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Analysis of the Effectiveness of E-Learning as a Method for Developing Employee Competence in the Digital Era

Mikael Kato Parantean [1], Puji Harto [2]

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Abstract

The development of digital technology has encouraged organizations to adopt e-learning as a more flexible, efficient, and accessible method for developing employee competencies. This study aims to analyze the effectiveness of e-learning in improving employee competencies in the digital era. The analysis was conducted by examining various aspects, such as ease of learning access, material quality, employee participation levels, and their impact on improving knowledge and work skills. The results showed that management support and policies have a positive and significant effect on learning motivation. In addition, the quality of e-learning materials and learning motivation were shown to have a positive and significant effect on e-learning effectiveness. Implementation barriers were shown to have a negative and significant effect on e-learning effectiveness, while e-learning methods were not shown to have a significant effect on either e-learning effectiveness or learning motivation. This study also showed that learning motivation was able to mediate the relationship between management support and policies on e-learning effectiveness, but was unable to significantly mediate the relationship between other independent variables.

1. Introduction

The development of digital technology has driven changes in various aspects of life, including the development of human resource competencies within organizations. Digital transformation requires organizations to develop more flexible, effective, and efficient learning methods to support continuous competency improvement.

One form of learning transformation currently developing is the implementation of e-learning as a digital learning method. E-learning enables flexible learning processes without the constraints of space and time through the use of information and communication technology. The implementation of e-learning is also increasing as organizations grow in demand for learning that adapts to changing work environments and technological advancements.

The implementation of e-learning is considered to provide various benefits to organizations, including increasing learning flexibility, expanding access to competency development, increasing the efficiency of training delivery, and supporting continuous learning processes.

[1] Universitas Diponegoro Semarang, Indonesia. Email: mikzto27@gmail.com
[2] Universitas Diponegoro Semarang, Indonesia

Furthermore, e-learning also enables organizations to develop competencies more quickly and adapt to the dynamics of changing work environments.

In the financial services sector, advancements in digital technology and regulatory dynamics are driving organizations to continuously improve their competencies to cope with increasingly complex industrial environments. The Financial Services Authority (OJK), as the regulatory body for the financial services sector, has a significant need for competency development to support its regulatory, supervisory, and consumer protection duties in the sector.

To support employee competency development, the OJK has utilized various digital learning platforms, such as Learning Management Systems (LMS), webinars, virtual classes, online workshops, and other digital learning tools. The use of e-learning is considered to enhance learning effectiveness through a more flexible and accessible learning process.

However, e-learning implementation is not always optimal. The effectiveness of digital learning is influenced by various factors, such as learning methods, material quality, organizational support, learning motivation, and implementation barriers faced by learners. This situation indicates that the success of e-learning is not solely determined by the availability of learning technology, but also by human and organizational factors.

Several previous studies have shown conflicting results regarding the factors influencing e-learning effectiveness. Some studies indicate that learning methods and organizational support significantly influence e-learning effectiveness, while others indicate that material quality and learning motivation are dominant factors in enhancing the effectiveness of digital learning. These differing research findings indicate a continuing research gap regarding the factors influencing e-learning effectiveness.

Furthermore, research on the effectiveness of e-learning in financial services sector supervisory institutions like the Financial Services Authority (OJK) remains relatively limited. This is despite the fact that supervisory organizations require dynamic and sustainable competency development in line with regulatory developments and the digital transformation of the financial services sector.

Based on these conditions, this study was conducted to analyze the influence of e-learning methods, implementation barriers, the quality of e-learning materials, and management support and policies on the effectiveness of e-learning, with learning motivation as a mediating variable at the Financial Services Authority (OJK). Several research gaps formed the basis for this study. Research conducted by Ayu (2024) showed that e-learning can increase employee motivation and productivity. However, that study did not examine motivation as a mediating variable that could explain the relationship between e-learning and learning outcomes. Therefore, this study fills this gap by examining the role of learning motivation as a mediating variable.

Rathnasekara's (2023) research found that positive perceptions of online learning can improve participants' self-efficacy. However, that study focused more on academic contexts. Unlike previous research, this study was conducted in a financial services organization, providing a more relevant perspective in the context of employee competency development.

Furthermore, research conducted by Cavus and colleagues (2024) revealed that technological barriers are a factor influencing e-learning implementation. However, this study did not examine the direct influence of technological barriers on learning effectiveness. This study attempts to address this limitation by examining both direct and indirect influences on learning effectiveness.

