

The Effect of Digital Self-Efficacy and Artificial Intelligence on Teachers' Adaptive Work Behavior, with Work Engagement as a Mediating Variable, in Public High Schools throughout Subang District, West Java

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Keywords	Abstract
Digital Self-Efficacy; Artificial Intelligence; Work Engagement	This research examines the influence of Digital Self-Efficacy and Artificial Intelligence on teachers' Adaptive Work Behavior, with Work Engagement as a mediating variable, among public senior high school teachers in Subang District, West Java. The research aims to analyze the direct and indirect effects of these variables and to test the mediating role of Work Engagement. A quantitative approach was applied using a survey method among public senior high school teachers in Subang District, West Java. Data were analyzed using Structural Equation Modeling to test the relationships among variables. The results indicate that Digital Self-Efficacy significantly enhances teachers' readiness to adopt digital technologies and strengthens adaptive work behavior. Artificial Intelligence also contributes to improving teaching effectiveness and adaptability in digital learning environments. Furthermore, Work Engagement plays a mediating role in strengthening the relationship between both Digital Self-Efficacy and Artificial Intelligence toward Adaptive Work Behavior. The findings highlight that psychological factors and technological integration jointly shape teachers' adaptive capacity in responding to educational transformation. This study provides theoretical and practical implications for improving digital readiness and teacher performance in the era of digital education transformation.

INTRODUCTION

The digital transformation that has occurred globally in the last two decades has brought very fundamental changes to various sectors of human life, including the education sector as the main pillar of human resource development (Akour & Alenezi, 2022; Alenezi, 2023; Benavides et al., 2020; Bratton et al., 2021; Hang, 2021; Li, 2024; Mamanazarov et al., 2025; Sima et al., 2020). These changes are not only technological, but also touch on the structural, cultural, and work behavior aspects of individuals within educational organizations. The presence of Artificial Intelligence has shifted conventional work patterns to data-based, system-based, and automation-based (Chiu et al., 2020; Patrício et al., 2025).

In this context, teachers are required to not only master the teaching material, but also be able to adapt to very rapid technological changes (Darling-Hammond & Bransford, 2007; Huang et al., 2013; Kinshuk et al., 2016; König et al., 2020; Mardiana, 2020; Mohamed & Nadia, 2024; Pahl, 2003). This condition requires high adaptive ability so that the learning

process remains relevant to the needs of the times. Digital transformation demands a redefinition of the role of teachers in the modern education system. Along with the development of the Industrial Revolution 4.0 and Society 5.0, the integration between human intelligence and artificial intelligence has become increasingly dominant in education.

Artificial Intelligence no longer only serves as a tool, but has become an integral part of the learning, evaluation, and management process of education. This change requires teachers to have more complex digital competencies than before. Teachers not only play the role of learning facilitators, but also as managers of technology-based learning systems. This condition has led to an increase in adaptive and dynamic work demands.

The success of technology implementation in education is not only determined by the availability of facilities and infrastructure, but also influenced by individual factors. One of the factors that is considered important is Digital Self-Efficacy. This concept refers to an individual's belief in his or her ability to use digital technology to complete tasks and achieve certain goals. In the context of education, teachers who have a high level of Digital Self-Efficacy will be more confident in using technology, more open to innovation, and better prepared to face changes in the digital-based work environment. In addition to Digital Self-Efficacy, the development of Artificial Intelligence is also an increasingly relevant factor in the world of education.

AI technology has begun to be used to assist teachers in compiling teaching materials, designing assessments, developing learning media, and improving the efficiency of administrative work. The presence of AI has the potential to increase the productivity and effectiveness of teachers' work. However, on the other hand, the utilization of AI also demands the readiness of individuals to learn new technologies and adapt to the changes that occur.

Teachers who are able to make optimal use of AI will have a greater chance of improving the quality of learning and adapting to the demands of modern education. The ability of individuals to adapt to changes in the work environment is known as Adaptive Work Behavior. Adaptive Work Behavior is a behavior that shows a person's ability to adapt to changes in tasks, technology, work procedures, and organizational demands.

In the world of education that continues to undergo digital transformation, adaptive work behavior is one of the important competencies that teachers must have. Teachers who have good adaptability will be more receptive to change, learn new technologies faster, and be better able to develop learning methods that suit the needs of students in the digital era.

