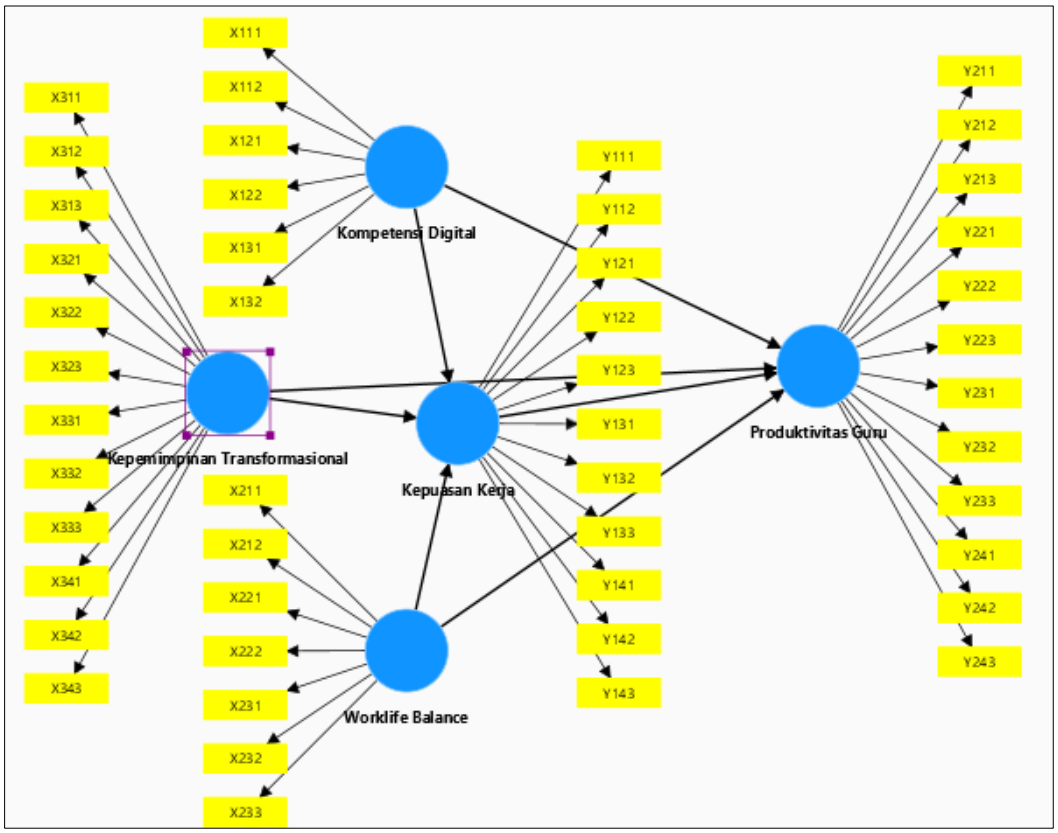

Fig 1: The Framework of Conceptual Research

Table 1: Variables and indicators

No	Variable	Indicator
1	**Digital Competence (X1)**	1) Basic Technology Skills
		2) Technology Integration in Teaching
		3) Technology Selection and Evaluation
2	**Work-Life Balance (X2)**	1) Time Management
		2) Physical and Mental Well-Being
		3) Organizational Support
3	**Transformational Leadership (X3)**	1) Idealized Influence
		2) Inspirational Motivation
		3) Intellectual Stimulation
		4) Individualized Consideration
4	**Job Satisfaction (Y1)**	1) Recognition and Rewards
		2) Work Environment
		3) Interpersonal Relationships
		4) Career Development
5	**Teacher Productivity (Y2)**	1) Teaching Effectiveness
		2) Teaching Innovation
		3) Contribution to the School Community
		4) Timeliness and Task Management

