

# Transforming Digital Teaching Practices: The Role of Empowering Leadership and Self-Efficacy in Emancipated Schools

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## ABSTRACT

Despite the increasing relevance of digital competence in education, elementary school teachers' digital learning behaviors often do not align with current expectations. Enhancing these behaviors is essential for building an inclusive school ecosystem. This study investigates the impact of principals' empowering leadership on teachers' digital learning behavior, with self-efficacy as a mediating factor. A quantitative research design was employed using Partial Least Squares Structural Equation Modeling (PLS-SEM). Data were collected through purposive sampling from 340 teachers participating in the emancipated school program. Respondents were selected based on their involvement in schools with digitally transformative leadership and self-efficacy development initiatives. The analysis followed three stages: (1) validity and reliability testing; (2) model fit assessment; and (3) hypothesis testing. The findings revealed that empowering leadership directly influences digital learning behavior, accounting for 65.4% of the variance. Additionally, self-efficacy plays a mediating role, contributing 29.5%. Although empowering leadership emerged as the dominant factor, the mediation effect suggests that self-efficacy remains a crucial element in fostering effective digital learning behaviors among teachers. The study highlights that teachers with higher self-efficacy are more receptive to empowering leadership, especially in the context of digital learning. These findings underscore the importance of fostering both strong leadership and personal belief in capability to promote sustainable digital competence in schools.

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## 1. INTRODUCTION

In shaping digital learning behavior, empowering leadership factors can help motivate and guide teachers in learning and using technology effectively (Omar & Ismail, 2021; Trihantoyo, Herachwati, Purwono, Suhariadi, & Aldhi, 2023). In addition, empowering leadership can encourage educators to seek

opportunities to improve digital skills and knowledge (Laadem, 2019). In addition, empowering leadership can encourage educators to seek opportunities to improve digital skills and knowledge, which leads to improved digital learning behaviors. Empowering leadership can also help overcome problems and obstacles that arise during the digital learning process (Hon & Chan, 2013). The importance of empowering leadership for educational organizations and schools lies in supporting teachers in various aspects, such as expanding the scope of authority that not only ensures teachers' professional development but also facilitates the achievement of the school's ultimate goals (Akkaya, 2023). It can be said that empowering leadership can foster individual confidence and the ability to carry out tasks (Celik & Konan, 2021).

Based on data from Kominfo (2024), the Indonesian Digital Society Index in the research setting of Surabaya City is 52.28, with a high category. This is supported by research data from Afifah, Mahfud, & Ardiansyah (2021), which shows that the digital literacy of primary school teachers in both public and private schools in the indicators of software operation, data and information literacy, and collaboration with digital devices is above 72%. This data indicates that digital literacy, which reflects teachers' ability in digital learning behaviour, is good. In order to improve the ability of teachers, the variable of self-efficacy is needed as a mediating variable (Bai & Jiang, 2024).

Self-efficacy is a key concept in teacher performance, first discussed by Bandura based on social learning theory (Albert Bandura & Walters, 1977). The fundamental concept of self-efficacy learning theory is the teacher's belief in their competence to encourage student activeness in learning (Ahmad & Safaria, 2013). To determine the parameters of the self-efficacy beliefs of each individual can be known by developing dimensions of sympathetic experience, social persuasion, mysterious experience, and physiological reflection (Bangs & Frost, 2012; Ross & Bruce, 2007). Strengthening teacher self-efficacy is an urgency in improving academic achievement and teacher professionalism in carrying out their duties as learning leaders (Alanoglu, 2022).

There are characteristics of schools that follow the emancipated school program. These characteristics reflect the principal's ability to carry out empowering leadership and the level of teacher self-efficacy in conducting self-development independently (Apoko, Handayani, Hanif, & Hendriana, 2023; Trihantoyo et al., 2023). This is in line with the goal of the emancipated school program, which is to improve the quality of education through strengthening the competencies of principals and teachers. In this program, principals play a central role in transforming schools to improve the quality of education. One of the keys to the success of the emancipated school program is the principal's ability to empower all elements of the school, including teachers, students, and the surrounding community, to achieve the school's vision (Trihantoyo, 2024).

From various previous literature reviews, the number of studies that reveal the mediating effect of self-efficacy on the influence of principals' empowering leadership on teachers' digital learning behavior is still insufficient. Research by Xue, Bradley, & Liang (2011) shows that leaders who implement an empowering leadership style can create an environment that supports the creation of innovation and technology adoption. This empowering leadership style leads to allowing leaders to facilitate the improvement of technological skills through teacher self-learning (Ahearne, Mathieu, & Rapp, 2005). This form of autonomy results in digital learning behaviors developing faster with the empowering leadership style (Abildinova, Assainova, Karymsakova, Abykenova, & Temirkhanova, 2024). The ability to increase digital competence can be seen from the level of teacher self-efficacy. Uppathampracha & Liu (2022) corroborate the opinion that self-efficacy plays a strong mediating role in the influence of empowering leadership on innovative behavior, and can increase job commitment and teacher satisfaction. Self-efficacy also facilitates technological transformation in schools through empowering leadership (Manliguis & Tagadiad, 2023).

