



Ki Hadjar Dewantara's leadership trilogy incorporates an integration model of literacy leadership and digital leadership

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ABSTRACT

Introduction. The research is urgent since the application of Ki Hadjar Dewantara's trilogy of leadership is still being conducted under conventional methods in educational institutions. The theoretical framework of Nature, Form, Content, and Rhythm in the Tamansiswa teachings forms the basis for the application of Ki Hadjar Dewantara's leadership trilogy to accommodate the advancements in technology of the 21st century. Conceptual literacy leadership and digital leadership are essential for expediting the application of Ki Hadjar Dewantara's leadership trilogy in educational institutions within the digital age. *The objective of this study* is to assess the quality of alignment between the integration model of literacy leadership and digital leadership in Ki Hadjar Dewantara's leadership trilogy.

Study participants and methods. This study uses a quantitative research method with a survey technique with 200 respondents. Data collection using a Likert scale questionnaire distributed to teachers, staff, and principals to measure the variables of Ki Hadjar Dewantara Leadership, Literacy Leadership variables, and Digital Leadership variables. Structural equation modeling (SEM) analysis is used to test complex causal relationships in hypothetical models.

Results. The principal's implementation of the Ki Hadjar Dewantara Leadership Trilogy was deemed satisfactory by the majority of teachers, with an overall achievement rate of 74.98%. The implementation of the Ki Hadjar Dewantara Leadership Trilogy is significantly positively correlated with the principal's literacy (0.434) and digital (0.476) leadership traits. This implies that principals who implement the Trilogy are more likely to exhibit robust literacy and digital leadership traits, as indicated by a determination coefficient (R^2) of 0.780. The results of this hypothetical study suggest that the integration of the Ki Hadjar Dewantara leadership trilogy in schools can be significantly influenced and strengthened by strong literacy leadership and digital leadership.

Practical significance. By embracing this integrated approach, school leaders can create a brighter future for their students, empowering them to become effective communicators, critical thinkers, and responsible digital citizens. When leaders "Ing ngarsa sung tulodo" they inspire and motivate others to embrace literacy and digital fluency. This creates a culture of continuous learning and growth. "Ing madya mangun karsa" empowers educators, and leaders to create a dynamic learning environment where both teachers and students feel confident and motivated to excel in literacy and digital skills. The "Tut wuri handayani" principle ensures that no one is left behind in the pursuit of literacy and digital fluency. Leaders provide a safety net, offering support and guidance to ensure everyone can thrive in a technology-rich learning environment.

KEYWORDS

Ki Hadjar Dewantara, leadership trilogy, literacy leadership, digital leadership, school leadership

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INTRODUCTION

The importance of education in achieving global peace and sustainable development goals has been recognized by international organizations such as the United Nations Educational, Scientific and Cultural Organization (UNESCO) [1]. These organizations have pioneered initiatives and set standards to promote quality education worldwide. They emphasize the importance of fostering essential skills, including literacy and digital literacy, in the 21st century [2]. In its report "Education at a Glance 2023", the OECD consistently highlights the importance of effective leadership in creating high-quality and equitable education systems for all. The OECD defines educational leadership as not only limited to the role of the principal, but also includes leadership at all levels, from teachers, supervisors, to policy makers [3]. The Council of Europe stresses the importance of student-centred educational leadership oriented towards the values of human rights, democracy and the rule of law. The Council of Europe highlights that effective educational leadership plays a key role in developing 21st century competencies [4].

Ki Hadjar Dewantara formulated the concept of the trilogy of leadership that still endures and is used in the field of education in Indonesia. The concept of leadership *Ing ngarsa sung Tuladha* (in front, a role model); *Ing madya mangukarsa* (in the middle, building the spirit); and *Tut wuri handayani* (from behind, giving encouragement) [5] is very appropriate to be applied by school principals in leading school organizations. Research by [6] on the leadership model of Ki Hadjar Dewantara can be applied in the present day; this leadership model can serve as a reference in the restoration of national leadership based on the noble values of culture. The concept of Nature, Form, Content, and Rhythm in the Tamansiswa teachings [7] serves as a foundation for the implementation of Ki Hadjar Dewantara's leadership trilogy to adapt to the technological developments of the 21st century. Literacy leadership and digital leadership, conceptually, are needed to accelerate the trilogy of leadership by Ki Hadjar Dewantara.

Literacy leadership signifies the authentic literacy knowledge of school system leaders at all levels [8]. Literacy leadership recognizes the importance of developing soft skills that facilitate effective communication regarding literacy [9]. Every educational leader bears the responsibility for important literacy decisions in schools [10]. Therefore, knowledge of literacy content is also equivalent to literacy leaders who are aware of and understand the latest literacy research [11]. Literacy leadership is a dimension of leadership that an educational leader considers when making long-term plans and setting priorities [12]. Literacy leadership transcends mere titles or positions; it embodies action and serves as a guiding example [13]. Literacy leaders possess extensive knowledge and many take risks for the sake of students, teachers, families, and the community [14]. School leadership plays a crucial role in supporting the literacy needs of all students [15]. School leaders build strong literacy teams to enhance the teaching and learning process by prioritizing staff motivation, commitment, and a positive school culture [16]. School leaders play a crucial role in facilitating the adoption of evidence-based literacy practices by ensuring access to high-quality professional development opportunities [17]. In this rapidly changing era, the importance of literacy leaders collaborating with community stakeholders to create a literacy-rich environment that extends beyond the classroom is crucial [18]. The right action plan from school leadership will significantly improve students' cognitive and literacy abilities while also fostering teachers' professional growth [19]. Consequently, it is essential for educational leaders to consistently collect data and leverage pertinent resources to guide their strategies in literacy leadership.