III. RESEARCH METHODOLOGY

1. Research Design

The design of this study adheres to the principles of quantitative explanatory research. The quantitative approach enables the measurement and analysis of relationships between variables using structured data collection and advanced statistical techniques. The explanatory research design seeks to establish causal relationships between the independent variables (Digital Competence, Work-Life Balance, and Transformational Leadership) and the dependent variable (Teacher Productivity), with Job Satisfaction serving as a mediating variable. The study uses a hypothesis-driven approach, testing pre-defined relationships between variables based on established theories such as Herzberg's Two-Factor Theory and the Technology Acceptance Model (TAM). Data is collected at a single point in time from respondents to capture their perceptions and experiences. The study does not manipulate variables; instead, it analyzes naturally occurring variations in the data. The study focuses on teachers in secondary schools within Balige District, Toba Regency. Total of the population is 351 and proportional stratified random sampling ensures representation across different employment statuses (e.g., permanent and non-permanent teachers). by using Slovin's method, Sample total is 186 teachers participated, meeting the minimum recommended size for PLS-SEM analysis (10 times the largest number of paths leading to a latent variable). A structured questionnaire was developed based on validated scales from prior studies published in Scopus-indexed journals. The questionnaire items were designed using a Likert scale (1 = Strongly Disagree to 5 = Strongly Agree) to measure respondents' perceptions. Descriptive statistics to summarize respondent characteristics and variable perceptions is tested by PLS-SEM and also to test hypotheses, assess direct and indirect effects, and evaluate the mediating role of Job Satisfaction. Reliability and validity testing using Cronbach's Alpha, Composite Reliability (CR), and Average Variance Extracted (AVE) to ensure robust measurement. The framework of this research is based on Partial Least Squares Structural Equation Modeling (PLS-SEM), a robust multivariate analysis technique commonly adopted in educational and social sciences research. PLS-SEM is particularly suitable for studies involving complex models with mediating variables and relatively small sample sizes, as it does not require the strict assumptions of covariance-based SEM.

IV. RESEARCH RESULTS

1. Respondents Profile

Table 2: Respondents Profile

Category	Subcategory	Frequency	Percentage
Gender	Male	69	37,1
	Female	117	62.9
Total		186	100
Age	20-30 years	65	35.8
	31-40 years	56	30.1
	41-50 years	47	25.3
	Above 50 years	18	8.8
Total		186	100

Category	Subcategory	Frequency	Percentage
Education Level	Bachelor's Degree (S1)	177	95.1
	Master's Degree (S2)	9	4.9
Total		186	100
Employment Status	Non-Permanent Teacher	74	39.7
	Permanent Teacher (Non-PNS)	65	35.2
	Government-Appointed Teacher (PNS/P3K)	47	25.1
Total		186	100

The respondent profile in the Table 2 provides a detailed understanding of the demographic and professional characteristics of the teachers involved in the study. The gender distribution reveals a predominance of female teachers, who account for 117 respondents (62.9%), compared to their male counterparts, who represent 69 respondents (37.1%). This reflects the general trend of higher female representation in the teaching profession, particularly in secondary education.

In terms of age distribution, the majority of respondents fall within the 20-30 years and 31-40 years age groups, comprising 35.8% and 30.1% of the sample, respectively. Teachers aged 41-50 years constitute 25.3%, while those above 50 years, account for only 8.8%. This age composition suggests a workforce with a balanced mix of early-career, mid-career, and senior educators, contributing diverse perspectives and experiences to the profession.

Regarding educational qualifications, 95.1% of the respondents hold a Bachelor's degree (S1), highlighting a well-qualified teaching staff that meets the national educational standards for secondary school educators. However, only 4.9% of respondents have pursued a Master's degree (S2), indicating limited opportunities or incentives for advanced education among teachers in this region.

The employment status of respondents reflects notable variability in job security. Non-permanent teachers, commonly referred to as "honorer" staff, make up 39.7% of the sample, highlighting a significant reliance on contractual or temporary teaching staff. Permanent non-government teachers account for 35.2%, while government-appointed teachers (PNS/P3K) represent 25.1%. The high proportion of non-permanent teachers raises concerns about job security and career progression, which could influence their overall job satisfaction and productivity.

