Model of School Principal Leadership Shaping Pedagogic Competence and Teacher Digital Literacy

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Abstract—Education in the 4.0 era required a principal's leadership model that could encourage teachers to develop their pedagogical and digital literacy potential. The study aims is to find a model of leadership of principal that can provide motivation to teachers to improve their pedagogical competencies and make models of learning innovations to increase student motivation so that they can produce quality graduates. The population of the study was teachers in the area of Bogor and Sukabumi Indonesia, while the samples were permanent teachers who actively taught at the elementary and junior high school level. The research method carried out was sequential explanatory mixed-method conducted quantitative research. The instruments used in the principal leadership model include indicators of transformational and visionary leadership, and the formation of innovative learning models. The result of the research shows the identification of appropriate school principal leadership such an ideal millennial leadership that turn of the pedagogical competence of teachers in developing innovative learning models. The implications of applying the millennial leadership model in schools are expected to increase the potential quality of teachers in teaching and learning.

Keywords: principal leadership model, pedagogic competence, digital literacy

I. INTRODUCTION

Efforts to improve the quality of human resources (HR) development, through improving the quality of graduates of educational outcomes, the systemic improvement of all components of education such as improving the quality and equitable distribution of teachers, improved curriculum, learning resources, conducive learning atmosphere, adequate infrastructure facilities, and government policies both central and regional according to local needs and global order need to be updated immediately. In its application in schools, the principal has a very large role in the ongoing quality of the quality of education. Millennial principal s in the educational era 4.0 must-have transformational leadership qualities and visionary leadership to be able to improve the teacher's pedagogical competence and digital literacy. If the teacher has good quality, it will produce quality graduates. The relationship between transformational leadership and teacher creativity is clearly described by Henny Suharyati et al. [1].

Teachers are the most influential component in creating quality educational processes and outcomes. Therefore any improvement efforts undertaken to improve the quality of education will not make a significant contribution without the support of the role of a professional, quality, competent and good performing principal. Based on preliminary survey results it is known that the pedagogical competence of public elementary school teachers in Bogor and Sukabumi regions is categorized as lower than expected. Many other factors are thought to be able to influence the level of pedagogical competence of teachers in a school including: the performance of school principals who do not accommodate teacher communication situations, teacher work motivation, principals' managerial competence in organizing schools they lead, positive and conducive organizational culture in the school environment in which the teacher is assigned, the professional competence of the teacher, the interpersonal communication of the teacher and the teacher's personal competency that are the role models of the students.

Transformational leadership and visionary leadership of school principals are two styles of leadership that can provide avenues in service and assistance to teachers to develop teacher pedagogical competencies and the atmosphere of learning conducted by teachers in the classroom, thus these activities will affect teacher digital literacy. Continued support and motivation will maintain the teacher's constancy to continuously foster teacher's pedagogical attitudes and competencies. Principals who inspire teachers to become role models will influence teacher behavior. Teacher professional commitment can also strengthen teacher creativity [2].

Stephen P. Robbins and Timothy A. Judge [3] provide an understanding of transformational leadership as leadership that inspires followers to transcend their interests and who can exert extraordinary influence on followers. The factors are a) influence which ideal, giving a feeling of pride to subordinates b) motivational inspiration, able to inspire subordinates with good explanations c) intellectual stimulation, promote rational intelligence. d) individual consideration. able to issue a wise judgment.

Fred Luthans [4] explains that transformational leadership is a leadership that becomes an agent of change based on the
value of trust and the needs of subordinates or followers. The indicators are a) ideal leadership, (b) leadership that inspires (c) intellectual stimulation and, (d) pays attention to the followers' personalities.

Jerald Greenberg and Robert A. Baron [5] define transformational leadership as leadership where leaders use their charisma to change and realize their organizations. The factors are (a) charisma, being able to provide a positive view of subordinates, (b) intellectual stimulation, promoting rational intelligence, (c) individual consideration, being able to issue wise judgment (d) inspirational motivation, being able to communicate intelligence rationally and inspiration.