Meanwhile, data on teachers' digital learning behaviors show that only 40% of teachers are prepared for changes in information technology, communication, and digital literacy integration (Bentri & Hidayati, 2023). This is enough to show evidence that professionalism and the quality of teachers is still low which has an impact on access to digital learning that occurs in Indonesia (Kawuryan, Sayuti, &

Dwiningrum, 2021). Serious concern is needed in improving teachers' digital learning behavior, despite the phenomenon of digitalization, such as the Industrial Revolution 4.0. Empowering leadership plays an important role in increasing teacher self-efficacy, especially in the context of digital learning in schools (Drushlyak, Semenikhina, Kharchenko, Mulesa, & Shamonina, 2023). The implementation of empowering leadership by providing support, giving responsibility, and facilitating active participation, can increase teachers' self-efficacy in integrating digital learning methods that support inclusiveness in the school environment. Empowering leadership helps build teachers' self-efficacy to be more confident and competent in facing digital learning challenges (Laksmi, Sari, Rinanto, & Sapartini, 2021).

The contribution of this research emphasizes the element of education, where educational institutions are *non-profit organizations* with underlying characteristics. The emphasis on the digital learning behavior of educators is very contextual to the current condition of education and the challenges of education in the future that prioritize aspects of information technology. The novelty of this research is also based on the theoretical perspective of Bandura's Social Learning Theory (SLT) (Albert Bandura & Walters, 1977). This research is based on the theoretical perspective of Bandura's Social Learning Theory (SLT), which in previous studies has never been discussed in the context of the research. In addition, methodologically, this study uses Structural Equation Model (SEM) analysis to determine the suitability of the model in the study. From the above background explanation, the purpose of this study is to answer the research hypothesis:

H1: The direct effect of empowering leadership on digital learning behaviour.

H2: The direct effect of empowering leadership on self-efficacy

H3: The direct effect of self-efficacy on digital learning behaviour.

H4: The mediating role of self-efficacy on the effect of empowering leadership on digital learning behaviour.

## 2. METHODS

This research uses a quantitative approach. The survey method in this study uses structure equation model (SEM) analysis. The sample determination was randomized using a purposive sampling method at the elementary school level that met the criteria of a emancipated school program. The emancipated school program represents the principal's awareness of implementing empowering leadership, school culture with high teacher self-efficacy, and implementation of digital-based school management. In the context of this research, there are 34 primary schools in Surabaya city that have implemented the emancipated school programme, as evidenced by data from the Ministry of Education and Culture (Kemdikbud, 2024). Teachers as respondents in this study filled in the instrument link to be able to access the questionnaire online. Data analysis was conducted with descriptive analysis to determine the components of the research variables. Factor analysis is a multivariate method used to analyse variables that are thought to have an interest in each other. The factor analysis used in this research is Confirmatory Factor Analysis (CFA).

In this study, reliability testing used Cronbach's alpha ( $\alpha$ ) technique which states that the questionnaire is reliable if it has an alpha value above 0.6. Reliability of less than 0.6 is not good, while 0.7 is acceptable, and 0.8 is good. The next step is to test the suitability of the model by paying attention to the index used to test the feasibility of a model by following the indicators as follows.

**Table 1.** Goodness of Fit Model Indicators

| Goodness of Fit Index | Cut off Value    | Indicator   |
|-----------------------|------------------|---|
| SRMR                  | $\leq 0.08$      | $\leq 0.08$ is considered an indication that the model has a good fit |
| Chi-Square            | Expectedly Small | 0: perfect fit; the larger the less fit                               |
| NFI                   | $\geq 0.95$      | 0: no fit; 1: perfect fit; $\geq 0.90$ : fit                          |

Note: SRMR (Standardized Root Mean Square Residual); Chi-Square or  $\chi^2$ ; NFI (Normed Fit Index)

The three goodness-of-fit indicators are used as the basis for determining the suitability of the research model. The next step in data analysis is hypothesis testing by looking at the p-value <0.005 to be declared to have an influence.

