



Development of E-Modules for Employee Training based on Interactive Media Performance Management Materials at PT. DMA

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Abstract:

This research aims to develop an interactive media-based training e-module to enhance employee performance management at PT. DMA is a company operating in the oil palm plantation industry. The primary challenge lies in the competency gaps among supervisors and managerial staff, negatively impacting leadership, innovation, and productivity. Traditional training methods have proven ineffective in addressing these issues. Therefore, this study proposes the use of interactive media-based e-modules to offer a more adaptive, participatory, and technology-driven learning experience. The research adopts the Research and Development (R&D) method using the ADDIE model (Analysis, Design, Development, Implementation, Evaluation). The developed e-module underwent expert validation and was rated highly: media experts (92%), instructional design experts (91%), material experts (87%), teacher users (92%), small group testing (87%), and large group testing (86%). These findings indicate that the e-module is feasible for employee training activities at PT. DMA. Effectiveness was further supported by data showing an increase in average test scores from 51 (pre-test) to 87 (post-test). The N-Gain test produced a score of 0.7, categorized as "effective." In conclusion, the use of interactive media-based e-modules in performance management training is effective in improving learning outcomes and has strong potential to support employee development at PT. DMA.

Keywords: E-Modules, Employee Training, Interactive Media, Performance Management

1. INTRODUCTION

The rapid technological transformation in the digital era has encouraged companies to continue to adapt and improve the competence of human resources (HR) to face global challenges (Dabić et al., 2023; Septiadi & Ramdani, 2024). The company's ability to implement relevant training strategies is one of the main factors for operational success. Employees are considered the most valuable asset in an organization due to their important role in ensuring high customer satisfaction as well as good quality of products and services (Kurdi et al., 2020; Lepistö et al., 2024). Without adequate training and development, they

may not be able to optimize their potential in completing tasks. Training and development are key mechanisms to improve employee performance, create efficiency, productivity, job satisfaction, motivation, and innovation. The results show that employee education and training, supported by technologies such as e-learning and computer-based simulation, significantly increase productivity, engagement, and job satisfaction, with success influenced by organizational culture, leadership styles, and training strategies tailored to sector needs, despite the gap in program adaptation across different types of organizations, requiring a tailored training approach more comprehensive, adaptive, and empirically tested to ensure effectiveness in various contexts (Arulsamy et al., 2023; Risman, 2024).

In the digital era, global education has shifted to the use of technology as the main tool of learning (Bonfield et al., 2020; Haleem et al., 2022). Technology-based approaches such as e-learning, interactive media, and simulation have become the main solution to the complexity of modern education (Masdul et al., 2024; Zanelidin et al., 2019). As is the general condition in Indonesia, this transformation still faces challenges in the provision of infrastructure and human resource

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adaptation, especially in industrial sectors such as plantations.

At PT. DMA, the competency gap is a big challenge. The 2022-2023 job analysis shows that the majority of employees have a low educational background (85% below D-III). Traditional training is considered less effective in bridging the competency gap, especially at the managerial level in terms of leadership and results-oriented, as well as innovation at the operator level. According to Adequate Competencies are essential to improve employee performance, because through improving individual abilities, organizations can face workload challenges and improve internal coordination, which ultimately has a positive impact on the productivity and competitiveness of the institution (Idayanti et al., 2020; Riyanto et al., 2021).

PT. DMA, as one of the players in the oil palm plantation industry, faces the challenge of developing its employees to have competencies that suit the needs of the company. Based on the results of the employee competency assessment carried out, it was found that there were significant gaps in various critical aspects. At the managerial level, the ability to develop others and be results-oriented still requires substantial improvement. This competency is essential to ensure leadership effectiveness in achieving the company's sustainable targets. At the supervisor and operator level, limitations in problem-solving and innovation skills are the main obstacles in dealing with daily operational dynamics. In the plantation industry, the ability to respond to challenges innovatively is indispensable to maintain a smooth work process.