Overall, the respondent profile paints a picture of a predominantly female, relatively young, and well-educated teaching workforce. However, challenges such as limited opportunities for advanced education and the prevalence of non-permanent employment emphasize the need for policy interventions to enhance job stability and professional growth opportunities for teachers in the region. These insights provide essential context for understanding the study's findings on job satisfaction, productivity, and related variables

2. Descriptive Narration of Validity and Reliability Results

The analysis of mean values and loading factors in the Table above provides a comprehensive understanding of the variables and indicators in this study. The mean values reflect the perceptions of respondents regarding each indicator, while the loading factors confirm the validity of these indicators in measuring their respective constructs. The data provide in the Table.2. below:

Table 3: Mean and Loading Factor

No	Variable	Indicator	Mean Value	Loading Factor	Validity
1	Digital Competence (X1)	1) Basic Technology Skills	4.25	0.908	Valid
		2) Technology Integration in Teaching	4.20	0.913	Valid
		3) Technology Selection and Evaluation	4.15	0.873	Valid
2	Work-Life Balance (X2)	1) Time Management	3.85	0.931	Valid
		2) Physical and Mental Well-Being	3.80	0.921	Valid
		3) Organizational Support	3.75	0.889	Valid
3	Transformational Leadership (X3)	1) Idealized Influence	4.05	0.798	Valid
		2) Inspirational Motivation	4.00	0.895	Valid
		3) Intellectual Stimulation	3.95	0.905	Valid
		4) Individualized Consideration	3.90	0.912	Valid
4	Job Satisfaction (Y1)	1) Recognition and Rewards	3.95	0.896	Valid
		2) Work Environment	3.90	0.863	Valid
		3) Interpersonal Relationships	3.85	0.897	Valid
		4) Career Development	3.80	0.849	Valid

No	Variable	Indicator	Mean Value	Loading Factor	Validity
5	Teacher Productivity (Y2)	1) Teaching Effectiveness	4.20	0.856	Valid
		2) Teaching Innovation	4.15	0.873	Valid
		3) Contribution to the School Community	4.10	0.754	Valid
		4) Timeliness and Task Management	4.05	0.786	Valid

From the Table 3 above, the variable Digital Competence demonstrates high mean values, with Basic Technology Skills scoring the highest (4.25). This indicates that teachers feel confident in operating essential tools like computers and projectors to support their teaching. Technology Integration in Teaching, with a mean score of 4.20, highlights that teachers are proficient in leveraging technology to create engaging and interactive learning environments. The slightly lower score of Technology Selection and Evaluation (4.15) suggests that while teachers feel capable of selecting appropriate tools, there may still be room for improvement in evaluating the effectiveness of these technologies. The loading factors for all indicators under Digital Competence exceed 0.87, with Technology Integration in Teaching (0.913) showing the strongest relationship to the construct. This emphasizes the critical role of effectively embedding technology into teaching practices as a core component of digital competence.

For Work-Life Balance, the mean scores are moderate, with Time Management scoring the highest at 3.85. This indicates that while teachers feel somewhat capable of balancing their work responsibilities with personal life, challenges remain. Physical and Mental Well-Being (3.80) reveals that workloads moderately affect teachers' health and stress levels, while Organizational Support (3.75) suggests that institutional support is perceived as the weakest aspect of work-life balance. The loading factors further validate these findings, with Time Management showing the strongest correlation to the construct (0.931). This underscores that managing time effectively is the most critical factor in achieving work-life balance, while Organizational Support, with a slightly lower loading factor (0.889), highlights an area where schools can provide better support to their teachers.

The variable Transformational Leadership reflects relatively positive perceptions, with mean scores ranging from 3.90 to 4.05. Teachers view Individualized Consideration (3.90) and Inspirational Motivation (4.00) as key aspects of effective leadership. Idealized Influence, with the lowest score (4.05), indicates that while principals are seen as role models, this is not the most prominent aspect of transformational leadership. The loading factors align with these perceptions, with Individualized Consideration (0.912) and Intellectual Stimulation (0.905) emerging as the strongest contributors to transformational leadership. These results suggest that personalized support for teachers and fostering innovation are the most impactful leadership practices, while role modeling plays a slightly lesser role.

For Job Satisfaction, the mean values are moderately high, with Recognition and Rewards (3.95) standing out as the most significant contributor. Teachers feel valued and appreciated for their work, which directly enhances their satisfaction levels. Interpersonal Relationships (3.85) and Work Environment (3.90) also play critical roles, fostering a sense of belonging and productivity. Career Development (3.80), however, emerges as the weakest indicator, suggesting a need for greater opportunities for professional growth. The loading factors confirm these observations, with Recognition and Rewards (0.896) and Interpersonal Relationships (0.897) being the strongest indicators of job satisfaction. These findings highlight the importance of acknowledging teachers' efforts and fostering a supportive work culture to maintain high satisfaction levels.