The importance of teachers' adaptability in facing digital transformation is also reflected in various national data. Based on data from the Central Statistics Agency, the Ministry of Communication and Informatics, and West Java Open Data, the use of technology in learning and the level of digital literacy still face various challenges. Although access to technology continues to increase, the ability to use technology effectively still shows considerable variation in various regions.

This condition shows that the digital transformation of education has not been fully followed by the readiness of human resources, especially teachers, in utilizing technology optimally. West Java Province was chosen as the research context because it is one of the provinces with the largest number of teachers and educational units in Indonesia.

However, the high number of educators is not always followed by an even level of digital readiness. Differences in geographical conditions, technological infrastructure, and access to

training cause teachers' adaptability to technological developments to be diverse. This condition is also found in Subang Regency, especially at State High Schools in Subang District. To obtain an initial picture of this condition, the researcher conducted initial observations of State High School teachers in Subang District.

The results of initial observations show that high school teachers in Subang District have begun to utilize technology in the learning process. The most commonly used technologies are PowerPoint and WhatsApp as learning support media. However, the use of technology still tends to be basic and has not fully led to innovative and adaptive digital-based learning.

In addition, there are still variations in the use of learning methods, where some teachers still use conventional approaches such as lecture methods, although there have been efforts to combine them with technology-based methods. This shows that the digital learning transformation process has been underway, but it is still in the early stages of development.

In terms of adapting to changes in curriculum and educational technology, teachers show varying levels of readiness. Some teachers have been able to adapt to the changes, but others still need time and support to optimize the use of technology in learning. In general, the results of this observation show that teachers are in the transition stage to digital-based learning, but there is still room for development in terms of learning innovation, technology utilization, and increased flexibility of teaching methods.

To strengthen these findings, researchers conducted a preliminary survey of 25 State High School teachers in Subang District through Google Form. The survey results show that the condition of respondents is in a varied category to be quite developed, with some aspects still in need of strengthening. As many as 72% of respondents stated that it was not optimal in understanding or utilizing Artificial Intelligence in learning. In addition, 64% of respondents still experience challenges in adapting learning methods to technological developments, and 60% of respondents stated that they are not fully confident in using digital technology in the learning process. In the work engagement variable, 52% of respondents showed a level of involvement in the medium category, which indicates that teachers' work involvement is still stable but not optimal.

Meanwhile, the motivation and organizational support aspects are in the relatively balanced category, which shows that the work environment is still quite supportive of the digital adaptation process. Overall, the survey results show that teachers have quite good potential in the use of technology, but there is still room for improvement in the aspects of Digital Self-Efficacy, the use of Artificial Intelligence, and strengthening work involvement in facing the digital transformation of education.

Previous research has established that ICT self-efficacy significantly influences technology integration in learning (Hatlevik & Hatlevik, 2018), adaptive performance is crucial in dynamic work environments (Gorostiaga et al., 2022), adaptive performance increased during crises (Tan & Antonio, 2022), and work engagement contributes to adaptive performance (Kaltiainen & Hakanen, 2022). However, these studies were conducted in general organizational or private sector contexts, did not specifically examine the education sector, and failed to integrate Digital Self-Efficacy and Artificial Intelligence as simultaneous predictors of Adaptive Work Behavior through Work Engagement among teachers. This research addresses these gaps by examining these relationships specifically among public high school teachers in Subang District, West Java, in the context of digital education transformation.

The novelty of this research lies in the integration of Digital Self-Efficacy and Artificial Intelligence as factors that affect Adaptive Work Behavior through Work Engagement as a mediating variable. In addition, this research was conducted on State High School teachers in Subang District which until now is still relatively rare to be the object of research related to the use of Artificial Intelligence in the world of education, especially in the Subang area, Jawa Barat.