The results of the employee competency assessment conducted by the Human Capital Business Partner (HCBP) of PT. The DMA in 2022 and 2023 shows significant gaps in various aspects of critical competence. At the managerial level, the ability to "develop others" and "result orientation" still needs improvement. Meanwhile, at the supervisor and operator level, problem-solving and innovation skills are also a major concern. This gap hinders the achievement of optimal productivity and effective performance management.

As part of efforts to improve employee competence, PT. DMA has implemented a Talent Management program based on core, technical, and managerial competencies. However, the

conventional training approach that has been used tends to be one-way, so it does not have a significant impact on performance improvement. Therefore, innovation is needed in training design that is able to meet the learning needs of employees from various educational backgrounds and job levels.

Interactive media-based training has been proven to be effective in increasing participant engagement and understanding compared to conventional methods. Interactive media is able to significantly improve communication and problem-solving skills through a participatory approach (Aslan, 2021). Simulation-based digital training modules help participants better understand complex technical processes (Fajar, 2023; Nikmah et al., 2023).

In the context of PT. DMA, this approach is very relevant to answer the challenge of the competency gap and employee motivation. By utilizing interactive media such as digital simulations, role-playing games, and learning videos, employees can actively learn, understand the material better, and apply it in their daily work. Based on previous research conducted by Arulsamy et al. (2023) shows that employee training and development significantly improves performance through increased skills, motivation, and job satisfaction. Training programs aimed at helping employees perform tasks more effectively, increase productivity, and strengthen innovation in the organization. The synergistic relationship between training, development, and performance was also found to contribute to the competitive advantage of the organization.

Previous research focused on the effectiveness of interactive media in general learning, but has not been specifically applied in the development of employee competencies in the plantation sector. This research fills this gap by focusing on the design of e-modules that suit the specific needs of the plantation industry, especially in PT. DMA. Therefore, in this study, research will be conducted with the title Development of Interactive Media-Based Employee Training E-Module Performance Management Materials at PT. DMA".

2. MATERIAL AND METHOD

This study uses the Research and Development (R&D) method with the ADDIE (Analysis, Design, Development, Implementation, Evaluation)

development model to produce valid, practical, and effective training products. The research method used is research and development (R&D) based on the ADDIE (Analysis, Design, Development, Implementation, Evaluation) model. This model is designed to develop learning products and ensure their effectiveness.

Stages of the ADDIE Model:

1. Analysis

A needs analysis was conducted to identify the problems and needs of interactive media-based training. This process includes distributing questionnaires to employees to find out their obstacles in managing performance.

2. Design

- a. Determine learning objectives.
- b. Develop interactive e-module teaching materials supported by videos, animations, and graphics.

- c. Designing validation and trial assessment instruments.

3. Develop

The development was carried out by creating an e-module using the Canva application in a worksheet format (A4 portrait). Expert validation is carried out to ensure the feasibility of the module.

4. Implementation

The module is applied to employees of PT. DMA to see its effectiveness in field practice.

5. Evaluate

Evaluation is carried out at each stage to identify the strengths and weaknesses of the product. The results of the evaluation are used for the revision of the e-module.

A diagram of the development procedure based on the ADDIE model is shown in Figure 1.