Research by Setiawan and Wijaya (2023) shows that the quality of learning materials influences participants' learning satisfaction. However, the focus of that research was limited to the aspect of learning satisfaction. This study broadens the focus by placing the effectiveness of competency development as the primary variable examined. Meanwhile, research by Khasanah (2022) found that organizational support plays a role in increasing participation in digital learning. However, that study did not use an integrated analysis model to comprehensively examine the relationships between variables. Therefore, this study uses an integrated SEM-PLS

approach to gain a more comprehensive understanding of the relationships between the research variables.

Sharma's (2022) research also showed that a combination of online and offline learning can increase participant satisfaction. However, this study did not simultaneously examine the relationship between motivation and learning effectiveness. This study fills this gap by examining both direct and mediated relationships within a single, integrated research model. Furthermore, research by Al-Fraihat and colleagues (2020) concluded that e-learning success is influenced by both technological and user factors. However, this research did not specifically focus on organizations within the financial services supervisory sector. Therefore, this study was conducted within the Financial Services Authority (OJK) environment to provide a more specific empirical contribution to that sector.

Finally, research by Suhendra and Yuliani (2023) found that e-learning effectiveness is influenced by user experience and social support. However, this research did not integrate organizational support, management policies, and the quality of learning materials into a single research model. To address this limitation, this study integrates all these variables into a single model, hopefully providing a more comprehensive picture of the factors influencing the effectiveness of e-learning as a method for developing employee competencies in the digital age.

Based on previous research, several research gaps remain regarding the effectiveness of e-learning. First, most previous research has focused on academic environments and general companies, resulting in relatively limited research on financial services regulatory bodies such as the Financial Services Authority (OJK). Second, previous research findings have shown inconsistencies regarding the dominant factors influencing e-learning effectiveness, particularly regarding the influence of learning methods, implementation barriers, and organizational support. Third, most previous research has not examined the role of learning motivation as a mediating variable in the relationship between organizational factors and e-learning effectiveness in an integrated manner. Therefore, this study aims to address these gaps by testing the SEM-PLS model in the context of OJK employee competency development in the era of digital transformation.

2. Methods

This study uses a quantitative approach with an explanatory design to analyze the effectiveness of e-learning as a method for developing employee competencies at the Financial Services Authority (OJK). The study population consisted of 4,449 OJK employees, with a sample of 162 respondents selected using a purposive sampling technique. Respondents were employees who had participated in e-learning programs through the OJK Learning Management System (LMS), had experience participating in competency development training, and had a minimum of one year of service. Primary data were collected through an online questionnaire using a five-point Likert scale, while secondary data were obtained from literature studies, scientific journals, and related organizational documents.

The research variables include e-learning methods, implementation barriers, material quality, management support and policies, learning motivation, and e-learning effectiveness. Data analysis was conducted using Structural Equation Modeling–Partial Least Squares (SEM-PLS) with the help of Smart PLS to test direct and indirect relationships between variables. The analysis stages include construct validity and reliability testing, structural model evaluation,

hypothesis testing through bootstrapping, and testing the mediating effect of learning motivation. The hypothesis is declared significant if the t-statistics value is > 1.96 and p-value < 0.05.

3. Results and Discussion

Hypothesis Testing

Hypothesis testing was conducted using the bootstrapping method in Smart PLS to determine the significance of the relationship between variables in the research model. A hypothesis is accepted if it has a t-statistic value greater than 1.96 and a p-value less than 0.05.

Table 1.
Hypothesis Test Results

Hypothesis	Variable Relationship	Original Sample	T-Statistic	P-Value	Decision
H1	X1→Y	0.071	0.815	0.415	Rejected
H2	X1→Z	0.183	1,508	0.131	Rejected
H3	X2→Y	-0.096	2,445	0.015	Accepted
H4	X2→Z	0.006	0.104	0.918	Rejected
H5	X3→Y	0.500	4,825	0,000	Accepted
H6	X3→Z	0.265	2,383	0.017	Accepted
H7	X4→Y	0.107	1,332	0.183	Rejected
H8	X4→Z	0.358	3,528	0,000	Accepted
H9	Z→Y	0.248	3,773	0,000	Accepted

Source: Processed primary data, 2026

Based on Table 1, it is clear that not all research hypotheses were accepted. The variable of e-learning material quality was shown to have a positive and significant influence on both e-learning effectiveness and learning motivation. Furthermore, management support and policies were also shown to significantly influence learning motivation.