Despite extensive research on adaptive work behavior, digital self-efficacy, and work engagement, gaps remain as most studies were conducted in private sector contexts, rarely integrating Digital Self-Efficacy and Artificial Intelligence as simultaneous predictors of Adaptive Work Behavior, particularly among Indonesian teachers, and underexploring Work Engagement's mediating role, with no prior research specifically examining public high school teachers in Subang District. This research addresses these gaps by examining the influence of Digital Self-Efficacy and Artificial Intelligence on teachers' Adaptive Work Behavior through Work Engagement as a mediator, aiming to analyze direct and indirect effects among these variables. The research offers theoretical contributions by extending Social Cognitive Theory and the Technology Acceptance Model to digital education contexts and providing empirical evidence on Work Engagement's mediating role, while practically offering insights for teachers, school administrators, and policymakers to enhance digital readiness, AI utilization, and work engagement, ultimately improving teacher adaptability and teaching quality in the era of digital transformation.

METHOD

Research Methods

This research used a quantitative approach with the type of explanatory research, which is research that aims to explain the causal relationship between variables through testing hypotheses that have been formulated. The quantitative approach was chosen because this study focuses on measuring and analyzing the relationship between Digital Self-Efficacy, Artificial Intelligence, Work Engagement, and Adaptive Work Behavior of Teachers objectively based on numerical data obtained through the distribution of questionnaires to respondents.

The data analysis method used in this study is Partial Least Squares Structural Equation Modeling (PLS-SEM) with the help of SmartPLS software. The selection of the PLS-SEM method is based on several considerations. First, the research model developed involves several latent constructs with direct and indirect relationships through mediation variables, thus requiring analytical techniques that are able to test the model comprehensively.

PLS-SEM has a good ability to analyze social and behavioral research data using reflective and formative indicators. Third, this method allows testing of measurement models (outer models) and structural models (inner models) simultaneously, so as to provide a more comprehensive picture of the relationships between variables in the study.

Data Collection Techniques

The data collection technique in this study was carried out through questionnaires (questionnaires) as the main research instrument, and supported by literature studies as a complement in strengthening the theoretical foundation.

Data Analysis Techniques

Analytical Approaches and Tools

The data analysis technique in this study uses the Structural Equation Modeling approach based on Partial Least Squares (PLS-SEM) with the help of SmartPLS software. The PLS-SEM approach was chosen because this study involves several latent variables that have complex relationships, both directly and indirectly (mediation), and aims to test the predictive relationships between variables.

According to Joseph F. Hair Jr. et al. (2021), PLS-SEM is an analysis method that is suitable for use in predictive and exploratory research, is able to accommodate models with many indicators, and does not require strict normal data distribution. In addition, PLS-SEM allows researchers to evaluate measurement models (outer models) and structural models (inner models) simultaneously, thus providing comprehensive analysis results.

In the context of this study, PLS-SEM was used to analyze the relationship between digital self-efficacy, artificial intelligence, work engagement, and adaptive work behavior, as well as to examine the mediating role of work engagement in the research model.

RESULT AND DISCUSSION

The Influence of Digital Self-Efficacy on Work Engagement

The test results showed that Digital Self-Efficacy had a positive and significant effect on Work Engagement with a path coefficient value (Original Sample) of 0.358, a T-statistics value of 4.412, and a P-value of 0.000. T-values greater than 1.96 and P-values smaller than 0.05 indicate that the hypothesis is accepted.

Thus, H1 that states that Digital Self-Efficacy has a positive and significant effect on Work Engagement is acceptable. The results of this study show that the higher the teacher's confidence in his ability to use digital technology, the higher the level of teacher involvement in carrying out his work.

Teachers who have confidence in digital skills tend to be more confident in utilizing various learning applications, school administration systems, communication platforms, and other learning support technologies. This condition makes teachers more active, enthusiastic, and fully involved in carrying out their professional duties.

This finding is relevant to the conditions at State Senior High School Subang Regency which is currently increasingly integrating digital technology in the learning process and school administration. Teachers who have the ability and confidence to use technology tend to be more likely to participate in various school activities, develop digital learning media, and adjust to the demands of technology-based education transformation.

On the other hand, teachers who have low digital confidence tend to have difficulty in utilizing technology so that their level of involvement in work becomes less than optimal. Theoretically, the results of this study support the Social Cognitive Theory theory put forward by Albert Bandura (2005) which states that an individual's belief in his abilities (self-efficacy) will affect behavior, motivation, and the level of involvement in certain activities.

