Principal transformational leadership and teacher readiness to teach: Mediating role of self-efficacy

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Article Info	**ABSTRACT**

Student should participate in high-quality learning regardless of all existing conditions; therefore, efforts are needed to identify various factors related to teacher readiness in teaching (TR). This research identified the effect of the four components of transformational leadership (TL) on teacher TR in the era of the coronavirus disease 2019 (COVID-19) pandemic through the role of teacher self-efficacy mediation. The study used a quantitative approach, with a model of structural equation modelling (SEM) causality with the help of the analysis of moment structure 24.0 (AMOS 24.0) program. This study involved 332 secondary school teachers as respondent. SEM is used to build relationship models and to analyze direct or indirect effects, while the Sobel test is conducted for testing mediation hypotheses. Based on the results of research, four components of TL, can affect teacher TR through teacher self-efficacy. The contribution of this research provides insight into the importance of the principal's TL practices in preparing teachers for teaching through teacher self-efficacy, which is a necessity today.

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1. INTRODUCTION

Since the beginning of the pandemic, the Indonesian government has imposed a policy shift in the teaching and learning process, and a ban on crowding in the school environment. Some studies on the running of online schools during the pandemic in Indonesia turned out to cause many negative impacts such as children becoming lost spirit of learning, discipline to the responsibility of schoolwork done by parents so that finally difficulty to measure learning outcomes [1], [2]. In order to anticipate the occurrence of learning loss, and pay attention to the development of positive numbers of covid that are increasingly hit, as well as the efforts of a massive vaccine movement, schools located in safe zones (green zones) can already do limited face-to-face learning by qualifying and imposing strict health protocols.

In the midst of the COVID pandemic, teaching and learning practices are undergoing a very fast transformation [3], [4]. This rapid change provides an opportunity for researchers to observe the readiness of teachers in teaching, especially in Indonesia, where not many teachers have experience in learning practices that use information and communication technology (ICT) a lot, which is certainly useful in facing the challenges that exist today [5]. Over the past two decades the practice of blended learning and online teaching has become part of teaching practice in schools in several countries [6]. To produce a teaching and learning with excellent quality, there needs to be certainty to learners have good access, it is therefore

necessary to explore various factors related to teacher readiness in teaching (TR). To understand a teacher's readiness for teaching practices in the midst of a pandemic in more detail, examining its relationship to the factors that influence it becomes very important [7], [8].

Various research results have shown that the leadership behavior of principals plays a key role in preparing qualified teachers [9], [10]. Transformational principals can serve as important agents to create a school vision, assist teachers in increasing their confidence, promote quality teaching practices, and assist teachers in developing teacher competencies [11]. The impact of transformational leadership (TL) on the readiness of teaching teachers in research that has been conducted states that there is a special focus on the role of the principal, this role is a promising prospect to be implemented [12], [13] together with the researchers' efforts to explain the influence of TL on teacher self-efficacy [11], [14]. It has been shown that self-efficacy is a major predictor of teacher TR, especially under the pressure of the pandemic [15], [16]. The model of the relationship between the TL of the principal and the readiness of teachers in teaching is built with mediator variables, self-efficacy, a relationship between TL and the readiness of teachers in teaching is expressed truth in a variable, so this makes an explanation of the relationship between the two. Explanation of the relationship that is intended is transformative leadership with teacher TR, inseparable from the situation of the coronavirus disease 2019 (COVID-19) pandemic.

An important factor to prepare teachers in teaching is the attention of the principal, this makes the teacher feel in a position when conditioning the organization to implement sustainable programs, program success, determine a high expectation, and realize the school's vision [17], [18]. TL can be referred to as a leadership approach that leads to changes in individuals and social systems. With increasing interest in the importance of TL in educational environments, researchers put forward the role of principals as transformational leaders because to produce cultural conditions, build the organizational capacity of schools as well as the quality of systematic teaching and learning, this becomes the most important agent in building the strength of an institution [19], [20].