Enhancing digital leadership skills in the education sector presents a significant challenge. The incorporation of digital leadership within the framework established by Ki Hadjar Dewantara is essential for navigating the swift progress of technological advancements. Integrating digital technology into education is crucial for developing students' potential, improving educational accessibility, and equipping them to thrive in a digitally connected society [20]. The advancement of technology has undeniably transformed the methods by which a leader guides their team. This technological advancement has resulted in a significant transformation and has profoundly influenced organizations [21]. Organizations can experience digital transformation when guided by leaders capable of driving change to meet digital transformation objectives [22]. Digital leadership encompasses a skill set and a viewpoint on leadership frameworks in the current unpredictable

landscape [23]. Digital leaders are essential as digital transformation represents a fundamental shift within organizations [24]. Digital leadership encompasses both digital culture and digital competencies. This leadership model facilitates the digitization of the work environment and work culture within organizations [25]. Digital leaders adopt a distinctly different approach than traditional leaders. A digital leader relies on data to guide decision-making and identify the optimal choices for the organization [26]. The role of digital leadership in the approach of Ki Hadjar Dewantara is crucial for ensuring the effective and efficient use of digital technology to meet educational goals.

Recent studies by Kelly teaching literacy leadership in either a traditional or online era requires that candidates make strategic decisions that fits their school context and identified goals [27]. Research by Torkzadeh, Mohammadi, & Eslami concludes that teachers in the leadership role of literacy need to develop their attitudes, acquire the skills they need, and use the knowledge necessary to train literacy and promote student literacy [12]. Digital literacy skills will enable students to develop problem-solving competencies, gain broad insights, and engage critically and creatively in their activities [28]. This research adopted digital leadership as a model that facilitates digital transformation within organizations, enabling the digitization of work environments and learning cultures [25]. This research adopted digital leadership is a leadership model that executes digital transformation within the organization can digitize the work environment and learning cultures of organizations.

Previous studies have examined the traditional implementation of Ki Hadjar Dewantara's leadership trilogy. The concept of Nature, Form, Content, and Rhythm within the Tamansiswa teachings provides a fundamental basis for applying Ki Hadjar Dewantara's leadership trilogy in response to the technological advancements of the 21st century. The concepts of literacy leadership and digital leadership are essential for advancing the trilogy of leadership proposed by Ki Hadjar Dewantara. The focus of literacy leadership is on the pivotal role that school principals play in fostering a culture of literacy within educational institutions, ensuring access to reading materials, and enhancing the literacy skills of all members within the school community. The role of school principals in digital leadership emphasizes their capacity to integrate technology into the learning process in an effective and sustainable manner, facilitate digital transformation, and enhance the ICT competencies of all members within the school community.

By integrating literacy leadership with digital leadership, principals can create a dynamic 21st century learning environment that captivates students and meets their diverse needs. School leaders have the potential to enhance learning outcomes by integrating technology and fostering literacy skills among both educators and students. School leaders discover it more manageable to actualize the institution's vision aimed at cultivating an intelligent, principled, and competitive generation in the digital age. Literacy leadership and digital leadership represent essential requirements for principals as they work to implement the Ki Hadjar Dewantara Leadership Trilogy in today's digital landscape. Both are essential for fostering an educational atmosphere that cultivates high-caliber graduates equipped with a global perspective.

While the ideas of literacy leadership and digital leadership are gaining traction, there is still a scarcity of studies examining the impact of these leadership styles on the execution of Ki Hadjar Dewantara's leadership trilogy by school principals. This research seeks to address the inquiry: In what ways do literacy leadership and digital leadership affect the application of Ki Hadjar Dewantara's Leadership Trilogy by school principals? Moreover, conducting qualitative research is essential for developing a comprehensive leadership model aimed at enhancing the implementation of Ki Hadjar Dewantara's leadership trilogy, particularly through literacy and digital leadership.

MATERIALS AND METHODS

The research approach employs a quantitative method, utilizing surveys with questionnaires as the data collection instrument. The study site is located in Tamansiswa Schools in Central Java and the Yogyakarta Special Region. The participants in this study included the principals, vice principals of vocational schools, and teachers from Tamansiswa Schools located in Central Java and the

Yogyakarta Special Region. In Central Java and the Yogyakarta Special Region, there exists a total of 39 Tamansiswa Schools. The sampling method employed was purposive sampling, involving a total of 200 respondents.