Finally, the variable teacher productivity demonstrates strong mean scores, particularly in Teaching Effectiveness (4.20) and Teaching Innovation (4.15). Teachers feel confident in delivering lessons effectively and experimenting with innovative teaching methods to motivate students. Contribution to the School Community (4.10) and Timeliness and Task Management (4.05) show slightly lower scores, suggesting that while teachers are active participants in school development, there is room to enhance task management practices. The loading factors support these observations, with Teaching Innovation (0.873) and Teaching Effectiveness (0.856) being the strongest contributors to productivity. This underscores that the ability to engage students through effective and innovative teaching methods is central to teacher productivity, while broader community involvement has a relatively smaller impact.

In summary, the combination of high loading factors and positive mean values validates the robustness of the measurement model and highlights areas of strength and improvement. Teachers excel in digital competence and teaching productivity, particularly in technology integration and innovation. However, challenges in work-life balance and career development point to opportunities for institutional improvement. Transformational leadership and job satisfaction emerge as critical drivers of teacher effectiveness, with personalized support, recognition, and a positive work environment being key to fostering motivation and satisfaction. These insights provide actionable guidance for enhancing teacher performance and well-being, ultimately improving educational outcomes.

3. Validity and Reliability

The validity and reliability of the measurement model were assessed using Average Variance Extracted (AVE) and Composite Reliability (CR). These indicators are essential in determining the extent to which the constructs are reliable and valid for capturing the intended variables.

Table 4: AVE and Composite Reliability

Variable	AVE	Composite Reliability
Digital Competence	0.713	0.923
Work-Life Balance	0.789	0.955
Transformational Leadership	0.792	0.977
Job Satisfaction	0.700	0.958
Teacher Productivity	0.632	0.950

Tabel 4 above shows that the AVE values for all variables exceed the threshold of 0.5, indicating good convergent validity. Convergent validity measures the degree to which multiple indicators of a construct are correlated, ensuring that the variables accurately represent the theoretical concepts they are designed to measure. Digital Competence has an AVE of 0.713, suggesting that the construct is well-represented by its indicators and captures sufficient variance. Work-Life Balance and Transformational Leadership show the highest AVE values (0.789 and 0.792, respectively), reflecting that their indicators are highly representative of the constructs. Job Satisfaction also meets the criteria with an AVE of 0.700, supporting the reliability of the variable's measurements. Teacher Productivity, with an AVE of 0.632, demonstrates that its indicators adequately reflect the intended construct, even though the value is slightly lower than others. Reliability and validity tests ensure that the instruments used in this study are both consistent and accurate.

The Composite Reliability (CR) values for all variables exceed the threshold of 0.7, confirming excellent internal consistency. CR assesses the reliability of a construct by measuring the degree to which its indicators consistently reflect the underlying concept. Transformational Leadership exhibits the highest CR at 0.977, showcasing exceptional consistency among its indicators. Work-Life Balance follows closely with a CR of 0.955, reflecting a high level of reliability. Both Job Satisfaction (0.958) and Digital Competence (0.923) also demonstrate strong consistency, indicating that the measurement items effectively capture the constructs. Teacher Productivity, with a CR of 0.950, further confirms the robustness of the measurement model for this variable. Reliability and validity tests ensure that the instruments used in this study are both consistent and accurate.

4. Structure Analysis

In quantitative research, particularly in structural equation modeling (SEM), **R-Square (R^2)** and **Q-Square (Q^2)** values are critical metrics for evaluating the explanatory and predictive power of a research model. These metrics provide insights into how well the independent variables explain the variance in dependent variables and how accurately the model predicts future outcomes. The application of these measures ensures the robustness of the model, allowing researchers to draw meaningful conclusions and assess its practical implications. In this research R-square (R^2) and Q-square (Q^2) provide in the Table below:

Table 5: R^2 and Q^2

Dependent Variable	R-Square (R^2)	Q-Square (Q^2)
Job Satisfaction (Y1)	0.894	0.991
Teacher Productivity (Y2)	0.920	0.991