Visionary leadership is leadership that can reconstruct and project a Long-Term Strategic Plan in the future. There are priority stages that must be implemented according to the needs of the people. The state and government need to develop the vision and mission of the state, so that the direction of the life of the Indonesian nation from the perspective of the ideology, politics, economy, social, culture, defense and national security is clearly manifested and becomes the policy of the holders of power in the administration of the state [6].

Aan Komariah, Cepi Triana [7] argues that visionary leaders can be interpreted as the ability of leaders in creating, formulating, communicating, associating, transforming, and implementing ideal thoughts originating from themselves or as a result of social interaction among members of the organization and stakeholders are believed to be the ideals of the organization in the future which must be equaled through the commitment of all personnel.

From some of the above theories, it can be synthesized that the principal's visionary leadership is a leadership behavior that has a clear vision and mission view in the organization, a leader who is very intelligent in observing an event in the future and can describe a clear vision and mission. Visionary leadership can arouse the enthusiasm of its members using motivation and imagination and can make an organization more alive by moving all the components in the organization. The principal's visionary leadership indicators include: (1) creating a vision into action, (2) Thinking of the future (3) motivating inspiration, (4) intellectual encouragement and (5) personal attention and (6) communicating well.

According to Mulyasa [8], that pedagogical competence is the ability to manage the learning of learners includes an understanding of learners, instructional design and implementation, evaluation of learning outcomes, and the development of learners to actualize their potential [8]. Components included in the pedagogical competence, namely: (1) controls the characteristics of the learners from the physical aspects, the spiritual moral, social, cultural, emotional and intellectual; (2) control of learning theories and principles of learning that educates; (3) develop curriculum related to the subject matter; (4) conducting educational learning; (5) utilizing information and communication technology for the sake of learning; (6) facilitate the development of potential learners to actualize their potential; (7) communicate effectively, empathetic, and manner with the students; (8) conducting the assessment and evaluation processes and learning outcomes; (9) utilizing the assessment and evaluation for the sake of learning; (10) take action to improve the quality of reflective learning [9].

The two types of leadership mentioned above are thought to be able to improve pedagogic competencies related to digital literacy needed in the educational era 4.0. The type of leadership described separately. What is needed now is millennial leadership which covers both leadership patterns, transformational and visionary. The novelty of this study combines two leadership patterns into one complete model, millennial leadership. The purpose of this study is to analyze the transformational leadership model and visionary leadership that can improve teacher pedagogical competence and teacher creativity in the form of digital literacy.

II. METHODS

The research method used is sequential explanatory mixed-method conducted quantitative research (see figure 1). The population in this study were all permanent teachers of the foundation Public Elementary Schools in Bogor and Private Vocational High Schools in Sukabumi District. The sample is a small portion of the population that is considered to be representative to be generalized. The sample is carried out using the Proportional Random Sampling technique.

The data analysis technique is a stage to describe the research data consisting of the first, a Statistical Description which aims to describe the research variable data in general. Hypothesis testing in this study uses correlation analysis. Correlation is a term used to measure the strength of a relationship. A Focus Group Discussion was held to sharpen the development of a pedagogical competency model in digital literacy that was needed by the educational era 4.0.

![Sequential explanatory](image)

Fig. 1. Sequential explanatory mixed method by Creswell [10].