The data collection method employed a questionnaire utilizing a five-point Likert scale to gather responses, allowing participants to rate statements from 1 (Strongly Disagree) to 5 (Strongly Agree). The literacy leadership variable assesses how respondents view the principal's role in developing literacy programs, supporting literacy instruction, and tracking student literacy advancement. The variable of digital leadership assesses how respondents view the principal's guidance regarding technology vision and strategy, the backing of digital infrastructure and resources, and the professional development of teachers in the area of ICT. The leadership variable of Ki Hadjar Dewantara acts as a cornerstone for applying his leadership trilogy, enabling adaptation to the technological advancements of the 21st century. The concepts of literacy leadership and digital leadership are essential for advancing the trilogy of leadership proposed by Ki Hadjar Dewantara. The leadership variable of Ki Hadjar Dewantara assessed how respondents perceived the application of principles such as setting an example (*Ing ngarsa sung Tuladha*), taking initiative (*Ing madya manguk karsa*), and offering support (*Tut wuri handayani*) by the principal.

The literacy leadership questionnaire was developed utilizing eight aspects derived from [37]. The eight categories of literacy leadership practices have been established: 1) possessing literacy content knowledge, 2) knowledge of best practices in literacy instruction, 3) establishing school-level structures that support literacy, 4) promoting and ensuring a literacy environment and management system, 5) developing a school-wide literacy mission, 6) evaluating literacy instruction, 7) monitoring student progress, and 8) supporting staff's professional development.

The digital leadership questionnaire is constructed around eight key aspects, which serve as the primary dimensions derived from [22]. The construct of digital leadership is comprised of eight distinct aspects: 1) digital literacy, 2) digital vision, 3) defense, 4) presence, 5) communication, 6) adaptability, 7) self-awareness, 8) cultural awareness.

In the meantime, the instrument for assessing the Ki Hadjar Dewantara leadership trilogy is evaluated through three aspects established by [36], specifically: 1) *Ing ngarsa sung Tuladha*. This variable assesses the extent to which the principal serves as a role model regarding literacy and the use of technology within educational settings. 2) *Ing madya manguk karsa*, the methods employed by the principal to inspire and enable teachers to innovate and work together in the integration of literacy and technology within the learning environment. 3) *Tutwuri handayani* evaluates the extent to which the principal offers support, guidance, and direction to teachers in enhancing their literacy and ICT competencies.

The data collected from the field were subsequently subjected to statistical analysis. The outcomes of the data analysis are anticipated to offer a comprehensive perspective in addressing the research objectives. This study employs a quantitative descriptive analysis technique for data analysis, subsequently utilizing model analysis through the Structural Equation Model (SEM). Utilizing SmartPLS 3 software to evaluate the research model as outlined in the structural model presented in Figure 1 below.

RESEARCH RESULTS

The demographic profile data of the research sample outlined in Table 1 provides a summary of the characteristics of the 200 respondents involved in this study. Table 1 presents comprehensive information regarding the distribution of respondents' gender, age range, educational background, professional certification, years of teaching experience, and employment status.