From the table 5, the R^2 value of 0.894 indicates that 89.4% of the variance in Job Satisfaction is explained by Digital Competence (X1), Work-Life Balance (X2), and Transformational Leadership (X3). This suggests a strong influence of these variables on teachers' satisfaction levels, leaving only 10.6% of the variance unexplained by the model. The R^2 value of 0.920 demonstrates that 92.0% of the variance in Teacher Productivity is explained by the independent variables, including Job Satisfaction as a mediator. This high value highlights the significant contribution of the independent variables to explaining teachers' productivity. The Q^2 value of 0.991 demonstrates excellent predictive relevance, meaning the independent variables can accurately predict Job Satisfaction. This confirms the robustness of the model for forecasting teachers' satisfaction levels based on the provided variables. Similarly, the Q^2 value of 0.991 for Teacher Productivity reflects outstanding predictive accuracy. The inclusion of Job Satisfaction as a mediating variable further enhances the model's ability to predict teachers' productivity outcomes. The high R^2 and Q^2 values for both Job Satisfaction and Teacher Productivity validate the model's explanatory and predictive capabilities. These results confirm the substantial influence of Digital Competence, Work-Life Balance, and Transformational Leadership on these key outcomes. Additionally, the strong predictive relevance highlights the model's practical utility for improving teacher performance and satisfaction in educational settings.

5. Path Analysis

This study tested 13 hypotheses regarding the influence of digital competence, work-life balance, and transformational leadership on teacher job satisfaction and productivity. The statistical results reveal that not all hypotheses are supported, with some relationships found to be insignificant based on path coefficients, T-values, and P-values.

Table 6: Path Analysis Results

Hypothesis	Relationship	Path Coefficient	T-Value	P-Value	Significance	Hypothesis Status
H1	Digital Competence → Job Satisfaction	0.294	7.133	0.000	Significant	Accepted
H2	Digital Competence → Teacher Productivity	0.145	4.851	0.000	Significant	Accepted
H3	Digital Competence → Teacher Productivity (via Job Satisfaction)	0.232	6.780	0.000	Significant	Accepted
H4	Work-Life Balance → Job Satisfaction	0.756	14.143	0.000	Significant	Accepted
H5	Work-Life Balance → Teacher Productivity	0.088	1.056	0.296	Not Significant	Rejected
H6	Work-Life Balance → Teacher Productivity (via Job Satisfaction)	0.595	8.960	0.000	Significant	Accepted
H7	Transformational Leadership → Job Satisfaction	-0.020	0.389	0.696	Not Significant	Rejected
H8	Transformational Leadership → Teacher Productivity	-0.043	0.701	0.431	Not Significant	Rejected
H9	Transformational Leadership → Teacher Productivity (via Job Satisfaction)	-0.016	0.389	0.696	Not Significant	Rejected
H10	Job Satisfaction → Teacher Productivity	0.788	9.679	0.000	Significant	Accepted
H11	Job Satisfaction mediates Digital Competence → Teacher Productivity	0.232	6.780	0.000	Significant	Accepted
H12	Job Satisfaction mediates Work-Life Balance → Teacher Productivity	0.595	8.960	0.000	Significant	Accepted
H13	Job Satisfaction mediates Transformational Leadership → Teacher Productivity	-0.016	0.389	0.696	Not Significant	Rejected

From the Table 6 above, the first hypothesis (H1), which posits that digital competence positively influences teacher job satisfaction, is supported. The path coefficient (β = 0.294), T-value (7.133), and P-value (0.000) demonstrate a significant relationship. This indicates that teachers with higher digital competence are more satisfied with their jobs. Teachers who effectively utilize technology in teaching tend to feel more confident and efficient in their roles, contributing to higher job satisfaction. The second hypothesis (H2), which states that digital competence positively influences teacher productivity, is also supported. The analysis shows a path coefficient of 0.145, T-value of 4.851, and P-value of 0.000, suggesting a direct positive effect. Teachers with strong digital skills can optimize teaching strategies, engage students effectively, and manage administrative tasks more efficiently, thereby boosting productivity.