There are various research results that seek to explain how the TL of principals and the level of teacher efficacy can affect teacher TR [7], [11], [13], [21]. Based on various previous research results, the four components of TL, can affect the level of teacher self-efficacy which shows predictability regarding teacher TR. During the COVID-19 pandemic, teachers need to answer the social challenges that occur, a number of adaptability from teachers that includes demographic and social changes, increased work virtually, and the growth of the complexity of the process in teaching [22], [23]. The results of previous research show that the readiness of teachers in teaching in the pandemic era is vital in realizing quality learning. This is because the adaptability of teachers is needed in answering the challenges that exist during the pandemic, this certainly requires a high level of teacher self-efficacy. During the pandemic period various recent studies have explored how the school environment has changed, it takes adequate TL skills from principals.

This research aims to identify the effect of the four components of TL on the readiness of secondary school teachers in teaching in the era of the COVID-19 pandemic through the role of teacher self-efficacy mediation. The research framework is shown in Figure 1. Based on these exposures, the proposed hypothesis are: i) Idealized influence directly affect teacher readiness to teach (H1); ii) Teacher self-efficacy (TSE) mediates the relationship between idealized influence and teacher readiness to teach (H2); iii) Inspirational motivation directly affect teacher readiness to teach (H3); iv) TSE mediates the relationship between inspirational motivation and teacher readiness to teach (H4); v) Intellectual stimulation directly affect teacher readiness to teach (H5); vi) TSE mediates the relationship between intellectual stimulation and teacher readiness to teach (H6); vii) Individualized consideration directly affect teacher readiness to teach (H7); and viii) TSE mediates the relationship between individualized consideration and teacher readiness to teach (H8).
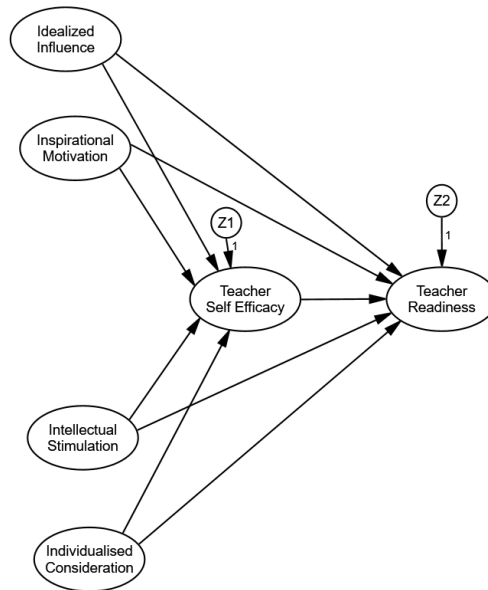
Figure 1. The research framework

2. RESEARCH METHOD

2.1. Research design

This study employed a quantitative approach to test the effect of the four components of TL on teacher TR in the era of the COVID-19 pandemic through the role of teacher self-efficacy mediation. The study used causality models to test proposed hypotheses using structural equation modelling (SEM). Which will then be operated through analysis of moment structure 24.0 (AMOS 24.0) software.

2.2. Population and sample research

The population of this study was 6,758 secondary school teachers in region of Solo, Central Java, Indonesia. The sample was determined by a proportional random sampling area; the sampling area is used to determine the grouping of regency/cities in the region of Solo, namely the western, central and eastern regions. The sample size was 332 teachers determinate by the Isaac and Michael formula [24] with a confidence level of 95%. Table 1 shows the description of the population and sample in the study.

Table 1. Population and sample

Division of territory	Regency/city	Regency/city sample	Population	Sample
West	1. Boyolali regency	Klaten regency	2,668	131
	2. Klaten regency			
Central	1. Surakarta city	Surakarta city	2,052	101
	2. Sukoharjo regency			
East	1. Sragen regency	Sragen regency	2,038	100
	2. Karanganyar regency			
	3. Wonogiri regency			
	Total		6,758	332

2.3. Research instruments

Data collection is obtained using questionnaires through the utilization of Google Forms. The instrument is specifically designed to test the effect of the four components of TL on teacher TR in the era of the COVID-19 pandemic through the role of teacher self-efficacy mediation. Questionnaire used a four-point scale starting from 1 (never) up to 4 (always). The TL questionnaire was developed based on Bass and Avolio theory [25], while questionnaires to measure teacher TR were developed based on previous research results [22], [23]. Hence, questionnaires to measure the teacher's level of self-efficacy are spelled out based on Bandura's theory [26]. Each respondent was asked to assess aspects of the principal's leadership behavior related to each four components of TL, namely individualized consideration (IC), inspirational motivation (IM), idealized influence (II), and intellectual stimulation (IS), and as well as their TR and also TSE levels.