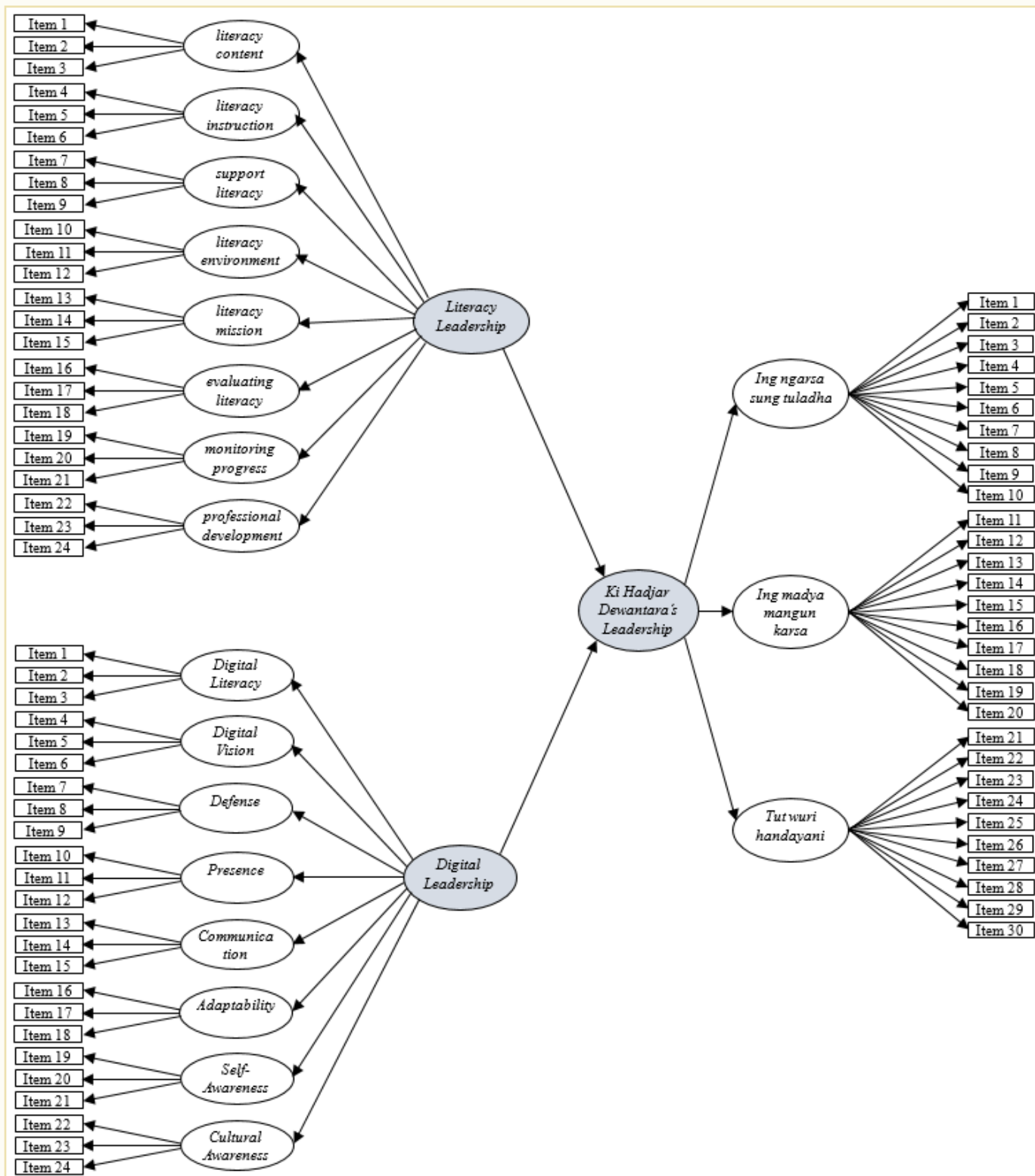


Figure 1 Integrated Structural Model of Ki Hadjar Dewantara's Leadership

The proportion of male and female responders is relatively balanced, with males representing 42.5% and females representing 57.5%. A significant majority of participants fell within the age range of 21-30 years, representing 37.5% of the overall sample. The subsequent group consisted of individuals aged 31-40 years, making up 34.5% of the sample. A significant portion of respondents, 83.5%, hold a graduate degree, whereas 11.5% possess postgraduate qualifications. Forty-five

percent of respondents hold a professional teaching certification. Forty-nine percent of respondents had teaching experience ranging from 1 to 10 years, whereas 28.5% had been in the profession for 11 to 20 years. The proportion of permanent teachers accounts for 57.5%, while non-permanent teachers make up 51%.

Table 1

Characteristics Respondents (N=200)

Variables	Category	N	Percentage
Sex	Male	85	42.5%
	Female	115	57.5%
Ages	21-30 years	75	37.5%
	31-40 years	69	34.5%
	41-50 years	39	19.5%
	51-60 years	17	8.5%
Education level	Diploma	10	5.0%
	Graduate	167	83.5%
	Postgraduate	23	11.5%
Professional Teaching Certification	Yes	90	45.0%
	No	110	55.0%
Experience as a teacher	1 - 10 years	99	49.5%
	11 - 20 years	57	28.5%
	21 - 30 years	35	17.5%
	31 - 40 years	9	4.5%
Employment status of teachers	Permanent	98	49.0%
	Non-permanent	102	51.0%

The assessment of the validity and reliability of the questionnaire, which functioned as the main data collection tool in this study, was conducted at the outset. The first step in the Partial Least Square analysis is to evaluate the outer model. The outer model is analyzed through the application of the PLS algorithm. This study assessed the outer model using reliability tests, discriminant validity tests, and convergent validity tests. Table 2 presents the factor loading values for each item in the literacy leadership variable, the digital leadership variable, and Ki Hadjar Dewantara's leadership variable, along with the outcomes of the discriminant validity test. An indicator is considered valid when its outer loading value exceeds 0.60. The analysis results indicated that all construct indicators exceeded the threshold of 0.60. Consequently, it can be determined that all items related to the research variables have successfully met the criteria for convergent validity.

The subsequent assessment for convergent validity involves calculating the average variance extracted (AVE) value. The Average Variance Extracted (AVE) is determined by assessing the proportion of variance attributable to the construct relative to the variance resulting from measurement error. The Average Variance Extracted (AVE) is determined through the Partial Least Squares (PLS) algorithm presented in Table 3.

A variable is deemed valid when its Average Variance Extracted (AVE) value surpasses 0.50. The findings of the AVE calculation shown in Table 3 demonstrate that all variables with reflective indicators possess an AVE value exceeding 0.5. The literacy leadership variable, the digital leadership variable, and Ki Hadjar Dewantara's leadership variable demonstrate validity through convergent validity.

Table 2

Discriminant Validity Result

[illegible]

IMMK5								0.846										
IMMK6								0.625										
IMMK7								0.860										
IMMK8								0.847										
IMMK9								0.821										
INST1								0.793										
INST10								0.804										
INST2								0.767										
INST3								0.705										
INST4								0.862										
INST5								0.831										
INST6								0.837										
INST7								0.814										
INST8								0.825										
INST9								0.761										
LC1									0.865									
LC2									0.814									
LC3									0.908									
LE1										0.920								
LE2										0.817								
LE3										0.906								
LI1											0.831							
LI2											0.833							
LI3											0.695							
LM1												0.861						
LM2												0.725						
LM3												0.920						
MP1													0.933					
MP2													0.776					
MP3													0.906					
PD1															0.919			

[illegible]