Individuals who have a high level of self-efficacy will show greater effort, higher perseverance, and stronger involvement in completing their work. The results of this study are also in line with previous research that found that digital self-efficacy has a positive effect on work engagement.

The research shows that individuals who have high confidence in their digital abilities tend to be more active, enthusiastic, and engaged in work because they are able to utilize technology to increase work effectiveness and productivity. Based on these results, it can be concluded that increasing Digital Self-Efficacy is an important factor in increasing teacher work involvement at State Senior High School Subang Regency.

The Influence of Artificial Intelligence on Work Engagement

The test results showed that Artificial Intelligence had a positive and significant effect on Work Engagement with a path coefficient value of 0.466, a T-statistics value of 5.423, and a P-value of 0.000. Thus, H2 is accepted. The coefficient value of 0.466 shows that Artificial Intelligence is a variable that has a strong influence on teacher work involvement.

These results indicate that the more optimal the use of Artificial Intelligence technology in work activities, the higher the level of teacher involvement in their work. In the context of State Senior High School Subang Regency, the use of Artificial Intelligence can help teachers in compiling teaching materials, making evaluation questions, designing learning media, finding learning references, and supporting the academic administration process.

This convenience allows teachers to focus more on value-added learning activities so as to increase their enthusiasm and involvement in work. These findings support the Technology Acceptance Model (TAM) which explains that technologies that are considered beneficial will increase the acceptance and use of technology by individuals.

When Artificial Intelligence provides real convenience and benefits in work, then individuals will show higher work involvement. The results of this study are also consistent with various recent studies that show that the implementation of Artificial Intelligence is able to increase work efficiency, productivity, and work engagement because it helps individuals complete work faster and more effectively.

Based on these results, it can be concluded that the use of Artificial Intelligence is one of the important factors in increasing teacher work involvement at State Senior High School Subang Regency.

The Effect of Digital Self-Efficacy on Adaptive Work Behavior

The test results showed that Digital Self-Efficacy had a positive and significant effect on Adaptive Work Behavior with a path coefficient value of 0.272, a T-statistics value of 3.334, and a P-value of 0.001. Thus, H3 is accepted. These results show that teachers who have high confidence in their digital abilities tend to have better adaptability to changes in the work environment.

This ability can be seen from teachers' readiness to learn new technologies, face changes in learning methods, and adjust to the development of educational digitalization. In the State Senior High School environment of Subang Regency, curriculum changes, the use of digital learning platforms, and the demands of technology integration in the teaching and learning process require teachers to have high adaptability.

Teachers who believe in their digital abilities tend to be more quick to accept change and better prepared for new challenges than teachers who have a low level of digital confidence. The results of this study support the theory of self-efficacy which states that an individual's

belief in his or her abilities will affect an individual's readiness to face challenges and changes in the environment.

In addition, the results of this study are in line with previous research that found that digital self-efficacy contributes positively to adaptive work behavior because individuals who are confident in their digital competencies are more easily adapted to technological changes and job demands.

The Effect of Artificial Intelligence on Adaptive Work Behavior

The test results showed that Artificial Intelligence had a positive and significant effect on Adaptive Work Behavior with a path coefficient value of 0.208, a T-statistics value of 2.526, and a P-value of 0.012. Thus, H4 was accepted. These results indicate that the use of Artificial Intelligence can help teachers improve their ability to adapt to changes in the work environment. The presence of AI technology provides faster access to information, solutions, and learning resources so that teachers can adapt to the demands of the job more effectively.

At State Senior High School Subang Regency, the use of Artificial Intelligence can support teachers in dealing with changes in learning methods, the development of teaching materials, and the ever-growing demands of educational digitalization. With the support of this technology, teachers become more flexible in dealing with changes and are able to adjust work strategies according to needs.

The results of this study are in line with previous research that stated that the use of Artificial Intelligence can increase agility and adaptive behavior because the technology helps individuals respond to changes more quickly and effectively.

The Effect of Work Engagement on Adaptive Work Behavior

The test results showed that Work Engagement had a positive and significant effect on Adaptive Work Behavior with a path coefficient value of 0.441, a T-statistics value of 6.737, and a P-value of 0.000. Thus, H5 was accepted.