Questionnaires of each component were conducted validity tests through Aiken's V validity analysis. Based on Aiken's V validity test, the range of Aiken's V coefficients for each item on each component shows results: i) II: .621 - .837; ii) IM: .680 - .891; iii) IS: .642 - .795; iv) IC: .608 - .812; v) TSE: .662 - .885; and vi) TR: .638 - .852. Based on Aiken's V value, all items on the instrument are declared valid [27]. The instrument reliability test is conducted using Cronbach's alpha, in detail based on the reliability test showing Cronbach's alpha value as: i) II: 0.874; ii) IM: 0.923; iii) IS: 0.890; iv) IC: 0.861; v) TSE: 0.835; and vi) TR: 0.912.

2.4. Data analysis

In this study, statistical analysis used a SEM causality model operated through the AMOS 24.0 program [28]. Before performing a complete SEM analysis model, first conduct a data assumption test consisting of a normality test and an outlier test. The Sobel test is conducted for the testing of the mediation hypothesis [29].

3. RESULTS AND DISCUSSION
3.1. Results
3.1.1. Assumption test

Before performing a complete SEM analysis, first perform an assumption test. Normality tests as well as outlier tests are used in data assumption tests. The data normality test was conducted using a critical ratio skewness value, known critical ratio values on the multivariate kurtosis line show a value of 2.291 ($<\pm 2.58$), while the critical ratio value for kurtosis and skewness of each indicator is not greater than ± 2.58. Byrne recommends [30] that data is normally distributed when the critical ratio skewness value is below ± 2.58. To find out the multivariate outlier can be seen through mahalanobis distance value. In this study the largest value at mahalanobis distance was 91.722, while the Chi-square value of this study was obtained at 346.885; based on the value showed no problem multivariate outlier [31].

3.1.2. Evaluation and interpretation the measurement model

Evaluation of goodness of fit criteria is conducted to test the feasibility of a model with several criteria for index conformity, to state whether a model is acceptable or rejected. The validity of the measurement model depends on setting the level of goodness of fit, and finding specific evidence of construct validity. Table 2 shows that all indices are within the recommended criteria [29], [30], i.e.: comparative fit index (CFI): 0.961; Tucker Lewis index (TLI): 0.957; minimum sample discrepancy divided by degrees of freedom (CMIN/df): 1.816; goodness-of-fit index (GFI): 0.923; and root mean square error of approximation (RMSEA): 0.049.

Table 2. The fit indices of the model

Goodness of fit indices	Model test results	Cut-off value	Description
Probability	0.054	>0.050	Good
RMSEA	0.049	<0.080	Good
GFI	0.923	>0.900	Good
CMIN/df	1.816	<3.000	Good
TLI	0.957	>0.900	Good
CFI	0.961	>0.900	Good

The measurement model also needs to be an evaluation of validity, a construct validity assessment consists of convergent and discriminant validity. Convergent validity analysis is based on loading factors, composite reliability, and extracted variances [28]. The results of the loading factor values shown in Table 3 range from 0.534 to 0.899, the values are in accordance with hair et al recommendations [28] the loading factor value must be greater than 0.50. Can be seen in Table 3, the average variance extracted (AVE) analysis values range from 0.527 to 0.667, the values are in accordance with Bagozzi and Yi's recommendations [32]. The AVE value must be greater than 0.50. Reliability is assessed based on composite reliability (CR), CR values as indicated in Table 3, each exceeding (>0.70), this is in accordance with Hair *et al*. recommendations [28].