Table 3

Average Variance Extracted Result

	Average Variance Extracted (AVE)
Adaptability	0.774
Communication	0.723
Cultural Awareness	0.854
Defense	0.800
Digital Literacy	0.731
Digital Vision	0.673
Evaluating Literacy	0.772
Ing Madya Mangun Karsa	0.657
Ing Ngarsa Sung Tuladha	0.641
Literacy Content	0.745
Literacy Environment	0.778
Literacy Instruction	0.623
Literacy Mission	0.704
Monitoring Progress	0.765
Presence	0.722
Professional Development	0.822
Self-Awareness	0.787
Support Literacy	0.796
Tut Wuri Handayani	0.647

In addition to validity testing, model reliability is assessed through measurement. Reliability tests are conducted to demonstrate the precision, accuracy, and consistency of instruments in measuring constructs. Composite reliability and Cronbach's alpha serve as two formative measures for evaluating construct reliability. However, Cronbach's alpha tends to yield lower results when assessing value; consequently, composite reliability is favored. The reliability assessment of the construct is generally deemed acceptable if both the composite reliability and Cronbach's alpha value exceed 0.70. Table 4 presents the results of the Cronbach alpha and composite reliability tests.

Table 4

Reliability Test Result

	Cronbach's Alpha	rho_A	Composite Reliability
Adaptability	0.850	0.869	0.911
Communication	0.808	0.842	0.886
Cultural Awareness	0.915	0.916	0.946
Defense	0.874	0.883	0.923
Digital Literacy	0.816	0.849	0.890
Digital Vision	0.759	0.771	0.860
Evaluating Literacy	0.850	0.869	0.910
Literacy Content	0.829	0.853	0.897
Literacy Environment	0.857	0.876	0.913
Literacy Instruction	0.709	0.756	0.831

Literacy Mission	0.789	0.828	0.876
Monitoring Progress	0.846	0.883	0.907
Presence	0.806	0.840	0.885
Professional Development	0.892	0.893	0.933
Self-Awareness	0.862	0.906	0.916
Support Literacy	0.872	0.880	0.921
Ing Ngarsa Sung Tuladha	0.938	0.942	0.947
Ing Madya Mangun Karsa	0.941	0.948	0.950
Tut Wuri Handayani	0.939	0.942	0.948

Reliability testing is performed to demonstrate the accuracy, consistency, and precision of the instrument in measuring the construct. Utilizing Partial Least Square (PLS) allows for the assessment of reliability through two key criteria: composite reliability and Cronbach alpha, derived from the indicator block employed to evaluate the construct. The values for composite reliability and Cronbach alpha for each construct or latent variable exceed 0.70, as shown by the previously mentioned estimates. It is clear that each construct meets the criteria for composite reliability measurement and demonstrates adequate reliability.

An inner model is a structural framework utilized for predicting causal relationships among variables or for testing hypotheses. Analyzing the Original Sample values within the path coefficient model and R-square table to evaluate the inner model or structural model. The second test is carried out to assess the inner model, utilizing the path coefficient value and t-statistical significance value to demonstrate the significance level in hypothesis testing. The path coefficient or inner model value that needs to be established by the t-statistic value at a 5% alpha level is 1.96. Execute the bootstrapping algorithm in SmartPLS 3.0 to determine the path coefficients. The path coefficient values that were subjected to testing are presented in Table 5.

Table 5

Path Coefficients Test Results

	Original Sample (O)	Standard Deviation (STDEV)	T Statistics (O/STDEV)	P Values
Literacy Leadership -> Evaluating_Literacy	0.900	0.011	80.305	0.000
Literacy Leadership -> Literacy Content	0.856	0.018	48.724	0.000
Literacy Leadership -> Literacy Environment	0.914	0.010	88.637	0.000
Literacy Leadership -> Literacy Instruction	0.750	0.032	23.585	0.000
Literacy Leadership -> Literacy Mission	0.858	0.022	38.721	0.000
Literacy Leadership -> Monitoring Progress	0.886	0.016	56.439	0.000
Literacy Leadership -> Professional Development	0.762	0.030	25.806	0.000
Literacy Leadership -> Support Literacy	0.884	0.015	58.190	0.000
Digital Leadership -> Adaptability	0.852	0.019	44.224	0.000
Digital Leadership -> Communication	0.862	0.020	43.339	0.000
Digital Leadership -> Cultural Awareness	0.721	0.048	15.100	0.000
Digital Leadership -> Defense	0.841	0.043	19.417	0.000
Digital Leadership -> Digital Literacy	0.826	0.037	22.498	0.000
Digital Leadership -> Digital Vision	0.786	0.028	28.070	0.000
Digital Leadership -> Presence	0.892	0.013	69.330	0.000
Digital Leadership -> Self Awareness	0.886	0.011	78.875	0.000
Ki Hadjar Dewantara's Leadership -> Ing Ngarsa Sung Tuladha	0.925	0.012	79.692	0.000
Ki Hadjar Dewantara's Leadership -> Ing Madya Mangun Karsa	0.895	0.022	40.693	0.000

Ki Hadjar Dewantara's Leadership -> Tut Wuri Handayani	0.922	0.010	92.423	0.000
Literacy Leadership -> Ki Hadjar Dewantara's Leadership	0.467	0.085	5.524	0.000
Digital Leadership -> Ki Hadjar Dewantara's Leadership	0.442	0.089	4.986	0.000