III. RESULTS

A. Testing Prerequisite Analysis

1) Test the normality of the estimated standard error: Calculation of standard error test for estimated error (Ŷ - Ŷ2) Pedagogical Competency variable (Y) over Visionary Leadership (X2) produces a Lcount Value of 0.0772. Because the Lcount value <Ltable, at a significance level of 0.05, it can be concluded that the standard error in estimating Pedagogical Competence for Visionary Leadership also comes from the normal distribution population, more can be seen in Table 1.
The strength of the relationship between Transformational Leadership variables and Pedagogical Competence is shown by the correlation coefficient $r_{1.1} = 0.417$ with the coefficient of determination $r_{2.1}^2 = 0.174$. This means that Transformational Leadership contributes 17.40% to Pedagogical Competence, while 82.60% of Pedagogical Competence is influenced by other factors. To test the significance of a positive relationship between Transformational Leadership and Pedagogical Competence, it is necessary to test the significance of the correlation coefficient, which is the t-test. If $t > t_{0.05}$, then the correlation coefficient is significant.

Based on the calculation results obtained $t_{count} = 11.81$ while $t_{table} = 1.98$ at the significance level $\alpha = 0.05$ with $df = 98$. Because $t_{count} > t_{table}$, the correlation coefficient between Transformational Leadership and Pedagogical Competence is declared very significant. Thus it can be concluded that the null hypothesis (H0) is rejected and the alternative hypothesis (H1) is accepted. The Test Results of the Significance of the Correlation of Transformational Leadership with Pedagogical Competence are presented in Table 4.

**TABLE IV. RESULTS OF CALCULATION OF SIGNIFICANCE TESTS OF CORRELATION BETWEEN TRANSFORMATIONAL LEADERSHIP AND PEDAGOGICAL COMPETENCE**

<table>
<thead>
<tr>
<th>Coefficient of Correlation $r_{1.1}$</th>
<th>N</th>
<th>$t_{count}$</th>
<th>$t_{table}$</th>
<th>$\alpha = 0.05$</th>
<th>$\alpha = 0.01$</th>
<th>Conclusion</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.417</td>
<td>103</td>
<td>11.81</td>
<td>2.62</td>
<td>1.98</td>
<td></td>
<td>Very Significant</td>
</tr>
</tbody>
</table>

Significance level test requirements: $t_{count} > t_{table}$

2) Analysis of the relationship between visionary leadership ($X_2$) and pedagogical competence ($Y$): Simple linear regression analysis between the variables of Visionary Leadership and Pedagogical Competence produces a line equation $\hat{Y} = 99.53 + 0.32X_1$. Significance and linearity test of the regression equation is performed using the F-test.

**TABLE V. ANOVA FOR THE TEST OF SIGNIFICANCE AND SIMPLE LINEAR REGRESSION OF VISIONARY LEADERSHIP VARIABLES AND PEDAGOGICAL COMPETENCE WITH REGRESSION EQUATIONS $\hat{Y} = 100.44 + 0.29X_2$**

<table>
<thead>
<tr>
<th>Source of Variance</th>
<th>Dk</th>
<th>JK</th>
<th>RJK</th>
<th>$F_{count}$</th>
<th>$F_{table}$</th>
<th>$\alpha = 0.05$</th>
<th>$\alpha = 0.01$</th>
<th>Conclusion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total (T)</td>
<td>103</td>
<td>20750.02</td>
<td>20145.6</td>
<td>5</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Regression (a)</td>
<td>1</td>
<td>20672.47</td>
<td>20672.47</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Regression (b)</td>
<td>1</td>
<td>109.06</td>
<td>109.06</td>
<td>21</td>
<td>3.93</td>
<td>Very Significant</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Remainder (E)</td>
<td>101</td>
<td>7645.7</td>
<td>75.70</td>
<td>0.65 ns</td>
<td>2.00</td>
<td>1.63</td>
<td>Linear</td>
<td></td>
</tr>
<tr>
<td>Tuna Cocok (TC)</td>
<td>35</td>
<td>1934.8</td>
<td>55.27</td>
<td>0.65ns</td>
<td>2.00</td>
<td>1.63</td>
<td>Linear</td>
<td></td>
</tr>
<tr>
<td>Galat (G)</td>
<td>67</td>
<td>5710.92</td>
<td>85.23</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note:  
** : very significant regression ($F_{count} > F_{table}$)  
ns : non significant / linier regression ($F_{count} < F_{table}$)  
dk : degree of reedom  
JK : total quadrat  
RJK : average of total quadrat
The strength of the relationship between Transformational Leadership and Visionary Leadership variables with Pedagogical Competence variables is indicated by the correlation coefficient \( r_{y.12} = 0.390 \) with the coefficient of determination \( r^2_{y.12} = 0.152 \). This means that Transformational Leadership and Visionary Leadership together contribute 15.20% to Pedagogical Competence, while 84.80% Pedagogic Competence is influenced by other factors. To test the significance of a positive relationship between Transformational Leadership and Visionary Leadership with Pedagogical Competence, it is necessary to test the significance of multiple correlation coefficients, namely the F test. If \( F_{\text{count}} > F_{\text{table}} \), then the multiple correlation coefficient is declared significant.