The coefficient value of 0.441 shows that Work Involvement is the variable that has the greatest influence on Adaptive Work Behavior compared to other variables in this study. These findings show that teachers who have a high passion, dedication, and attachment to their work tend to have better adaptability to changes and challenges of work.

In the context of State Senior High School Subang Regency, teachers who have high work involvement will be more proactive in dealing with changes in the curriculum, developments in educational technology, and various demands of school organizations. They tend to see change as an opportunity to grow rather than as a barrier. The results of this study support the Work Engagement theory put forward by Wilmar Schaufeli which explains that individuals with high levels of engagement will show energy, dedication, and absorption that encourage adaptability in a dynamic work environment.

These findings are also consistent with previous studies that show that work engagement is an important predictor of adaptive work behavior. Individuals who are emotionally and cognitively engaged in their work tend to be more prepared for change, more flexible, and more quickly adapt to the demands of the organization.

INDIRECT EFFECT

Table 1. Indirect effect

Hypothesis	Original Sample (O)	T statistics (O/STDEV)	P values	Verdict
Digital Self-Efficacy -> Work Engagement -> Adaptive Work Behavior	0.158	4.054	0.000	Significant
Artificial Intelligence -> Work Engagement -> Adaptive Work Behavior	0.206	3.748	0.000	Significant

Source: SmartPLS output from primary data analysis (2026)

The Effect of Digital Self-Efficacy on Adaptive Work Behavior through Work Engagement

The results of the indirect influence test showed that Digital Self-Efficacy had a positive and significant effect on Adaptive Work Behavior through Work Engagement with a path coefficient value (Original Sample) of 0.158, a T-statistics value of 4.054, and a P-value of 0.000. T-values greater than 1.96 and P-values smaller than 0.05 indicate that the effect of mediation is significant. Thus, H6 was accepted.

The results of this study show that Work Engagement acts as a mechanism that bridges the relationship between Digital Self-Efficacy and Adaptive Work Behavior. In other words, increasing teachers' confidence in their digital skills not only directly increases work adaptability, but also increases teachers' involvement in their work, which further encourages increased adaptability to changes in the work environment.

These findings indicate that teachers who have a high level of digital self-efficacy tend to be more confident in using various digital technologies to support the learning process and school administration. This confidence encourages the emergence of work spirit, dedication, and higher involvement in carrying out their professional duties. When teachers have a high level of work engagement, they will be more proactive in dealing with change, more open to innovation, and better prepared to adapt to the ever-evolving demands of work.

In the context of State Senior High School Subang Regency, digital transformation in the world of education requires teachers to be able to adapt to various learning platforms, digital-based administrative systems, and increasingly dynamic developments in educational technology. Teachers who have high confidence in their digital abilities tend to be more active in utilizing technology in their work so that their involvement increases. This condition ultimately strengthens teachers' ability to adjust to changes in education policies, technological developments, and the needs of students.

Theoretically, the results of this study support the Social Cognitive Theory put forward by Albert Bandura (2005) which explains that an individual's belief in his abilities will affect motivation, behavior, and performance displayed. Individuals with a high level of self-efficacy will show greater effort and higher engagement in their work. This involvement then becomes a factor that encourages the emergence of adaptive behavior in dealing with changes in the work environment.

The results of this study also strengthen various previous studies that show that work engagement acts as a mediator between self-efficacy and adaptive behavior. The study explains that individuals who have high confidence in their competencies will be more involved in work,

so they are better able to deal with changes, challenges, and uncertainties in the work environment

In addition, the results of this study show that the mediation that occurs is partial mediation because the direct influence of Digital Self-Efficacy on Adaptive Work Behavior remains significant ($\beta = 0.272$; $p < 0.05$), while the indirect influence through Work Involvement is also significant. This condition suggests that Work Engagement plays a role as one of the important mechanisms that reinforces the influence of Digital Self-Efficacy on Adaptive Work Behavior, but is not the only mechanism that explains this relationship.

Based on these results, it can be concluded that increasing Digital Self-Efficacy will be more effective in improving Adaptive Work Behavior if accompanied by an increase in teacher work involvement.