The PLS bootstrapping technique is utilized for the calculation of the inner model. The statistical t-value and p-value for each relationship or path will be calculated based on the outcomes of the bootstrapping process. The test results indicate that the factors 1) possessing literacy content knowledge, 2) knowledge of best practices in literacy instruction, 3) establishing school-level structures that support literacy, 4) promoting and ensuring a literacy environment and management system, 5) developing a school-wide literacy mission, 6) evaluating literacy instruction, 7) monitoring student progress, and 8) supporting staff's professional development are significant ($p < 0.05$) in the formation of the literacy leadership variable. The results are consistent across the digital leadership variables, where factors such as 1) digital literacy, 2) digital vision, 3) defense, 4) presence, 5) communication, 6) adaptability, 7) self-awareness, and 8) cultural awareness are statistically significant ($p < 0.05$) in the formation of the variable. Similarly, the construct of Ki Hadjar Dewantara's leadership is profoundly influenced by the principles of Ing ngarsa sung tuladha, Ing madya mangun karsa, and Tut wuri handayani.

Path coefficients serve as a framework to analyze the direction of the hypothesized relationships. The analysis of the path coefficients indicates that all relationships among the variables exhibit a positive direction. The test results indicate that literacy leadership has an estimated coefficient of 0.467, which is statistically significant at the 5% significance level. It indicates that literacy leadership has an impact on Ki Hadjar Dewantara's leadership. Similarly, digital leadership has a significant influence on Ki Hadjar Dewantara's leadership, with an estimated coefficient of 442.

After completing the measurement evaluation, the next step involves assessing the structural model by analyzing the R-square, which acts as an indicator of the model's goodness of fit. This evaluation examines how external factors may account for the differences observed in internal variables. The analysis produced an R-square value of 0.778, suggesting that literacy leadership and digital leadership accounted for a 77.8% impact on Ki Hadjar Dewantara's leadership. The R-square value of 0.778 in Figure 2 indicates the influence of external variables on internal variables, categorizing it as good.

DISCUSSION OF RESULTS

The leadership principles of Ki Hadjar Dewantara, grounded in Javanese cultural values, highlight an egalitarian and participatory approach to education. The model, referred to as the "Leadership Trilogy," encompasses leading from the front as a role model, fostering spirit in the middle, and providing encouragement from behind [29]. This approach aligns with contemporary ideas surrounding literacy leadership, highlighting the significance of shared leadership and the empowerment of educators [30]. The integration of literacy leadership and digital leadership serves as a significant catalyst for promoting the adoption of Ki Hadjar Dewantara's leadership trilogy by school principals.

The practices of literacy leadership have the potential to greatly impact and improve Ki Hadjar Dewantara's leadership model by fostering an inclusive, participatory, and community-oriented educational atmosphere. Ki Hadjar Dewantara's focus on egalitarian and participatory systems illustrates the principles of literacy leadership, promoting a collaborative and inclusive educational environment [31]. Ki Hadjar Dewantara's leadership model promotes the idea that principals should place their trust in and empower their teachers, akin to literacy leadership practices that emphasize teacher development and participation in the decision-making process [31]. Leaders who are passionate about reading, writing, and lifelong learning will motivate educators and learners to embrace literacy. They exemplify the significance of literacy in daily living.