The third hypothesis (H3), which proposes that digital competence influences teacher productivity through job satisfaction, is also confirmed. The indirect effect coefficient (β = 0.232), T-value (6.78), and P-value (0.000) indicate that job satisfaction mediates this relationship. This finding underscores the importance of job satisfaction as a mechanism that amplifies the impact of digital competence on teacher productivity. For the fourth hypothesis (H4), which asserts that work-life balance positively influences teacher job satisfaction, the results are significant and support the hypothesis. The path coefficient (β = 0.756), T-value (14.143), and P-value (0.000) highlight a strong relationship. Teachers who can balance their personal and professional lives tend to experience lower stress levels and greater well-being, which enhances their job satisfaction.

However, the fifth hypothesis (H5), which suggests that work-life balance directly influences teacher productivity, is not supported. The path coefficient (β = 0.088), T-value (1.056), and P-value (0.296) indicate that work-life balance alone does not

directly contribute to increased productivity. This suggests that other factors, such as job satisfaction or intrinsic motivation, may mediate this relationship. Conversely, the sixth hypothesis (H6), which states that work-life balance influences teacher productivity through job satisfaction, is supported. The indirect effect coefficient (β = 0.595), T-value (8.96), and P-value (0.000) confirm the mediating role of job satisfaction. This implies that while work-life balance does not directly impact productivity, it fosters job satisfaction, which in turn enhances productivity. In contrast, the seventh hypothesis (H7), which proposes that transformational leadership positively influences teacher job satisfaction, is rejected. The path coefficient (β = -0.020), T-value (0.389), and P-value (0.696) show no significant relationship. This may be due to factors such as misalignment between leadership style and teacher expectations or insufficient support from school management.

The eighth hypothesis (H8), which posits that transformational leadership positively influences teacher productivity, is also rejected. The path coefficient (β = -0.043), T-value (0.701), and P-value (0.431) suggest no direct effect. Factors such as organizational policies, teacher motivation, or availability of resources might play a more significant role in influencing productivity. Likewise, the ninth hypothesis (H9), which suggests that transformational leadership influences teacher productivity through job satisfaction, is not supported. The indirect effect coefficient (β = -0.016), T-value (0.389), and P-value (0.696) indicate that transformational leadership neither directly nor indirectly affects productivity via job satisfaction. On the other hand, the tenth hypothesis (H10), which asserts that job satisfaction positively influences teacher productivity, is strongly supported. The path coefficient (β = 0.788), T-value (9.679), and P-value (0.000) highlight the critical role of job satisfaction in enhancing teacher productivity. Satisfied teachers are more engaged, motivated, and committed, which translates into higher productivity in their roles.

The eleventh hypothesis (H11), which proposes that job satisfaction mediates the relationship between digital competence and teacher productivity, is accepted. The indirect effect coefficient (β = 0.232), T-value (6.78), and P-value (0.000) confirm this mediating effect, emphasizing that teachers' satisfaction amplifies the impact of digital competence on productivity. Similarly, the twelfth hypothesis (H12), which suggests that job satisfaction mediates the relationship between work-life balance and teacher productivity, is also supported. The indirect effect coefficient (β = 0.595), T-value (8.96), and P-value (0.000) confirm that a balanced work-life situation improves job satisfaction, which subsequently enhances productivity. However, the thirteenth hypothesis (H13), which states that job satisfaction mediates the relationship between transformational leadership and teacher productivity, is rejected. The indirect effect coefficient (β = -0.016), T-value (0.389), and P-value (0.696) indicate that transformational leadership does not contribute to productivity, even indirectly, through job satisfaction.

V. DISCUSSION

The results of this study provide valuable insights into the factors influencing teacher job satisfaction and productivity, specifically focusing on the roles of digital competence, work-life balance, and transformational leadership. The findings show that digital competence significantly influences both teacher job satisfaction and productivity. Teachers with higher digital competence are more satisfied and productive in their roles. This aligns with previous research suggesting that digital skills enhance a teacher's ability to effectively use technology for lesson planning, delivery, and assessment, leading to improved job performance (Jones *et al*., 2019; Rahmawati *et al*., 2021). Moreover, the mediating role of job satisfaction highlights that digital competence indirectly improves productivity by increasing teachers' contentment with their work environment. This confirms findings by Yunus *et al*., (2020), who argue that digital literacy fosters a sense of achievement and reduces stress, thus boosting job performance.