Refers to a benchmark, making the validity of the discriminant to see existing constructions, it aims to establish internal consistency. Discriminant validity testing is done through comparing squared correlations between constructs and variance extracted for a construct [28], [33]. The test results as shown in Table 4 have adequate discriminant validity, since the value of squared correlations for each construct, is smaller than the AVE according to Fornell and Lacker assessment criteria [33].

The purpose of this study is to test the effect of the four components of TL on teacher TR in the era of the COVID-19 pandemic through the role of teacher self-efficacy mediation. Figure 2 shows the results of SEM testing using the help of the AMOS 24 app. To find out the influence of teacher self-efficacy mediator variables, in mediating the effect four components of TL on teacher TR, Sobel test is used. Mediation hypothesis testing can be done with testing developed by Sobel [34], known as the Sobel Test [29]. If the p value<0.05, it indicates that the mediation effect is statistically significant.

Table 3. Results of the measurement model

Factor	Item code	Loading	AVE	CR
II	II_1	0.690	0.531	0.887
	II_2	0.691		
	II_3	0.717		
	II_4	0.684		
	II_5	0.768		
	II_6	0.864		
	II_7	0.666		
IM	IM_1	0.617	0.527	0.846
	IM_2	0.636		
	IM_3	0.844		
	IM_4	0.745		
	IM_5	0.764		
IS	IS_1	0.802	0.584	0.875
	IS_2	0.794		
	IS_3	0.817		
	IS_4	0.721		
	IS_5	0.677		
IC	IC_1	0.748	0.650	0.903
	IC_2	0.824		
	IC_3	0.797		
	IC_4	0.855		
	IC_5	0.804		
TSE	TSE_1	0.815	0.534	0.871
	TSE_2	0.755		
	TSE_3	0.810		
	TSE_4	0.778		
	TSE_5	0.650		
	TSE_6	0.534		
TR	TR_1	0.726	0.667	0.856
	TR_2	0.899		
	TR_3	0.816		

Table 4. Discriminant validity of constructs

Factor	1	2	3	4	5	6
1. II	0.531					
2. IM	0.267	0.527				
3. IS	0.098	0.240	0.584			
4. IC	0.322	0.116	0.085	0.650		
5. TSE	0.074	0.192	0.238	0.414	0.534	
6. TR	0.180	0.351	0.274	0.169	0.203	0.667

This study tested the effect of the four components of TL on teacher TR in the era of the COVID-19 pandemic through the role of teacher self-efficacy mediation. Figure 2 shows the results of SEM testing using the help of the AMOS 24 application. To find out the influence of teacher self-efficacy mediator variables, in mediating the effect four components of TL on teacher TR, Sobel test is used. Mediation hypothesis testing can be done with testing developed by Sobel [34], known as the Sobel Test [29]. If the p value<0.05, it indicates that the mediation effect is statistically significant.

Table 5 and Figure 2 show a summary of the proposed hypothesis testing and the effect of a total of four components of TL on teacher TR, and indirect effects through teacher self-efficacy. The total effect of the TL component is idealized influence on teacher TR shows significant results. The effect is also significant when teacher self-efficacy is added to the model as a mediator, with the mediation effect being 0.313. When combined with direct effect, the total idealized influence on teacher TR is 0.562, where the value shows the effect of mediation reaching 55.69% of the total effect. Furthermore, the effect of total inspirational motivation on teacher TR showed significant results. The effect is also significant when teacher