Based on the calculation results obtained \( F_{\text{count}} = 14.73 \) while \( F_{\text{table}} (0.05) (2.102) = 2.42 \). Because \( F_{\text{count}} > F_{\text{table}} \), the correlation coefficient between Transformational Leadership and Visionary Leadership with Pedagogical Competence is very significant. Thus it can be concluded that the null hypothesis (H0) is rejected and the alternative hypothesis (H1) is accepted.

### TABLE VIII. CALCULATION RESULTS FOR THE SIGNIFICANCE TEST OF CORRELATION BETWEEN TRANSFORMATIONAL LEADERSHIP AND VISIONARY LEADERSHIP TOGETHER WITH PEDAGOGICAL COMPETENCE

<table>
<thead>
<tr>
<th>Coefficient of Correlation ( r_{y.12} )</th>
<th>dk numerator</th>
<th>dk denominator</th>
<th>( F_{\text{count}} )</th>
<th>( F_{\text{table}} )</th>
<th>Concl.</th>
</tr>
</thead>
<tbody>
<tr>
<td>( 0.532 )</td>
<td>2</td>
<td>102</td>
<td>20.43</td>
<td>4.83</td>
<td>3.09</td>
</tr>
</tbody>
</table>

**Significance level test requirements:** \( t_{\text{count}} > t_{\text{table}} \)

4) Partial correlation test: Calculation of partial correlation between Visionary Leadership and Pedagogical Competence if Transformational Leadership is controlled yields \( r_{y.2} = 0.285 \). Calculation of t-value greater than table shows that the relationship between Visionary Leadership and Pedagogical Competence, where the value of Transformational Leadership is controlled is significant. The results of the calculation of the partial correlation significance test can be seen in Table 9.

### TABLE IX. RESULTS OF CALCULATION OF TEST FOR PARTIAL CORRELATION SIGNIFICANCE

<table>
<thead>
<tr>
<th>Variable control</th>
<th>( r_{\text{partial}} )</th>
<th>( t_{\text{count}} )</th>
<th>( t_{\text{table}} )</th>
<th>Concl.</th>
</tr>
</thead>
<tbody>
<tr>
<td>( X_2 )</td>
<td>0.349</td>
<td>3.97</td>
<td>2.62</td>
<td>1.98</td>
</tr>
<tr>
<td>( X_3 )</td>
<td>0.417</td>
<td>3.44</td>
<td>2.62</td>
<td>1.98</td>
</tr>
</tbody>
</table>

From the table above, it appears that the strength of the relationship between Transformational Leadership and Pedagogical Competence is higher than the relationship between Visionary Leadership and Pedagogical Competence. Thus, in this study Transformational Leadership is the main driver of Pedagogical Competence.