The Influence of Artificial Intelligence on Adaptive Work Behavior through Work Engagement

The test results showed that Artificial Intelligence had a positive and significant effect on Adaptive Work Behavior through Work Engagement with a path coefficient value of 0.206, a T-statistics value of 3.748, and a P-value of 0.000. These values show that the indirect influence that occurs through Work Engagement is proven to be significant. Thus, H7 was accepted.

The results of this study show that Work Engagement can be a variable that bridges the relationship between Artificial Intelligence and Adaptive Work Behavior. This means that the better use of Artificial Intelligence not only has a direct impact on teachers' work adaptability, but also increases teachers' involvement in their work which then encourages increased adaptability to change.

These findings indicate that the use of Artificial Intelligence in the educational environment can help teachers complete various tasks more effectively and efficiently, such as preparing teaching materials, making evaluation instruments, processing information, finding learning references, and developing more innovative learning media. This convenience makes teachers focus more on learning activities that have strategic value so as to increase their enthusiasm, dedication, and involvement in work.

At State Senior High School Subang Regency, the use of Artificial Intelligence technology can be a means of support in dealing with increasingly complex educational changes and challenges. Teachers who are able to make optimal use of Artificial Intelligence tend to have higher work engagement because technology helps reduce administrative burden and increase work effectiveness. The high level of work involvement then encourages teachers to be more flexible, responsive, and adaptive to changes in the work environment.

The results of this study are in line with the Technology Acceptance Model (TAM) which explains that technology that is considered useful will increase the acceptance and use of technology by individuals. When Artificial Intelligence is able to provide real benefits in work, then individuals will show a higher level of engagement, which further contributes to the improvement of adaptive work behavior.

The results of this study also support various previous studies that show that the use of digital technology and Artificial Intelligence can improve adaptive work behavior through increased work engagement. Individuals who benefit from technology tend to be more motivated, more engaged in work, and better prepared for the changes that occur in the

organization.

Based on the results of direct effect and indirect effect testing, the mediation that occurs also includes **partial mediation**. This is shown by the direct influence of Artificial Intelligence on Adaptive Work Behavior which remains significant ($\beta = 0.208$; $p < 0.05$), as well as the indirect influence through Work Engagement which is also significant ($\beta = 0.206$; $p < 0.05$). The findings show that Work Engagement is one of the important pathways that strengthens the influence of Artificial Intelligence on Adaptive Work Behavior.

Thus, it can be concluded that increasing the use of Artificial Intelligence will be more effective in increasing Adaptive Work Behavior if followed by increasing teacher work involvement.

CONCLUSION

Based on the results of research conducted on State High School teachers in Subang District, West Java, it can be concluded that Digital Self-Efficacy and Artificial Intelligence each have a positive and significant effect on teachers' Adaptive Work Behavior, both directly and indirectly through Work Engagement. Teachers with higher confidence in their digital abilities demonstrate greater adaptability to changes in the work environment, including technological developments, evolving learning methods, and increasingly dynamic professional demands. Similarly, the optimal use of Artificial Intelligence helps teachers carry out learning and administrative activities more effectively and efficiently, thereby increasing their readiness to face challenges and adapt to the ever-changing educational landscape. Furthermore, both Digital Self-Efficacy and Artificial Intelligence positively and significantly influence Work Engagement, as teachers who are confident in using technology and who benefit from AI assistance tend to be more active, enthusiastic, and dedicated in carrying out their professional duties. This study also found that Work Engagement has a positive and significant effect on Adaptive Work Behavior, with teachers who exhibit high work involvement being more prepared for change, more flexible in adjusting to job demands, and more proactive in responding to educational developments. Importantly, Work Engagement serves as a mediating mechanism that strengthens the influence of both Digital Self-Efficacy and Artificial Intelligence on Adaptive Work Behavior. These findings indicate that teachers' confidence in digital abilities and the use of AI not only directly enhance work adaptability but also increase work involvement, which subsequently reinforces adaptive behavior. Overall, this study concludes that improving teachers' Adaptive Work Behavior can be achieved through strengthening Digital Self-Efficacy, optimizing the use of Artificial Intelligence, and increasing Work Engagement, with work involvement playing a crucial role as a mediating mechanism in shaping teachers' adaptability to educational transformation in the digital era.

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