The learning motivation variable was shown to have a positive and significant influence on e-learning effectiveness. Meanwhile, the e-learning method did not significantly influence either e-learning effectiveness or learning motivation.

Implementation barriers have a negative and significant influence on the effectiveness of e-learning, but do not have a significant influence on learning motivation.

Indirect Effect Testing

Indirect effect testing was conducted to determine the indirect influence of independent variables on the effectiveness of e-learning through learning motivation variables as mediating variables.

Table 2.
Indirect Effect Test Results

Mediation Path	Original Sample	T-Statistic	P-Value	Decision
X1→Z→Y	0.045	1,466	0.143	Rejected
X2→Z→Y	0.001	0.104	0.917	Rejected
X3→Z→Y	0.066	1,939	0.053	Rejected
X4→Z→Y	0.089	2,670	0.008	Accepted

Source: Processed primary data, 2026

Based on the results of the indirect effect test in Table 2, learning motivation was shown to mediate several relationships between independent variables and e-learning effectiveness. These results indicate that the effectiveness of digital learning is not only directly influenced by

technical and organizational factors, but also by the psychological state of employees during the learning process.

The research results show that learning motivation mediates the influence of management support and policies on e-learning effectiveness. These results indicate that organizational support not only directly influences the success of e-learning implementation but also increases employees' internal drive to engage in the learning process more optimally.

In the context of the Financial Services Authority (OJK), employee competency development is a crucial part of the organizational culture, actively encouraged by management through various digital learning programs, such as LMS, webinars, virtual classes, and self-learning. Furthermore, e-learning implementation is monitored at the work unit level, encouraging management's attention to employee participation in the learning process. This makes management support and policies crucial in enhancing employee learning motivation.

This research also shows that when employees are motivated to learn, the effectiveness of e-learning increases. Conversely, if learning motivation is disrupted by workload, multitasking, or other work interruptions during training, the effectiveness of digital learning tends to decrease. This situation aligns with the reality of e-learning implementation in the OJK workplace, where some employees still prefer face-to-face training because it is considered more conducive to learning focus than online learning, which often occurs concurrently with other work activities.

Meanwhile, in several other mediating relationships, learning motivation was not able to exert a strong mediating influence. This condition indicates that the effectiveness of e-learning is not solely determined by learning motivation, but is also directly influenced by the quality of the learning materials, the delivery method, and the implementation conditions of the digital learning itself. In practice, employees can directly experience the benefits of relevant and applicable learning materials for their work without first being influenced by increased learning motivation.

The results of this study align with Self-Determination Theory, which explains that organizational environmental support can increase an individual's intrinsic motivation to participate in the learning process. Furthermore, the results of this study also support the ARCS Motivation Model, which states that learning motivation plays a crucial role in increasing participant attention, relevance, confidence, and satisfaction in digital learning.

Thus, learning motivation has an important role as a psychological mechanism that bridges the relationship between organizational support and e-learning effectiveness in the context of employee competency development in the OJK environment.

4. Discussion

The Influence of E-Learning Methods on Learning Motivation

The research results show that e-learning methods have no significant effect on OJK employees' learning motivation. These results suggest that the digital learning method used is not yet a primary factor in determining employees' motivation to participate in e-learning.

In practice, the implementation of e-learning within the OJK provides employees with flexibility to participate in learning activities without the constraints of time and space. Various digital learning methods, such as LMS, webinars, virtual classes, and video conferencing, have also been used to support the ongoing development of employee competencies.

However, research results show that the flexibility of digital learning methods does not necessarily directly increase employee learning motivation. This condition may be influenced by

the characteristics of the work environment, which has a high workload, causing some employees to multitask during training. Furthermore, some employees still prefer in-person or hybrid training, as they are considered more conducive to learning focus than online learning, which occurs concurrently with work activities.

These conditions indicate that employee learning motivation is influenced not only by the learning methods used, but also by organizational conditions, learning focus, workload, and the learning experiences experienced by participants during the learning process. The results of this study indicate that successful e-learning implementation cannot rely solely on digital learning methods but also requires organizational support and learning management that can create a more conducive learning experience for training participants.