This study was conducted in accordance with the tenets of research ethics, whereby the data was collected via a survey and the respondents were duly informed of the purpose of the research. The present study is limited by the sample size, which is specific to respondents who have implemented the emancipated school programme and is conducted at the primary school level. The method of analysis employed in this study is Structural Equation Modelling-Partial Least Square (SEM-PLS), which has certain limitations in terms of measuring overall model fit. While this method is effective for predicting relationships between latent variables, SEM-PLS does not provide as comprehensive a goodness-of-fit index as covariance-based SEMs such as AMOS or LISREL.

### 3. FINDINGS AND DISCUSSION

#### 3.1 Findings

This study analyses the mediating role of self-efficacy on the influence of empowering leadership on teachers' digital learning behaviour in the research setting of elementary schools in Surabaya City. By considering the research subject is a school that has implemented the emancipated school program, as a requirement in fulfilling the characteristics of the respondent profile by the research objectives. This study analyses the findings and discussion of the data from the research analysis as follows.

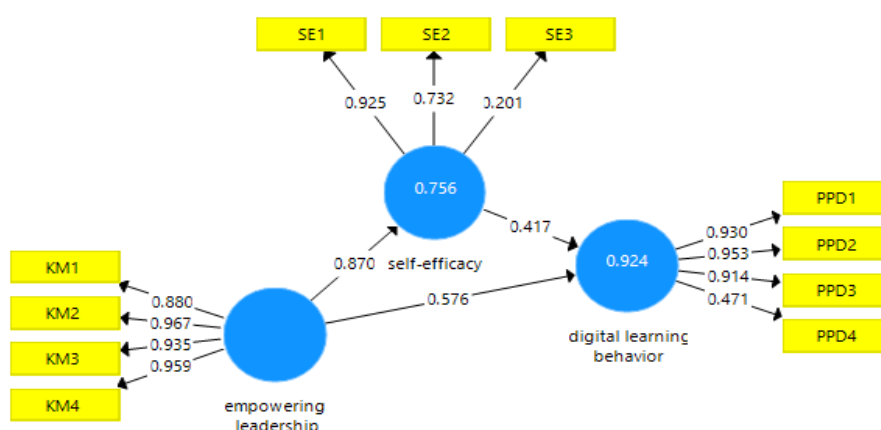
The initial step in data analysis is the assessment of validity and reliability. Researchers employ the value of data testing results by examining the value of convergent validity, discriminant validity, and composite reliability. Convergent validity is a measurement model that demonstrates how observed variables represent latent variables, which are measured using outer loading parameters and Average Variance Extracted (AVE). According to Baharum et al. (2023), individual reflexive measures are said to be correlated with the construct to be measured if the value is >0.70. The subsequent section presents the results of the outer loading analysis on each instrument item.

**Table 2.** Phase 1 Outer Loading Measurement Results

| Variables                  | Item Code | Outer Loading | Description |
|----------------------------|-----------|---------------|-------------|
| Empowering leadership      | KM1       | 0.880         | Valid       |
|                            | KM2       | 0.967         | Valid       |
|                            | KM3       | 0.935         | Valid       |
|                            | KM4       | 0.959         | Valid       |
| Digital Learning Behaviour | PPD1      | 0.930         | Valid       |
|                            | PPD2      | 0.953         | Valid       |
|                            | PPD3      | 0.914         | Valid       |
|                            | PPD4      | 0.471         | Invalid     |
| Self-Efficacy              | SE1       | 0.925         | Valid       |
|                            | SE2       | 0.732         | Valid       |
|                            | SE3       | 0.201         | Invalid     |

Source: primary data processed by researchers, 2024

Described in the research model by the results of stage 1 outer loading measurements, where there are two outer loading analysis results whose values are <0.70, namely the PPD4 item code on the digital learning behaviour variable and SE3 on the self-efficacy variable. The following picture presents the results of stage 1 measurement.



**Figure 1.** Research Analysis Results Model Stage 1

According to the results of the analysis of the research measurement model, two manifest variables are identified as having factor loading values below 0.70. To adhere to the established guideline, these manifest variables must be removed from the model. The subsequent presentation contains the findings of the outer loading measurement following the removal of invalid statement elements.

**Table 3.** Results of Stage 2 Outer Loading Measurements

| Variables                  | Item Code | Outer Loading | Description |
|----------------------------|-----------|---------------|-------------|
| Empowering leadership      | KM1       | 0.880         | Valid       |
|                            | KM2       | 0.967         | Valid       |
|                            | KM3       | 0.935         | Valid       |
|                            | KM4       | 0.959         | Valid       |
| Digital Learning Behaviour | PPD1      | 0.930         | Valid       |
|                            | PPD2      | 0.953         | Valid       |
|                            | PPD3      | 0.914         | Valid       |
|                            | PPD4      | 0.471         | Invalid     |
| Self-Efficacy              | SE1       | 0.925         | Valid       |
|                            | SE2       | 0.732         | Valid       |

Source: primary data processed by researchers, 2024

According to the findings of the data processing, it can be concluded that the loading factor value on the three variables studied, namely: empowering leadership, digital learning behavior, and self-efficacy, is valid. These variables can, therefore, be carried out for further testing.