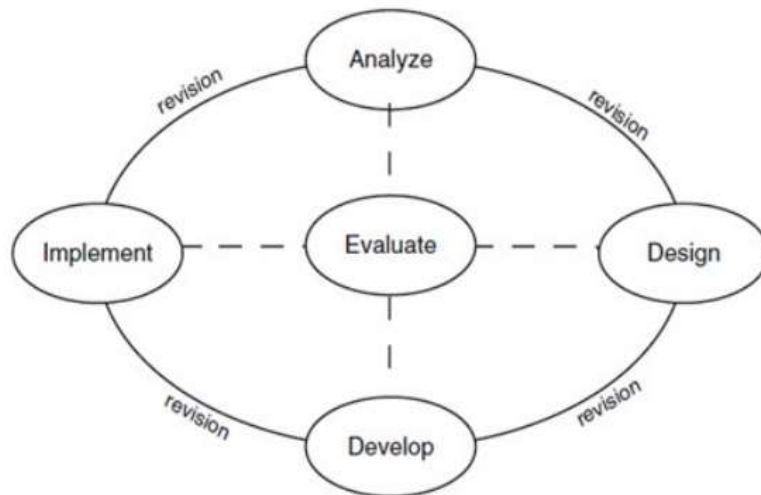


Figure 1. ADDIE Model Development Design

Samples and Research Objects:

The object of the study was an employee of PT. DMA at various levels (operators, supervisors, managers) as many as 50 employees.

Research Time:

The research was conducted for four months, from November 2023 to January 2024. The research locations include the head office in Jakarta and plantations in Central Kalimantan, South Kalimantan, and East Java.

Research Procedure:

In order to ensure that the development of the e-module runs according to the objectives, this study follows the following steps in detail:

1. Analysis Stage

This stage is the foundation of the entire development process. The steps in the analysis include:

- a. Problem Identification: Interviews are conducted with managers and division heads to understand the challenges employees face in performance management.

- b. Training Needs Analysis: A questionnaire is distributed to employees to identify e-module-based training needs.
- c. Literature Study: The researcher examines the theory of performance management and the development of interactive media to ensure that the modules designed are based on current research.
- d. Employee Profile: Conduct an analysis of the characteristics of the participants, such as education level, technological skills, and the level of accessibility of digital devices.
- e. Final Results of the Analysis Stage: It was concluded that interactive media-based e-modules are needed to improve performance management competencies.

2. Design Stage

The design stage focuses on creating an e-module framework. The steps include:

- a. Formulate Learning Objectives: Specific objectives are structured based on the results of the needs analysis. For example, "Participants are able to compile monthly performance management reports using the company's standard guidelines."
- b. Defining the Module Structure: Modules are designed with chapter divisions, such as:
 - 1) Chapter 1: Introduction to Performance Management.
 - 2) Chapter 2: Techniques for Preparing Performance Targets.
 - 3) Chapter 3: Performance Evaluation and Report.
- c. Designing Interactive Media:
 - 1) Create storyboards to arrange a sequence of information, learning activities, and supporting media such as videos or animations.
 - 2) Determine the visual elements (images, infographics) that are relevant to the topic.
- d. Preparation of Evaluation Instruments:
 - 1) Validation questionnaires are compiled for material experts, media experts, and users.

- 2) Learning tests are created to measure participants' achievement towards the modules.

- e. Material Collection: Collecting scientific references, videos, and images to ensure the modules have accurate and engaging content.

3. Development Stage

This stage involves prototyping the e-module based on the design that has been designed. The steps are:

- a. Module Manufacturing:
 - 1) The e-module is designed using the Canva app with user-friendly formats, such as an A4 portrait display for easy printing.
 - 2) Interactive content is added, such as quizzes connected to online platforms or instructional video links.
- b. Validation by Experts:
 - 1) Material experts check the accuracy and completeness of the content of the modules.
 - 2) Media experts assess the aesthetic and interactivity aspects.
 - 3) Learning design experts evaluate the suitability of modules with learning theories.
- c. Product Revision: Based on feedback from experts, the modules are improved to ensure their quality is in line with educational standards and user needs.
- d. Initial Trial: The e-module prototype is tested to small groups (5-10 employees) to see if there are any technical difficulties or problems in understanding the material.

4. Implementation Stage

The implementation stage aims to test the effectiveness of the module in real situations.

Steps:

- a. Preparation of Training Schedule: Training is conducted online using modules that have been developed.
- b. Trial Implementation:
 - 1) Small Groups: Modules are tested on 10 employees to identify technical and content issues.