Thus, the e-learning method in this study has not been able to provide a significant influence on the learning motivation of OJK employees.

The Influence of Implementation Barriers on Learning Motivation

The research results show that implementation barriers negatively impact OJK employees' learning motivation. These findings indicate that the greater the barriers employees face in implementing e-learning, the lower their learning motivation tends to be.

Implementation barriers in this study were not only related to technical aspects, such as internet connection and the use of digital learning systems, but also related to work conditions and learning patterns within the organization. In practice, some employees still face multitasking and ongoing workloads that continue alongside e-learning, reducing focus on learning. Furthermore, some employees still prefer face-to-face or hybrid training because they are considered more conducive to learning concentration than online learning, which often occurs concurrently with other work activities. These conditions mean that the digital learning process is not yet fully capable of creating an optimal learning experience for all employees.

Multitasking during training also causes employees to divert their attention to the learning material, potentially decreasing their motivation to learn while participating in e-learning. Employees who continue to receive work assignments during the training process tend to struggle to optimally participate in the learning process compared to face-to-face training, which generally provides a better learning environment.

The results of this study align with previous research, which found that implementation barriers, both technical and non-technical, can impact individual participation and motivation in digital learning. The greater the barriers perceived by participants, the lower their learning motivation tends to be.

Thus, implementation obstacles are one of the factors that can reduce employee learning motivation in implementing e-learning in the OJK environment.

The Influence of the Quality of E-Learning Materials on Learning Motivation

The research results show that the quality of e-learning materials has a positive and significant impact on OJK employees' learning motivation. Relevant, systematic, and easy-to-understand learning materials can increase employee interest and engagement in the digital learning process. These results demonstrate that the quality of learning content is a crucial factor in increasing learning motivation in e-learning implementations.

The Influence of Management Support and Policies on Learning Motivation

The research results show that management support and policies have a positive effect on OJK employees' learning motivation. These results demonstrate that the success of digital learning in organizations is influenced not only by the quality of technology and learning

materials, but also by organizational support and management commitment to employee competency development.

The results of this study indicate that the better the support and management policies provided by an organization, the greater the employee's motivation to participate in e-learning. This support can take the form of providing digital learning facilities, competency development policies, leadership encouragement for training participation, and organizational attention to employee learning processes.

In the context of the Financial Services Authority (OJK), employee competency development is a crucial part of organizational culture, actively promoted through various digital learning programs such as LMS, webinars, virtual classes, and self-learning. Furthermore, the implementation of digital learning is monitored at the work unit level, encouraging leadership to focus on employee engagement in the learning process. This contributes to employees' perception that digital learning is a crucial part of their professional development and organizational performance.

The results of this study also show that strong organizational support can increase employees' internal motivation to participate in learning more optimally. When employees perceive that the organization is paying attention to competency development, they tend to have higher learning motivation in participating in the e-learning process.

The results of this study align with Self-Determination Theory, which explains that organizational environmental support can increase an individual's intrinsic motivation in engaging in learning activities. Furthermore, these results also support previous research that suggests organizational support and management involvement play a crucial role in increasing individual participation and motivation in digital learning.

Thus, management support and policies are important factors in increasing employee learning motivation in the implementation of e-learning in the OJK environment.

The Influence of Learning Motivation on the Effectiveness of e-learning

The research results show that learning motivation has a positive and significant effect on e-learning effectiveness. Employees with high learning motivation tend to be more active in learning, understand the material better, and are able to apply learning outcomes in their work. These results demonstrate that learning motivation is a crucial factor in supporting the successful implementation of e-learning.

The Influence of E-Learning Methods on the Effectiveness of E-Learning

The research results show that e-learning methods do not significantly influence e-learning effectiveness. These results indicate that the use of digital learning methods has not yet fully become a primary factor in determining the success of e-learning implementation in developing OJK employee competencies.

In practice, various digital learning methods such as LMS, webinars, virtual classes, and video conferencing have provided employees with flexibility to participate in the learning process more easily and efficiently. However, this flexibility does not necessarily directly increase learning effectiveness if participants still face work interruptions and limited focus during training.