The discriminant validity test is a methodological instrument employed to assess the validity of a model. Discriminant validity is demonstrated by the cross-loading value, which indicates the magnitude of the correlation between the construct and its indicators, as well as the indicators of other constructs. The standard value used for cross-loading is  $> 0.70$ , or by comparing the square root value of AVE for each construct with the correlation between constructs and other constructs in the model. If the AVE root value of each construct is greater than the correlation value between the construct and other constructs in the model, it is said to have a good discriminant validity value. The following table presents the results of cross-loading.

**Table 4.** Cross-Loading Measurement Results

| Variables                  | Item Code | Cross Loading | Description |
|----------------------------|-----------|---------------|-------------|
| Empowering leadership      | KM1       | 0.880         | Valid       |
|                            | KM2       | 0.967         | Valid       |
|                            | KM3       | 0.935         | Valid       |
|                            | KM4       | 0.959         | Valid       |
| Digital Learning Behaviour | PPD1      | 0.941         | Valid       |
|                            | PPD2      | 0.967         | Valid       |
|                            | PPD3      | 0.918         | Valid       |
| Self-Efficacy              | SE1       | 0.938         | Valid       |
|                            | SE2       | 0.707         | Valid       |

Source: primary data processed by researchers, 2024

As demonstrated in the above table, the cross-loading value for each item is greater than 0.70. Furthermore, the maximum value is observed for each item when associated with its latent variable, as opposed to when associated with other latent variables. This finding indicates that each manifest variable in this study has accurately predicted its latent variable, thereby substantiating the discriminant validity of all items.

In addition to serving as a validity test, the measurement model also performs a reliability test. The objective of the reliability test is to ascertain the precision and consistency of the instrument in measuring a construct. Within the context of Smart PLS software, the assessment of construct reliability can be facilitated through two distinct methodologies: Cronbach's Alpha and Composite Reliability. The following table presents the results of the reliability test.

**Table 5.** Reliability Test

| Variables                  | Cronbach's Alpha | Composite Reliability | Average Variance Extracted (AVE) |
|----------------------------|------------------|-----------------------|----------------------------------|
| Digital Learning Behaviour | 0.936            | 0.959                 | 0.888                            |
| Empowering Leadership      | 0.952            | 0.966                 | 0.876                            |
| Self-Efficacy              | 0.590            | 0.814                 | 0.690                            |

Source: primary data processed by researchers, 2024

As illustrated in the above table, the value of all variables in testing reliability with composite reliability is  $> 0.70$ , and testing validity using AVE is  $> 0.50$ . The utilization of Cronbach's Alpha for the assessment of construct reliability typically yields lower values. Consequently, it is more prudent to employ Composite Reliability. The conclusion drawn from this analysis is that the variables that were examined are both valid and reliable. As a result, it is recommended that these variables be used in future studies to test the structural model.

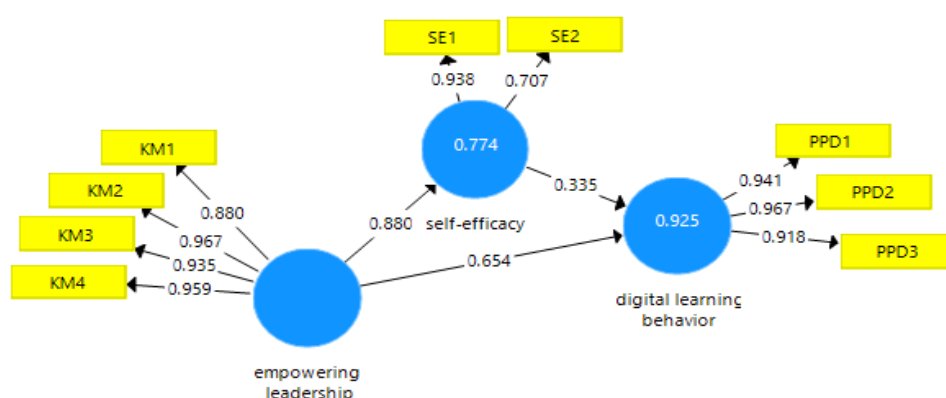
The objective of structural model analysis is to predict the relationship between latent variables. The structural model is evaluated by examining the percentage of variance explained, specifically the R-Square value for endogenous latent constructs and the Average Variance Extracted (AVE) for prediction using a resampling procedure, such as bootstrapping, to ascertain the stability of the estimate. The ensuing presentation will offer a structural model of the research data analysis results.