self-efficacy is added to the model as a mediator, with the mediation effect being 0.181. When combined with direct effect, the total effect of inspirational motivation on teacher TR was 0.683, where the value showed the effect of mediation reached 26.50% of the total effect. The total effect of intellectual stimulation on teacher TR showed significant results. The effect is also significant when teacher self-efficacy is added to the model as a mediator, with the mediation effect being 0.237. When combined with direct effect, the total effect of intellectual stimulation on teacher TR was 0.508, where the value showed the effect of mediation reached 46.65% of the total effect. The effect of the fourth total TL component, individualized consideration of teacher TR, showed significant results. The effect is also significant when teacher self-efficacy is added to the model as a mediator, with the mediation effect being 0.285. When combined with direct effect, the total effect of individualized consideration on teacher TR is 0.715, where the value shows the effect of mediation reaching 39.86% of the total effect, which means that individualized consideration can significantly increase teacher TR through teacher self-efficacy.
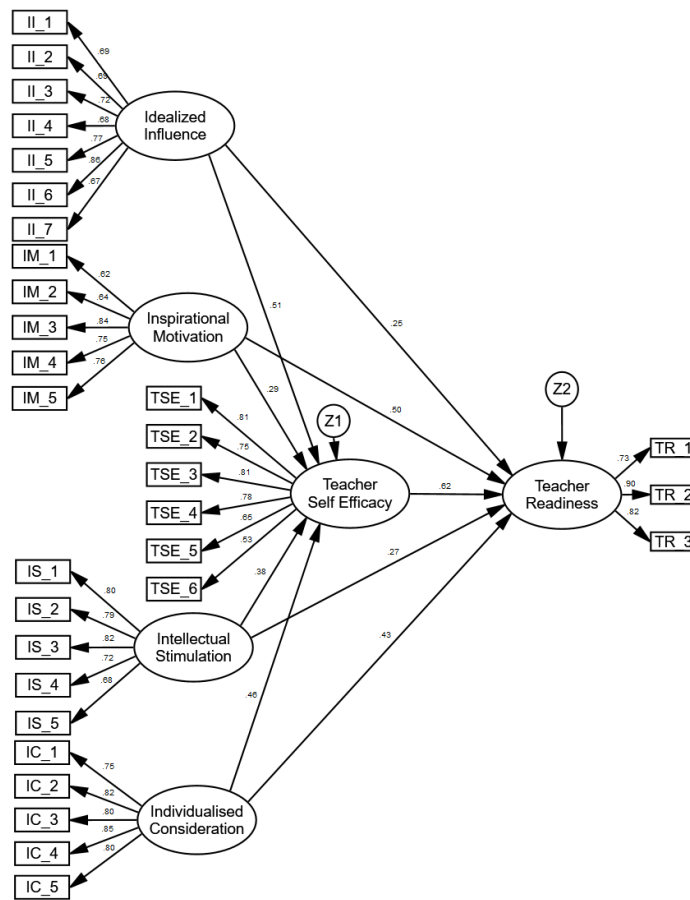
Figure 2. SEM test result

Table 5. Summary of hypothesis testing and size of effect

Model pathways	β	p	Cut of value	Decision
II→TR	0.249	0.005	0.05	H1 accepted
II→TSE→TR	0.313	0.000	0.05	H2 accepted
IM→TR	0.502	0.000	0.05	H3 accepted
IM→TSE→TR	0.181	0.006	0.05	H4 accepted
IS→TR	0.271	0.001	0.05	H5 accepted
IS→TSE→TR	0.237	0.000	0.05	H6 accepted
IC→TR	0.430	0.001	0.05	H7 accepted
IC→TSE→TR	0.285	0.000	0.05	H8 accepted

Note:
Total effect of II→TR, β=0.562; Total effect of IM→TR, β=0.683;
Total effect of IS→TR, β=0.508; Total effect of IC→TR, β=0.715

3.2. Discussion

Teacher readiness to teach in the midst of the pressures of the COVID-19 pandemic can be interpreted as the readiness of teachers in responding to social challenges that occur, where a number of adaptability from teachers includes demographic and social changes, increased work virtually, and the growth of the complexity of the process in teaching [22], [23]. Therefore, teachers' perceptions of their TR them have to do with beliefs about their readiness. Perceptions of teacher readiness include a mixture of attitudes and experiences, which are influenced by the principal's various leadership, individual characteristics, contextual, and teacher self-efficacy [7], [35]. Personally, this perception may depend in particular on their future-oriented projection of skills and knowledge about teaching practice, which is manifested in their sense of self-efficacy and experience.