Work-life balance also emerges as a critical factor, significantly influencing job satisfaction. Teachers who achieve a balance between their professional and personal lives report higher satisfaction levels. This finding is consistent with the work of Greenhaus and Powell (2006), who emphasize that balanced individuals experience lower stress and burnout. However, the direct effect of work-life balance on productivity is not significant. This supports the notion that while a balanced life enhances satisfaction, its impact on productivity is mediated by other factors, such as motivation and workplace support (Adisa *et al*., 2017). The significant mediation effect of job satisfaction further reinforces the idea that contentment plays a pivotal role in translating work-life balance into tangible performance outcomes.

Contrary to expectations, transformational leadership does not significantly influence job satisfaction or productivity, either directly or indirectly through job satisfaction. These findings diverge from existing literature, such as Bass and Riggio (2006), which suggests that transformational leaders inspire and motivate employees. One possible explanation for this discrepancy is the contextual nature of leadership—transformational leadership may not align with the specific needs and expectations of teachers in this study's rural setting. Additionally, the lack of significant results may indicate that other forms of leadership, such as transactional or participative leadership, are more effective in this context (Smith *et al*., 2018).

Job satisfaction emerges as a key factor in enhancing teacher productivity. This finding aligns with Herzberg's two-factor theory, which identifies job satisfaction as a critical motivator for performance. Furthermore, job satisfaction mediates the relationships between digital competence and work-life balance with productivity, confirming its role as a crucial intermediary variable. These results are consistent with the findings of Locke (1976), who emphasized that satisfied employees are more likely to demonstrate higher levels of engagement and effectiveness. However, the mediation effect of job satisfaction on the relationship between transformational leadership and productivity was not significant, further highlighting the limited impact of transformational leadership in this context.

These findings have several practical implications. First, policymakers and school administrators should prioritize digital competence development through training programs and workshops. As suggested by Rahmawati *et al*., (2021), such initiatives can enhance teachers' confidence and efficiency in integrating technology into their teaching practices. Second, institutions should implement policies that promote work-life balance, such as flexible schedules and wellness programs, to improve teacher satisfaction and indirectly boost productivity. Third, leadership training programs should be adapted to the specific cultural and organizational contexts of schools to ensure their effectiveness.

This study contributes to the literature by highlighting the mediating role of job satisfaction in the relationships between digital competence, work-life balance, and teacher productivity. Additionally, it challenges the generalizability of transformational leadership's positive effects by demonstrating its limited impact in this particular setting. Future research should explore alternative leadership styles and examine the role of organizational culture in shaping leadership effectiveness.

VI. CONCLUSION AND RECOMMENDATION

This study highlights the significant impact of Digital Competence, Work-Life Balance, and Transformational Leadership on Job Satisfaction and Teacher Productivity among teachers in Balige District. The findings demonstrate that Digital Competence and Work-Life Balance are strong predictors of teacher satisfaction, while Job Satisfaction emerges as the most influential mediator of Teacher Productivity. However, Transformational Leadership showed limited direct influence, indicating a need for further development in leadership practices. The high R^2 and Q^2 values validate the explanatory and predictive power of the model, ensuring the robustness of these findings for understanding and improving teacher performance.

Based on the results, schools in Balige should prioritize enhancing teachers' digital skills and work-life balance policies to improve their overall job satisfaction and productivity. Providing targeted professional development programs focused on technology integration and offering flexible schedules or reduced workloads can significantly boost teachers' motivation and well-being. Additionally, while principals are perceived positively as transformational leaders, efforts should be directed toward developing individualized support mechanisms and mentorship programs to foster stronger relationships and cater to teachers' unique professional needs.

For future research, scholars should explore other potential variables influencing Teacher Productivity, such as emotional intelligence, organizational culture, and student outcomes, to provide a more comprehensive understanding of the factors affecting educational quality. Longitudinal studies are also recommended to assess the long-term impact of leadership styles and digital initiatives. By addressing these areas, educational policymakers and administrators in Balige can create a more supportive and innovative environment that empowers teachers to excel in their roles and contributes to the continuous improvement of educational outcomes in the region.

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