2) Large Group: The module is applied to 30 employees to obtain quantitative and qualitative data on the effectiveness of the module.

c. Data Collection: Module effectiveness data is collected through pre-test and post-test, as well as user satisfaction questionnaires.

5. Evaluation Stage

This stage focuses on assessing the success of the module based on the data obtained during implementation. The evaluation steps are:

a. Formative Evaluation: Performed at each stage of development (analysis, design, development, and implementation) to improve the module.

b. Summative Evaluation:

1) Using the results of the pre-test and post-test to calculate the N-Gain Score and determine the effectiveness of learning.

2) The user satisfaction questionnaire was analyzed to determine the acceptance rate of the module.

c. Final Conclusion: Based on the data, the module is assessed whether it is feasible to be widely implemented or requires further revision.

Data Collection Techniques:

Data were collected using questionnaires, interviews, observations, and performance tests before and after training.

Research Instruments:

1. Observation sheets to monitor employee engagement.
2. Validation questionnaire as many as 1 person for colleagues, 5 people for small groups, and 50 employees for large groups, with 1 material expert test, 1 media expert test, and 1 instructional design expert
3. Performance tests to assess the effectiveness of the modules.

Analysis Plan:

Data Analysis Techniques

Quantitative Analysis

1. Use the Likert scale to measure the validation rate of the product (experts and users).

2. The Guttman scale is used for test responses with a Yes or No option.

Qualitative Analysis

1. Segment data from interviews, inputs, and critiques for e-module improvement.

Effectiveness Test:

The effectiveness of the module is calculated using the N-Gain Score to compare the results of the pre-test and post-test:

$$N_{-gain} = \frac{\text{Post test score} - \text{Pretest score}}{\text{Ideal score} - \text{Pretest score}}$$

N-Gain results are categorized based on the following table:

- $g > 0.7$: High.
- $0.3 \leq g \leq 0.7$: Medium.
- $g < 0.3$: Low.

Scope and Limitations of the Study:

The scope of this study is limited to employees of PT. DMA with a representative sample from each level of position. Limitations include limited time for module development and possible bias in participant feedback during the trial.

3. RESULT AND DISCUSSION

1. Analysis Stage

a. Performance Analysis

Performance analysis is carried out to understand employee training needs in improving performance management. The main data was obtained from the results of the Competency Assessment Center of PT. Dwi Mitra Adhiusaha in 2023, which revealed three core competencies with low scores:

Results-oriented: Low ability of employees to design clear and measurable work targets using SMART principles.

The analysis is carried out by the following methods:

- 1) Discussion Simulation: Identify communication and decision-making patterns.
- 2) Written Test: Assesses the understanding of performance management concepts.
- 3) Competency Interview: Reveals the employee's ability to provide analytics-based solutions.

Student Analysis:

The trainees consisted of 45 employees with diverse educational backgrounds:

- 1) 15% of D3/S1/S2 graduates: Already have a foundation in management theory, but need to strengthen practical applications.
- 2) 15% of high school/K graduates: Have basic skills that need to be improved through visual and practical learning.
- 3) 70% equivalent to junior high school or below: Tend to be more comfortable with simple and interactive learning media.

Implications of Learning Design:

- 1) The material is presented in simple language and equipped with visual elements to help understanding.
- 2) Interactive media is chosen to attract attention and facilitate independent learning.
- 3) The modules are accessed through user-friendly technological devices, such as smartphones or computers.

b. Material Analysis

The training material is focused on improving performance management competencies which includes:

- 1) Basic Concepts of Outcome Orientation: Teaches SMART principles to design effective work targets.
- 2) KPI Design: Provides practical guidance in compiling measurable performance indicators.
- 3) Performance Evaluation Techniques: The process of measuring performance using quantitative and qualitative data.
- 4) Constructive Feedback: Improve communication skills to provide constructive feedback.