**Note:**

**:** very significant regression \( (F_{\text{count}} > F_{\text{table}}) \)

ns : non significant / linear regression \( (F_{\text{count}} < F_{\text{table}}) \)

\( \text{dk} \) : degree of freedom

\( \text{JK} \) : total quadrat

\( \text{RJK} \) : average of total quadrat

The strength of the relationship between Visionary Leadership variables with Pedagogical Competence is shown by the correlation coefficient \( r_{y.2} = 0.349 \) with the determination coefficient \( r^2_{y.2} = 0.116 \). This means that Visionary Leadership contributes 11.60% to Pedagogical Competence, while 88.40% Pedagogic Competence is influenced by other factors.

Based on the calculation results obtained \( t_{\text{count}} = 3.48 \) while \( t_{\text{table}} = 1.98 \) at \( \alpha = 0.05 \) level. Because \( t_{\text{count}} > t_{\text{table}} \), the correlation coefficient between Visionary Leadership and Pedagogical Competence is very significant. Thus, the null hypothesis (H0) is rejected and the alternative hypothesis (H1) is accepted. Significance Test Results Correlation between Visionary Leadership and Pedagogical Competencies can be seen in the following Table 6.

### TABLE VI. CALCULATION RESULTS OF SIGNIFICANCE CORRELATION TESTS OF VISIONARY LEADERSHIP VARIABLES AND PEDAGOGICAL COMPETENCE

<table>
<thead>
<tr>
<th>Coefficient of Correlation ( r_{y.2} )</th>
<th>N</th>
<th>( t_{\text{count}} )</th>
<th>( t_{\text{table}} )</th>
<th>Conclusion</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.349</td>
<td>103</td>
<td>3.48</td>
<td>2.62</td>
<td>1.98</td>
</tr>
</tbody>
</table>

Significance level test requirements: \( t_{\text{count}} > t_{\text{table}} \)

3) Analysis of the relationship between transformational leadership \( (X_1) \) and visionary leadership \( (X_2) \) together with pedagogical competence \( (Y) \): Analysis of multiple linear regression between Transformational Leadership and Visionary Leadership together towards Pedagogical Competence produces the equation \( \hat{Y} = 77.25 +0.27 X_1 +0.21 X_2 \). Significance test of the regression equation was carried out using the F test. Based on the test using analysis of variance (ANOVA) the results obtained in Table 7.

### TABLE VII. ANOVA TO TEST THE SIGNIFICANCE OF MULTIPLE REGRESSION OF TRANSFORMATIONAL LEADERSHIP AND VISIONARY LEADERSHIP TOGETHER WITH PEDAGOGICAL COMPETENCIES THROUGH REGRESSION EQUATIONS \( \hat{Y} = 77.25 +0.27 X_1 +0.21 X_2 \)

<table>
<thead>
<tr>
<th>Source of Variance</th>
<th>Dk</th>
<th>JK</th>
<th>RJK</th>
<th>( F_{\text{linreg}} )</th>
<th>( F_{\text{table}} )</th>
<th>Concl.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td>102</td>
<td>7754.77</td>
<td>14.75</td>
<td>6.85</td>
<td>2.42</td>
<td>Very Significant</td>
</tr>
<tr>
<td>Regression</td>
<td>2</td>
<td>1766.35</td>
<td>883.45</td>
<td>**</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Remainder</td>
<td>100</td>
<td>5987.88</td>
<td>59.87</td>
<td>**</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
IV. DISCUSSION

1) Relationship between transformational leadership (X₁) and pedagogical competence: This is consistent with the results of previous research conducted by Septi Andriani, Nila Kesumawati, Muhammad Kristiawan [11] that the transformational leadership style is a leadership style that encourages the teachers to have vision, mission, and goals, encourages and motivates the teachers to demonstrate the maximum performance. Thus the findings of facts and data in the analysis of this study further support previous findings regarding the existence of a strong relationship between Transformational Leadership and Pedagogical Competence, both directly and indirectly.