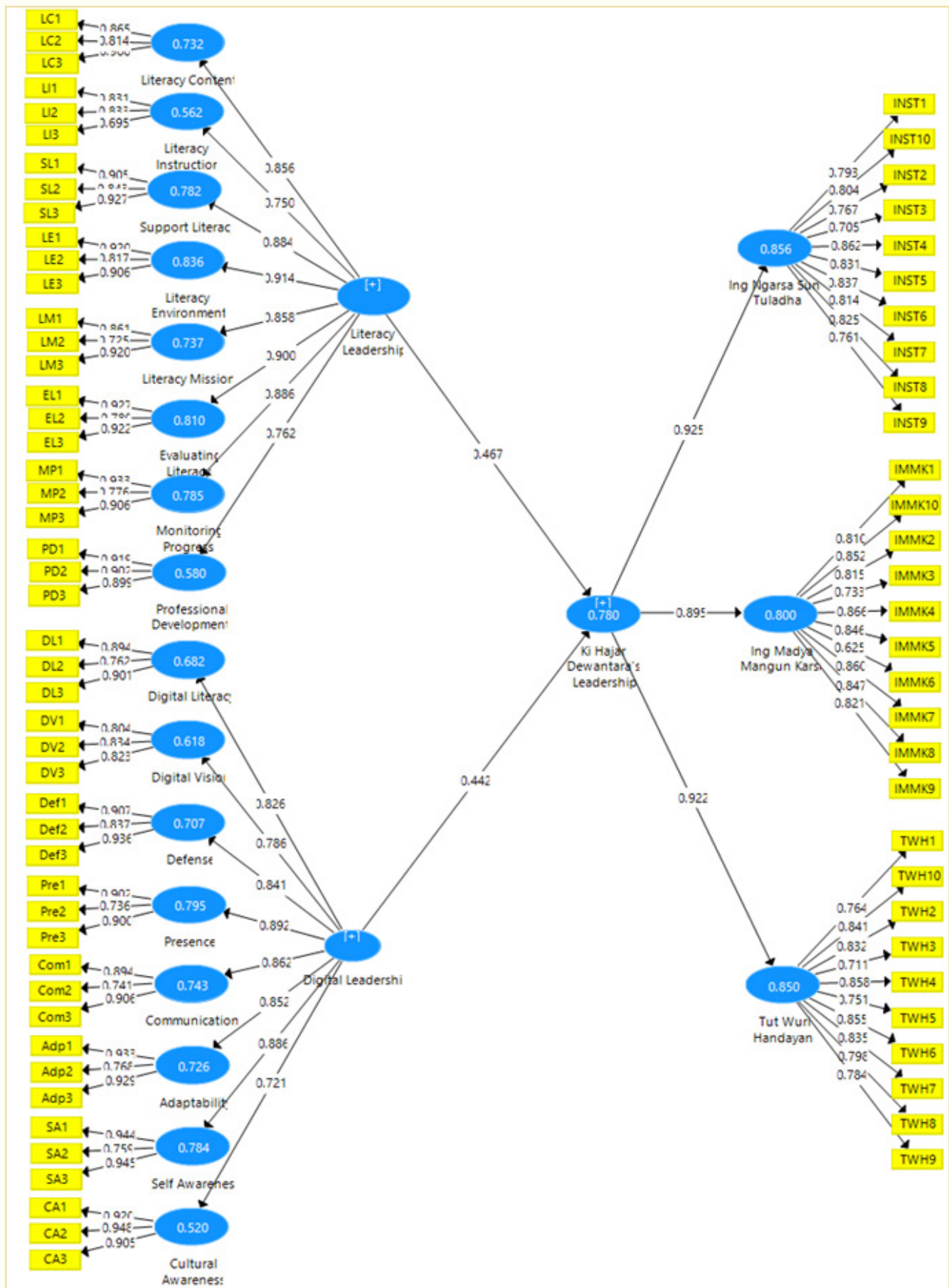


Figure 2 Structural Model of Integrated Ki Hadjar Dewantara's Leadership

The practices of literacy leadership have the potential to greatly impact and improve Ki Hadjar Dewantara's leadership model by fostering an inclusive, participatory, and community-oriented educational atmosphere. Ki Hadjar Dewantara's focus on egalitarian and participatory systems illustrates the principles of literacy leadership, promoting a collaborative and inclusive educational environment [28]. Ki Hadjar Dewantara's leadership model promotes the idea that principals should place their trust in and empower their teachers, akin to literacy leadership practices that emphasize teacher development and participation in the decision-making process [28]. The principles of *Ing ngarsa sung tuladha* supporting leaders who are passionate about reading, writing, and lifelong learning will motivate educators and learners to embrace literacy. They exemplify the significance of literacy in daily living.

The principle of *Ing madya mangun karsa* in literacy leadership promotes the creation of a collaborative literacy culture among school principals. This involves supporting reading communities, motivating teachers to develop literacy-based teaching materials, and ensuring easy access to a variety of reading resources. Practices in literacy leadership, including the supervision and evaluation of teaching, have the potential to enhance teacher performance and student literacy results, aligning with Ki Hadjar Dewantara's vision of ongoing teacher development [32]. This leadership model has significantly impacted the development of educational leadership in Indonesia [33]. Ki Hadjar Dewantara's approach to literacy leadership has cultivated an education system that is culturally rich, character-driven, and holistic, leaving a lasting impact on Indonesian education and societal transformation [30].

The *Tut wuri handayani* principle in literacy leadership encourages principals to support teacher professional development in literacy, provide mentoring, and create a reward system for teachers and students who excel in literacy. Ki Hadjar Dewantara's literacy initiative has had a significant impact in promoting leadership development in Indonesia through several key concepts and educational reforms. The leadership trilogy has played a significant role in shaping leadership practices in educational settings. It aligns with the values of responsibility, initiative, and support, which are essential for effective leadership [35]. The principles derived from Ki Hadjar Dewantara's philosophy have influenced modern educational leadership in Indonesia, promoting an egalitarian and participatory approach that is essential for effective school management and leadership [31].

This investigation aims to explore the impact of digital leadership on the leadership principles of Ki Hadjar Dewantara. The abstract presented does not specifically focus on Ki Hadjar Dewantara's leadership; however, it provides valuable insights into the wider implications of digital leadership, which can be used to infer possible influences. Ki Hadjar Dewantara's leadership trilogy corresponds with the digital transformation leadership model that facilitates and empowers both educators and students [35]. What are the fundamental principles of digital leadership and how do they correspond with Ki Hadjar Dewantara's leadership style?

Digital leadership aligned with the principles of *Ing ngarsa sung tuladha*, where a principal proficient in technology for both learning and administration, embraces technological innovation, will inspire school community members to enhance their digital competencies. Ki Hadjar Dewantara promotes an educational framework that weaves together cultural values and community participation, crucial for sustaining relevance and engagement in the digital age [35]. The integration of digital and transformational leadership strategies has the potential to foster innovation and resonate with Ki Hadjar Dewantara's vision of driving change through education [30]. Innovative leadership and responsible digital engagement can improve the exchange of knowledge and emotional awareness among educators, fostering comprehensive educational objectives. Enhancing digital skills and fostering citizenship education via digital tools can elevate educational quality, particularly in underprivileged settings, aligning with Dewantara's ideals of character development and civic duty [38]. Through the integration of these digital leadership strategies, educational institutions can maintain and elevate Ki Hadjar Dewantara's educational philosophy, fostering a more engaging, inclusive, and effective learning environment. Both highlight the significance of having a clear vision and the necessity of leading as a role model [37].