There are four constructs that have been obtained from a study, namely idealized influenced, inspirational motivation, intellectual stimulation, and individualized consideration, can affect teacher TR through teacher self-efficacy. Previous studies have identified that almost all successful principals use TL practices, which positively affect teachers' levels of self-efficacy [11], [36]. The study found the idealized influence was positively associated with teachers' teaching readiness. Leaders who demonstrate this behavior have the ability to add value to activities carried out by institutions, through knowledge creation, sharing, and integration between knowledge and experience [37]. Transformational leaders who use these attributes can build a trust-based culture and thus the life of trust-based organization [38]. When the teacher has a high level of trust in others, indirectly the teacher is able to analyze the knowledge possessed by the interlocutor, which makes the teacher must have high trust in everyone, and as a result the level of self-efficacy of teachers is higher which then the teachers are also increasingly ready to teach. However, ideal leadership behavior must be demonstrated by the principal to stimulate teachers to imitate the behavior of the principal.

Transformational leaders who demonstrate inspirational motivational attributes, look optimistic and enthusiastic. To produce a committee and engagement, a view is needed on the vision that has been designed and the mission that has been prepared, so that this will be an inspiration for his followers [39]. Such leaders have the ability to encourage their teachers to engage in vision by creating an adequate level of teacher self-efficacy. The study's findings suggest inspirational motivation encourages teacher TR through teacher self-efficacy, this can be done by raising team spirit and stimulating staff to imagine an exciting future for their schools [40], [41]. Thus, to support educators and vision of hope, this will have a positive impact on education in Indonesia.

The findings of this study show that principals who have intellectual stimulation attributes can affect teacher TR through teacher self-efficacy. In terms of intellectual stimulation, leaders have the ability to foster creativity, critical attitudes, innovation and encourage teachers to do the best things to achieve organizational goals [19], [42]. The principal should be able to provide stimulus to teachers by providing confidence when there is a problem, this can be implemented by showing problem solving from various views. That way teachers will be encouraged to find solutions and ways to do this. When principals place a high value on knowledge and encourage teachers to ask questions, and discuss their teaching practices, it is more likely to increase the teacher's level of self-efficacy and certainly encourage teacher TR [38].

Leaders who use individual considerations tend to pay attention to the individual needs of teachers and develop their strengths through mentoring and coaching [20]. The results of this study showed that principals who have individualized consideration attributes can affect teacher TR through teacher self-efficacy. Principals who apply this attribute encourage teachers to share knowledge by communicating with each other effectively, and by listening to their advice on learning implementation and administrative issues either through informal or formal meeting [14], [37]. Transformation is essentially turning potential into the real thing. Principals who are able to transform means that they can turn the potential of the school into real energy to improve the quality of the school.

A more complicated level of responsibility causes fatigue for many teachers, and of course it becomes something that can make the teacher's performance decrease because adaptation is needed to be able to adapt to all the changes that exist [43], [44]. Based on this, self-efficacy is needed, the readiness of teachers to face all challenges shows the beliefs, attitudes, and intentions of teachers regarding the need to achieve success in the face of change, especially in the midst of the pressure of the COVID-19 pandemic, one of the changes that occurred massively was the use of ICT in learning [45], [46]. Emsza [47] in his research states that there is a significant influence on the level of teacher self-efficacy on teacher TR. In the end, the readiness of teachers in teaching returns to the leadership role of the principal through the behavior shown and the support provided, as well as with high self-efficacy. Hopefully, teachers can answer all challenges and are confident in their ability to be ready for all changes that occur.

4.   CONCLUSION

The research revealed four components of transformational leadership (TL) affects teacher readiness (TR) through teacher self-efficacy. However, the results of this research should be viewed taking into consider several limitations. This research focused only on secondary school teachers in the region of Solo, Central Java, Indonesia, but similar studies can be conducted on a broader scale to explore the readiness and mapping of the competence of primary and secondary school teachers during pandemic times. Future studies could use more variables associated with teacher TR especially amid the pressures of the pandemic. Another limitation is that this work is limited to understanding the principal's TL, the teacher's level of self-efficacy and teaching readiness through self-assessment that may not provide the level of circumstances that the teacher actually has. Therefore, this can be further assessed through the perspective of school superintendents, students and school administrators. Despite the limitations, the results of this study provide insight into the importance of the principal's TL practices in preparing teachers for teaching through teacher self-efficacy, which is a necessity today.

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