**Table 6.** Research Model Fit

| Item       | Saturated Model | Estimated Model | Cut Off Value    | Decision     |
|------------|-----------------|-----------------|------------------|--------------|
| SRMR       | 0.093           | 0.093           | $\leq 0.08$      | Fit          |
| Chi-Square | 842.548         | 842.548         | Expectedly small | Marginal Fit |
| NFI        | 0.819           | 0.819           | $\geq 0.95$      | Fit          |

Source: primary data processed by researchers, 2024

Based on the research fit model, as seen from the model fit index by looking at the SRMR, Chi-Square, and NFI values. From the results of these three indices, it was found that 3 indices were declared fit, while 2 indices were declared marginal fit. For this reason, it can be concluded that this research model fulfils the goodness of a model. The following is the stage 2 research analysis model.

**Figure 2.** Model of the Results of Stage 2 Research Analysis

The research step, after seeing the value of the research fit model, the R-square test, and the research hypothesis test are carried out. The R-Square value is the coefficient of determination to see how much influence the exogenous variables have on the endogenous variables. The results of the data analysis of the R-Square value in the study are shown in the following table.

**Table 7.** R-Square value

| Variables                  | R Square | R Square Adjusted |
|----------------------------|----------|-------------------|
| Digital Learning Behaviour | 0.925    | 0.925             |
| Self-Efficacy              | 0.774    | 0.774             |

Source: primary data processed by researchers, 2024

Based on the table above, it can be concluded that the empowering leadership and self-efficacy model contributes 0.925 to the formation of digital learning behaviour, which can be interpreted that the empowering leadership and self-efficacy construct variables contributing 92.5%, while the rest is explained by other variables. Meanwhile, in the next model, empowering leadership contributes 0.774, which can be interpreted as the empowering leadership construct variable contributing 77.4% to the formation of self-efficacy, while the rest is explained by other variables.

The bootstrapping method is employed to ascertain the influence of variables. The bootstrapping approach is a nonparametric method that quantifies the precision of the estimate. In the PLS method, the decision to accept or reject a hypothesis is based on the significance value (p-value) and the T-table value. In the context of the Smart PLS application, the significance value can be ascertained by examining the

parameter coefficient value and the significance value of the t-statistic. The acceptance or rejection of a hypothesis is determined by the following criteria:

- If the t-value is greater than 1.96 and the p-value is less than 0.05 at the 5% significance level, then the null hypothesis ( $H_0$ ) is rejected and the alternate hypothesis ( $H_a$ ) is accepted.
- Conversely, if the t-value is less than 1.96 and the p-value is greater than 0.05 at the 5% significance level, then the  $H_0$  is accepted and the  $H_a$  is rejected. The ensuing section delineates the findings of the path coefficient posited in this study.

**Table 8.** Path Coefficient

| Construct  | Original Sample (O) | Sample Mean (M) | Standard Deviation (STDEV) | T-Statistic (O/STDEV) | P-Value |
|--|---------------------|-----------------|----------------------------|-----------------------|---------|
| Empowering Leadership→ Digital Learning Behaviour                | 0.654               | 0.656           | 0.047                      | 14.046                | 0.000   |
| Empowering Leadership→ Self_Efficacy                             | 0.880               | 0.880           | 0.012                      | 73.321                | 0.000   |
| Self-Efficacy→ Digital Learning Behaviour                        | 0.335               | 0.332           | 0.047                      | 7.191                 | 0.000   |
| Empowering Leadership→ Self-Efficacy→ Digital Learning Behaviour | 0.295               | 0.292           | 0.040                      | 7.443                 | 0.000   |

Source: primary data processed by researchers, 2024

Based on the hypothesis test results above, it can be said that the entire hypothesis was influenced as evidenced by the p-value <0.05. It can be summarized in one table about the results of the research hypothesis test as follows.

**Table 9.** Results of The Hypothesis Test

| No. | Hypothesis   | Magnitude of Influence | P-Value | Conclusion         |
|-----|--|------------------------|---------|--------------------|
| 1   | The Effect of Empowering Leadership on Digital Learning Behaviour                            | 0.654                  | 0.000   | Significant Effect |
| 2   | The Effect of Empowering Leadership on Self-Efficacy   | 0.880                  | 0.000   | Significant Effect |
| 3   | The Effect of Self-Efficacy on Digital Learning Behaviour                                    | 0.335                  | 0.000   | Significant Effect |
| 4   | Mediating Self-Efficacy on the Effect of Empowering Leadership on Digital Learning Behaviour | 0.295                  | 0.000   | Significant Effect |

Source: primary data processed by researchers, 2024

There are four hypotheses tested in this study, the first hypothesis tests the effect of empowering leadership on digital learning behaviour, the second hypothesis tests the effect of empowering leadership on self-efficacy, the third hypothesis tests the effect of self-efficacy on digital learning behaviour, and the fourth hypothesis testing the mediation of self-efficacy on the effect of empowering leadership on digital learning behaviour. The overall test results obtained a t-value > 1.96 and a p-value <0.05, meaning that all hypotheses have an influence on the variables measured.