The principle of *Ing madya mangun karsa* in digital leadership promotes the innovation and creativity of school principals in leveraging technology for educational purposes, providing ICT

training for teachers, and establishing systems that enhance technology-driven learning. Digital leaders inspire and motivate their teams with a clear vision for the future [37], they empower employees by utilizing digital tools and technologies. Digital empowerment aligns with Ki Hadjar Dewantara's emphasis on fostering and instilling confidence in those he leads [31]. The collaboration across borders in digital leadership embodies the participatory approach of Ki Hadjar Dewantara [37]. The flexibility inherent in both leadership styles emphasizes the importance of adjusting to a dynamic environment [34]. In summary, the principles of digital leadership, including vision, motivation, empowerment, and collaboration, align closely with Ki Hadjar Dewantara's approach, which highlights participatory leadership, trust, and ongoing improvement [34]. The impact of digital leadership on the formation of strategic alliances and dynamic capabilities is profound, playing a crucial role in organizational transformation and market orientation [38]. Digital leadership enhances innovation performance through the digitization of the company's platform, suggesting that leaders who adopt digital tools can facilitate substantial organizational advancements [39]. In educational environments, the integration of digital leadership fosters pedagogical skills, indicating that those who incorporate digital strategies can enhance teaching effectiveness and curriculum development [40].

The Tut wuri handayani principle in digital leadership suggests that school leaders should offer technical assistance and guidance to educators in the integration of technology, ensure sufficient ICT infrastructure, and foster an environment conducive to digital transformation within the school. Incorporating digital leadership has the potential to update Ki Hadjar Dewantara's educational principles, enhancing their relevance in the contemporary digital landscape. The integration of digital leadership has the potential to significantly improve curriculum development and deepen the understanding of student needs, aligning with Dewantara's emphasis on holistic education [40]. Effective digital leadership can alleviate technostress among employees by fostering a supportive and empowering school environment, which is crucial for sustaining motivation and work capacity [42]. Digital leadership has the potential to cultivate strategic partnerships and drive innovation, both of which are crucial for reforming education and enhancing dynamic capacity building [41].

The influence of digital transformation on educational leadership necessitates a transition to a leadership approach that prioritizes innovation, the integration of technology, and ongoing enhancement. This approach closely aligns with the principles of Ki Hadjar Dewantara's leadership style, emphasizing participatory and egalitarian systems. Leaders embracing digital transformation play a vital role in creating an environment that supports Education 4.0, characterized by personalized and technology-enhanced learning experiences [42]. This approach to leadership promotes the integration of cutting-edge technologies and nurtures an environment of ongoing enhancement and empowerment [43]. The leadership in digital transformation positively influences educators' perceptions of digital technology, enhances their technical competencies, and boosts their capacity to incorporate technology into their teaching practices, ultimately leading to improved student engagement and learning results [42]. The process of digital transformation enhances the management of education, leading to notable improvements in student efficiency and satisfaction [44]. This highlights Ki Hadjar Dewantara's focus on impactful and inclusive leadership aimed at enhancing educational results [33].

Transforming education through digital means necessitates a leadership approach that is both innovative and participatory, in line with the principles put forth by Ki Hadjar Dewantara. This strategy guarantees that educational institutions stay flexible and attentive to technological progress, all while cultivating a nurturing and inclusive learning atmosphere. Integrating digital leadership strategies into Ki Hadjar Dewantara's educational philosophy involves considering various aspects of the digital learning environment. Digital platforms have the potential to foster more dynamic and personalized learning experiences, reflecting Ki Hadjar Dewantara's focus on student-centered education [45]. Interventions that utilize data analytics can facilitate informed decision-making, enhancing academic outcomes and offering personalized support, aligning with Ki Hadjar Dewantara's emphasis on fostering individual potential [46]. Digital tools can improve collaboration and communication among educators and students, creating a more cohesive educational environment [38]. An encouraging organizational environment, enhanced by digital resources, can foster communities of practice and learning, which are essential to Ki Hadjar Dewantara's educational philosophy [47].

Literacy leadership and digital leadership are not just trends, but urgent needs for school principals in implementing the Ki Hadjar Dewantara leadership trilogy in the digital era. Both are key to creating a learning environment that produces quality graduates with global insight.

CONCLUSION

The integration of literacy leadership and digital leadership serves as a significant catalyst for promoting the adoption of Ki Hadjar Dewantara's leadership trilogy by school principals. By embracing this integrated approach, school leaders can create a brighter future for their students, empowering them to become effective communicators, critical thinkers, and responsible digital citizens. When leaders "Ing ngarsa sung tulodo" they inspire and motivate others to embrace literacy and digital fluency. This creates a culture of continuous learning and growth. "Ing madya mangun karsa" empowers educators, and leaders to create a dynamic learning environment where both teachers and students feel confident and motivated to excel in literacy and digital skills. The "Tut wuri handayani" principle ensures that no one is left behind in the pursuit of literacy and digital fluency. Leaders provide a safety net, offering support and guidance to ensure everyone can thrive in a technology-rich learning environment.

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