The following Table 1 describes the material maps used:

Tabel 1. The Material Maps Used

Learning Outcomes	Learning Objectives
Understand the concept of performance management.	Identify the SMART principles.
Able to design KPIs based on result orientation.	Analyze the flow of annual performance evaluations.
Master constructive feedback techniques.	Using performance analysis tools based on digital technology.

c. Analysis of Learning Objectives

The results of the performance analysis, students, and materials were used to formulate learning objectives:

- 1) Conceptual Understanding: Provides a strong theoretical foundation on performance management.
- 2) Mastery of Practical Techniques: Improve participants' ability to design KPIs and conduct data-based evaluations.
- 3) Communication Skills: Develop the ability to provide feedback in a professional and constructive manner.

2. Design Stage

The e-module design stage is carried out by considering the results of previous analysis. The design process includes the following steps:

a. Structure of E-Module:

- 1) The module is divided into three main sections: an introduction to theory, interactive exercises, and evaluation.
- 2) Each section features videos, images, and diagrams to support comprehension.

b. User-Friendly Interface:

- 1) The navigation of the modules is made simple and intuitive, so participants from different educational backgrounds can access them easily.

- 2) Added a hyperlink feature that connects the module content to online videos or quizzes.
- c. Storyboard Creation:
 - 1) Designing a systematic and structured learning flow.
 - 2) Determine visual elements and interactive activities in each learning session.
- d. Evaluation Design:
 - 1) Pre-test and post-test are prepared to measure the effectiveness of the training.
 - 2) Interactive-based practice questions are designed to reinforce participants' understanding.

3. Development Stage

This stage produces a prototype of the e-module based on the design that has been prepared. The development process involves the following activities:

- a. Media Production:
 - 1) Modules are designed using the Canva app to produce an attractive look.
 - 2) Text content is enriched with multimedia elements, such as videos, animations, and infographics.
- b. Product Validation:
 - 1) Validation was carried out by three experts:
 - Media Expert: average score of 87%
 - Matter Expert: average score of 94%
 - Learning Design Specialist: average score of 91%

It was found that employees needed interactive media-based training that focused on mastering data analysis, collaboration development, and measurable results-oriented.

The research shows that the interactive media-based training e-module developed is considered valid and feasible to use based on expert evaluations and trial results. Expert validation showed an average score of 89% (very feasible), while small group trials provided an acceptance rate of 85%. The improvement of employee competence was measured using the N-Gain Score with an average of the "moderate" (65%) to "high" (78%) categories, which indicates the effectiveness of the e-module. Graphs and tables will present a comparison of the employee's initial and final test results.

The results of the study show that the interactive media-based training e-module is effective in

overcoming the competency gap of employees of PT. DMA, in line with the findings of Nanda & Kusumo (2020) on improving understanding through interactive media. Digital simulations and adaptive approaches in modules support the improvement of practical competencies, as also reported by Pratama & Setiawan (2019). Compared to traditional training methods, e-modules provide a more engaging and participatory learning experience. These findings reinforce the urgency of technology adoption in HR training to support business sustainability.

This research has implications for the development of learning technology in the plantation sector, providing an efficient training model to improve employee competence. This e-module can also be applied in other companies with adaptation as needed. In addition, these findings support the integration of digital technology in HR training policies that are in line with the development of the industrial era 4.0.

The limitations of the study include limited time for field trials as well as relatively small samples. Further research is suggested to involve more participants from different levels and areas to expand the generalization of results. The integration of gamification elements in modules can also be explored to increase participant engagement.

4. CONCLUSION

The interactive media-based training e-module has proven to be valid, practical, and effective to improve the competence of PT. DMA. This technology-based approach is able to answer the needs of adaptive learning, relevant to the digital era, and supports the sustainability of the company's business. It is a short text to acknowledge contributions from specific colleagues, institutions, or agencies that are assisting the author's efforts.

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