### 3.2 Discussion

#### The Effect of Empowering Leadership on Digital Learning Behaviour

The findings of the study, which examined the impact of a transformative leadership style on digital learning behavior, yielded a p-value of 0.000, indicating a statistically significant relationship ( $p < 0.05$ ).



Concurrently, the effect size was determined to be 0.654, indicating that the impact of empowering leadership on digital learning behavior was 65.4%. The findings suggest a substantial impact of empowering leadership on teachers' digital learning behavior, as influenced by its constituent dimensions. These dimensions include the enhancement of work's significance, the promotion of participation in decision-making, the fostering of belief in high performance, and the provision of autonomy and bureaucratic rules. Empowering leadership is a leadership style that involves the delegation of authority, responsibility, and support to subordinates, thereby enabling them to make their own decisions and act independently. Within the educational milieu, principals who employ this leadership style furnish the requisite support to teachers, enabling them to cultivate competencies and proficiencies, including the utilization of digital technology for educational purposes. As indicated by Taheri, Zandi, and Mousavi (2024), principals have the capacity to empower teachers by offering opportunities for professional development and facilitating the implementation of training programs aimed at enhancing digital literacy skills.

Several studies have shown that empowering leadership has a positive impact on employee performance and job satisfaction, and encourages innovation and creativity (Zhang & Bartol, 2010). In the school environment, principals who empower teachers can encourage them to be more active in adopting and implementing digital technology in the learning process (Cheong, Yammario, Dionne, Spain, & Tsai, 2019). The results of this study indicate that empowering leadership has a significant influence on digital learning behaviour. That is, empowering principals tends to increase digital learning behaviour among teachers. This is in line with previous findings which state that empowering leadership can increase intrinsic motivation and self-efficacy (Bandura, 1977; Thomas & Velthouse, 1990). Teachers who feel supported and empowered by their principals will be more confident in using digital technology in the learning process. Teachers will be more likely to explore different digital tools and platforms and integrate them into their learning (Kilag et al., 2023). In addition, with support from principals, teachers will also feel more comfortable in trying new and innovative approaches to digital learning (Fullan, 1990). (Fullan, 1990).

The findings have important implications both practically and theoretically. Practically, the results of this study can be used by principals and education managers to improve digital learning behaviours among teachers. Principals can adopt an empowering leadership style by providing more autonomy, support, and resources to teachers to encourage them to implement digital technology in learning. Theoretically, the results of this study add to the understanding of the mechanism of how empowering leadership can influence digital learning behaviour. This finding is consistent with Bandura's social learning theory (1986) which emphasizes the importance of a supportive environment and positive role models in influencing individual behaviour. In this context, empowering principals serve as role models that facilitate teachers' adoption and use of digital technologies. Overall, this study shows that empowering leadership has a significant influence on digital learning behaviour among teachers. Empowering principals can increase teachers' motivation, confidence, and ability to use digital technology for learning. Thus, the adoption of this leadership style can be an effective strategy to improve the quality of digital learning in educational institutions.

### **The Effect of Empowering Leadership on Self-Efficacy**

Based on the test results of the influence of empowering leadership on self-efficacy using SEM-PLS, the p-value is 0.000 and the effect value is 0.880, which means it has a significant effect. Empowering leadership of school principals plays an important role in building teacher confidence in facing digital learning challenges. Principals who give authority, support, and trust to teachers can increase teachers' belief in their abilities, known as self-efficacy (Aslamiah, Lahmuddin, & Effendy, 2020). This increase in self-efficacy is crucial in creating an educational environment that is inclusive and adaptive to technological developments. High teacher self-efficacy has direct implications for improving the quality and effectiveness of digital learning. Teachers with high self-efficacy tend to be more courageous in

exploring and implementing technology in the learning process (Khadijah, Mini, & Salim, 2024).. Teachers are also better able to overcome obstacles and challenges that may arise during the digital learning process. In the context of social inclusion in education, high self-efficacy allows teachers to be more responsive and adaptive to the needs of diverse students, including students with special needs or different backgrounds.