Some employees still prefer in-person or hybrid learning, as they believe it creates better interaction and concentration compared to online learning, which often occurs alongside other

work activities. This situation suggests that digital learning methods alone are insufficient to determine the optimal effectiveness of e-learning. In addition to learning methods, e-learning effectiveness is also influenced by other factors such as the quality of learning materials, learning motivation, organizational support, and the implementation of digital learning in the workplace. Therefore, the success of e-learning requires a more comprehensive approach and goes beyond the use of digital learning methods alone.The results of this study indicate that the effectiveness of e-learning in organizations is more influenced by the quality of the learning experience and organizational support than just by the learning methods used. Thus, the e-learning method in this study has not been able to provide a significant influence on the effectiveness of e-learning in developing employee competencies in the OJK environment.

The Influence of Implementation Barriers on the Effectiveness of e-learning

The research results show that implementation barriers negatively impact the effectiveness of e-learning. These results indicate that the greater the barriers employees face in the digital learning process, the lower the effectiveness of e-learning tends to be. Implementation barriers in this study relate not only to the technical aspects of using the digital learning system but also to work conditions and the implementation of learning within the organization. In practice, some employees still face multitasking and ongoing workloads during e-learning implementation, reducing focus on learning.

This situation prevents employees from optimally participating in the learning process because their attention is divided between training and completing work. Furthermore, some employees still prefer in-person or hybrid training, as they believe it promotes better concentration and learning engagement than online training conducted concurrently with other work activities.

High implementation barriers make digital learning less effective because participants cannot fully understand the material, their engagement during training decreases, and their focus tends to be disrupted. These conditions indicate that e-learning effectiveness is influenced not only by the quality of the digital learning system but also by organizational conditions and learning delivery patterns.

The results of this study are in line with previous research which states that implementation barriers, both technical and non-technical, can reduce the effectiveness of digital learning implementation in organizations. Thus, the higher the implementation barriers faced by employees, the more the effectiveness of e-learning in developing employee competencies within the OJK environment tends to decrease.

The Influence of the Quality of e-learning Materials on the Effectiveness of e-learning

The research results show that the quality of e-learning materials has a positive and significant impact on their effectiveness. Relevant, interactive, and job-appropriate learning materials can enhance participants' understanding and support the application of learning outcomes in the workplace. Therefore, material quality is a crucial factor in supporting the effectiveness of digital-based competency development.

The Influence of Management Support and Policies on the Effectiveness of e-learning

The results of the study indicate that management support and policies have a positive effect on the effectiveness of e-learning. These results indicate that the effectiveness of digital learning in an organization is not only influenced by the learning system and the quality of the materials, but also by organizational support in creating a conducive learning environment. The results of this study indicate that the better the support and management policies provided by the

organization, the greater the effectiveness of e-learning implementation. This support can take the form of providing digital learning facilities, organizational attention to employee competency development, and leadership encouragement for employee participation in digital learning programs. In practice, management support and policies within the OJK environment are reflected not only in the provision of digital learning facilities but also through an organizational culture that encourages continuous employee competency improvement. The implementation of e-learning is also monitored at the work unit level, encouraging employees to be more active in participating in the digital learning process. This condition causes employees to view e-learning as an important part of professional development, thus making the learning process more effective. Strong organizational support also helps create a more conducive learning environment for employees to participate in continuous competency development.

The results of this study align with previous research, which found that organizational support and management commitment significantly influence the success of digital learning implementation within an organization. The greater the organizational support for the learning process, the greater the effectiveness of e-learning implementation.

Thus, management support and policies are important factors that support the effectiveness of e-learning implementation in developing employee competencies within the OJK environment.

5. Conclusion

This study aims to analyze the effectiveness of e-learning as a competency development method in the digital era at the Financial Services Authority (OJK). The study used a quantitative approach using Structural Equation Modeling–Partial Least Squares (SEM-PLS) on 162 OJK employees who had participated in digital learning programs through the Learning Management System (LMS), webinars, virtual classes, and other digital learning media.

The results of the study indicate that the quality of e-learning materials, management support and policies, and learning motivation have a positive influence on e-learning effectiveness. Material quality is the most dominant factor in increasing the effectiveness of digital learning, while implementation barriers negatively affect e-learning effectiveness. Conversely, e-learning methods have no significant effect on learning motivation or e-learning effectiveness. Furthermore, learning motivation has been shown to mediate the influence of management support and policies on e-learning effectiveness. In general, the effectiveness of e-learning in the OJK environment is determined more by the quality of learning, participant motivation, and organizational support than by the learning methods used.

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