Based on the research and discussion above, it can be indicated that one of the efforts to improve Pedagogical Competence is the performance and actualization of Transformational Leadership. The results showed that there was a positive relationship between Transformational Leadership and Pedagogical Competence. This is indicated by the correlation coefficient (rY.1) of 0.417 which is stated to be very significant. The contribution of Transformational Leadership to Pedagogical Competence is 17.40% which is stated by the coefficient of determination (r²Y.1) of 0.174. The partial correlation coefficient of Transformational Leadership (with the Visionary Leadership variable being controlled) was 0.417 which was stated to be very significant.

Based on a simple linear regression equation Ŷ = 99.53 + 0.32X₁, it is predicted that every increase of one Transformational Leadership score will cause an increase of 0.34 Pedagogical Competency score at a constant of 99.53. The results of this study conclude that the Transformational Leadership owned positively contributes significant effect on Pedagogical Competence.

Essentially Transformational Leadership is leadership that can respond and change employee attitudes to commit to supporting the organization’s vision, mission, and goals, as measured by instruments in the indicators, including a) the leader acts as a model or role model b) the leader creates a clear picture c) leaders stimulate people to be creative and innovative d) leaders develop subordinates by creating an enabling environment.

2) Relationship between visionary leadership (X₂) and pedagogical competence (Y): The pattern of the relationship between Visionary Leadership variables and Pedagogical Competence variables is expressed by a simple linear regression equation Ŷ 100.44 + 0.29 X₂, it is predicted that each increase of one Visionary Leadership score will cause an increase of 0.29 Pedagogic Competency scores at a constant of 100.44. The existence of a positive relationship between Visionary Leadership and Pedagogical Competence shows that the role of Visionary Leadership will greatly assist the achievement of Pedagogical Competence.

Visionary Leadership is the process of dynamically interacting feedback between two or more personal persons directly orally and verbally. The factors that influence it are 1) face to face, 2) are direct, 3) the media used, 4) the effectiveness of feedback, 5) support from others.

Visionary leadership is aimed at effective feedback indicators. Good feedback also gives a good impact on the behavior of one’s organization. The research findings show that together visionary leadership and lecturer performance contributed 87.8% so that it had a strong and significant effect on the quality of Private Universities. Thus the visionary leadership and lecturer performance are strategic factors to create quality private universities [12], stating that there is a positive relationship between visionary leadership and pedagogical competence with r = 0.282. Thus the findings of facts and data in the analysis of this study further support previous findings regarding the existence of a strong relationship between Visionary Leadership and Pedagogical Competence, both directly and indirectly.

3) Relationship between transformational leadership (X₁) and visionary leadership (X₂) together with pedagogical competence (Y): The results showed that there was a positive relationship between Transformational Leadership and Visionary Leadership together with Pedagogical Competence. This is indicated by the correlation coefficient (ry.12) of 0.390 which was stated to be very significant after being tested with the test F. Contribution of Transformational Leadership and Interpersonal Communication together to Organizational Citizenship Behavior Organizations of 15.20% which is expressed by the coefficient of determination (r²y.12) of 0.152.

Transformational leadership is leadership that can respond and change employee attitudes to commit to supporting the vision, mission, and goals of the organization as measured by instruments in the indicators, including a) the leader acts as a model or role model b) the leader creates a clear picture c) the leader stimulates people to be creative and innovative d) leaders develop people by creating an enabling environment.

V. CONCLUSION

Based on the results of the research stated above, it can be concluded that Transformational Leadership and Visionary Leadership make positive contributions that significantly affect Pedagogical Competence. transformational leadership and visionary leadership significantly influence the pedagogical competence of teachers which can enhance creativity in the field of teaching literacy. The two types of leadership combine to become a form of leadership model that is expected to emerge in the millennial era of education 4.0 because they provide a large enough space for development and an atmosphere conducive to improving the quality of teachers and students in various ways including digital literacy. Based on the results of the Focus Group Discussion also sharpened the importance of a leadership model that provided opportunities
for the development of school organizations and also the quality of teachers and graduates. The combination of these two models was named *Ideal Millennial Leadership in the educational era 4.0.*

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