In addition, principals' empowering leadership not only impacts individual teachers' self-efficacy but also the school's organizational culture as a whole. Principals who empower teachers encourage a collaborative and supportive work environment (Qistiyah & Karwanto, 2020). This creates a positive working atmosphere, where teachers support each other and work together to develop innovative and inclusive learning methods. Thus, principals' empowering leadership contributes to the establishment of an inclusive and progressive school culture.

However, it is important to note that improving teachers' self-efficacy through empowering leadership does not happen instantly. This process requires time and consistent effort from the principal and the entire school community. Principals need to continuously provide support, training, and constructive feedback to teachers. In addition, there needs to be an effective evaluation and assessment mechanism to measure the development of teachers' self-efficacy and its impact on digital learning (Wandini & Lubis, 2021). In the long run, the success of empowering leadership in improving teacher self-efficacy will be seen in the improvement of education quality and inclusiveness in schools. Teachers who are confident and competent in digital learning will be able to create more meaningful and relevant learning experiences for students (Rofiah, Setyawati, Peni, & ..., 2024). Thus, the goal of social inclusion in education can be achieved, where every student has the same opportunity to learn and develop according to their potential.

### **The Effect of Self-Efficacy on Digital Learning Behaviour**

Based on the test results of the effect of self-efficacy on digital learning behaviour. There is a p-value of 0.000, where this value is  $<0.05$ , and the amount of influence is 0.335, so it can be concluded that self-efficacy significantly affects students' digital learning behaviour. Although the value of the influence is considered quite small, the dimensions that influence are interest in facing and enthusiasm in facing tasks, strength or confidence in one's abilities. Teachers' self-efficacy measures can increase engagement and motivation in digital learning. Where teachers who have higher self-efficacy will tend to have a higher sense of confidence in resolving any obstacles that arise and may be experienced in the digital learning process, allowing them to more actively participate, and use every opportunity and technology available to the maximum to support the learning process carried out.

This is also supported by previous research conducted by Susanti (2023). In this study, it is stated that self-directed learning, students' digital literacy, and the thought process that can foster creative ideas have a positive influence on learning achievement, where self-efficacy is a moderating variable and has a strengthening influence mentioned by Susanti (2023). In addition, self-efficacy is also able to increase competence in managing one's own learning time, so that it can determine what strategies are most appropriate to apply. In this case, it is by other research which states that self-efficacy has a significant impact on increasing student learning which is carried out independently and also on an ongoing basis. This is very crucial in the digital learning process.

### **Mediating Self-Efficacy on the Effect of Empowering Leadership on Digital Learning Behaviour**

Based on the results of the study, the mediation of self-efficacy on the effect of empowering leadership on digital learning behaviour shows a p-value of 0.000 with an effect size of 0.295, which means it has a significant effect. This shows that empowering leadership applied by principals has a direct and indirect impact on teachers' digital learning behaviour through increased self-efficacy. Empowering leadership plays an important role in improving teacher self-efficacy. According to Bandura (1977), self-efficacy is an individual's belief in his or her ability to organize and carry out the actions necessary to

achieve a certain performance. Research by Zhu et al. (2012) showed that empowering leadership increases teachers' self-efficacy by providing autonomy, support, and necessary resources. Empowering leaders encourages teachers to take initiative and feel confident in facing the challenges of digital learning.

Self-efficacy serves as a strong mediator in the relationship between empowering leadership and digital learning behaviour. Teachers who have high self-efficacy tend to be more proactive in adopting digital technology in the learning process. Research by Schunk and Pajares (2002) shows that high self-efficacy motivates individuals to set higher goals and be more committed to achieving them. Another study by Chen et al. (2011) showed that self-efficacy mediates the positive effect of empowering leadership on innovation in digital learning practices. Effective empowering leadership not only increases teachers' self-efficacy but also encourages teachers to use digital technology creatively and innovatively in their teaching. Research by Albrecht and Andreetta (2011) found that empowering leadership is positively related to self-efficacy and job performance. This suggests that when teachers feel supported and empowered by leaders, they are more likely to develop confidence in their ability to implement digital learning. In addition, a study by Tims et al. (2011) shows that self-efficacy can strengthen the influence of empowering leadership on innovative behaviour, including the use of digital technology in learning. Teachers with high self-efficacy are more likely to explore and adopt new digital tools that can improve teaching effectiveness.

The results of this study have significant practical implications for school management and teacher professional development. Principals should adopt an empowering leadership style to increase teachers' self-efficacy, which in turn will encourage them to be more effective in using digital technology in learning. Empowering leadership significantly affects teachers' digital learning behaviour through the mediation of self-efficacy. Empowering principals can increase teachers' confidence in their ability to use digital technology effectively, and has a positive impact on digital learning behaviours. Therefore, principals need to adopt empowering leadership strategies and support the development of teachers' self-efficacy.

### Managerial Implications

Based on the results of the study, there are several significant managerial implications that can be taken for the development and improvement of the quality of education in educational institutions. The results of this study show that 77.4% of self-efficacy is determined by the principal's empowering leadership. Meanwhile, 92.5% of successful digital learning behaviour is determined by principals' empowering leadership and teachers' self-efficacy. These implications cover various aspects of strategic management, leadership, and efficient resource management. Empowering leadership plays an important role in the development of strategy-focused schools. Educational leaders must have a clear vision of the future of the institution and be able to develop a holistic long-term plan. According to Davies (2009; 2004) empowering leadership encompasses strategic processes, approaches, and leadership that focus on medium to long-term goals and align with the school's vision (Carvalho, Cabral, Verdasca, & Alves, 2021). Leaders must be able to anticipate contextual changes and lead the process of analysing and responding to the changing environment (Tokuhama-Espinosa, 2019). In this context, empowering leadership also includes the development, implementation, monitoring, and evaluation of strategic actions considering the available resources, whether physical, financial, or human (Mincu, 2022).

Effective resource management is a critical aspect of achieving excellence in teaching and learning. Strategic use of resources and harmonization of all activities in the school are essential to achieving the goal of educational excellence. School leaders must be able to allocate resources appropriately and ensure that all activities support the main objectives of the school (Çetin & Karsantık, 2022). In the digital and industrial era 4.0, the need for continuous learning and advanced technology necessitates a new approach to educational leadership. This includes adapting to global changes and using technology to support learning and administration (Çetin & Karsantık, 2022). The distributed leadership model has shown potential in enhancing organizational change and improvement. In this model, power and authority are not only centralized in the formal leader but also distributed among other organizational members. This

requires leaders to establish a high level of mutual trust and the ability to negotiate between formal and informal leadership practices (Harris, 2012). By adopting a distributed leadership model, schools can be more responsive to changes and challenges and encourage greater participation of all staff in the decision-making process (Harris, 2012).

Increased school autonomy also impacts the balance between teacher autonomy and school management. High autonomy systems tend to reduce teacher autonomy, but it is important to maintain the balance so as not to sacrifice coherence and alignment at the school level (Mincu, 2022). On the other hand, less autonomous systems often experience greater resistance to change. Therefore, it is important to establish an appropriate level of autonomy that can support teacher agency without compromising collaborative organizational structures (Mincu, 2022). The role of educational leaders is no longer limited to administration but also includes inspiration and transformation. The modern school leader must be able to handle a wide range of responsibilities, from better teaching initiatives to social-emotional well-being programs and sustainable school infrastructure (Tokuhamma-Espinosa, 2019). The leadership competencies needed to handle these wide-ranging responsibilities are constantly evolving, and leaders must be able to adapt quickly to changing needs and prioritize the most important tasks (Tokuhamma-Espinosa, 2019). Empowering leadership also involves interacting with various stakeholders outside the school, including policymakers, universities, communities, and social institutions. This collaboration is important for creating added value through mutual support and building strong networks to support educational goals (Çetin & Karsantık, 2022). In this regard, school leaders must be able to manage external relationships effectively and ensure that the collaboration is aligned with the school's vision and mission.

Recommendations from the findings and analysis in this study, principals should focus on the dominant factors that influence the formation of digital learning behaviour. Principals also need to facilitate inclusive and intensive training programmes to improve the use of technology in learning, either through workshops, seminars or learning communities. In addition, teachers' confidence-building needs to be a regular programme, especially in using digital learning technology. Technical guidance and hands-on practice in using digital platforms, such as learning management systems, can be a concrete example.

#### 4. CONCLUSION

To sum up of this study provides a deeper understanding of the role of empowering leadership in supporting digital learning behaviours while confirming the importance of self-efficacy as a mediator. The findings suggest that empowering leadership can encourage individuals to be more confident in managing the learning process in the digital environment to increase learning engagement and effectiveness. This research contributes to the development of leadership theory and digital learning by highlighting the importance of psychological aspects, namely self-efficacy, in mediating the influence of leadership on learning behaviour. The practical implications of this research are significant for educational institutions and organizations implementing digital learning. Leaders who apply an empowering leadership style can play a strategic role in creating a learning culture that supports technological innovation and adaptation. By strengthening individual self-efficacy, organizations can increase motivation and commitment to using digital technology effectively in the learning process. This development strategy can help accelerate digital transformation in education and improve the quality of learning.

This study has limitations in the context of primary education with a regional research scope in Surabaya City. Suggestions for future research can explore other factors such as teacher motivation, self-regulated learning or organisational culture on the influence of empowering leadership on digital learning behaviour.

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