

Development Of Cyber Office Administrator for Digital Administration Competence Learning

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ABSTRACT

This study aimed to develop the Cyber Office Administrator Application based on Digital Administration competencies to support learning for Digital Office Administration students. The study employed a Research and Development approach using the ADDIE model, consisting of Analysis, Design, Development, Implementation, and Evaluation. The participants were 35 students enrolled in a Digital Records Management course. Data were collected through needs analysis, expert validation, student responses, and pre-test and post-test assessments. The application obtained an expert feasibility score of 87%, categorized as highly feasible, while student responses reached 86%, indicating high practicality. Students' mean scores increased from 83.03 in the pre-test to 87.09 in the post-test. Although the paired-test result showed a significant difference, the N-Gain value of 0.24 was categorized as low. The findings indicate that the application is feasible and practical as a competency-based digital learning environment, while further experimental testing is needed to establish its learning effectiveness

Keywords:

Cyber Office Administrator; Digital Administration; Digital Competence; Educational Technology; Digital Learning

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I. Introduction

Digital transformation has significantly changed the characteristics of work and administrative processes in modern office environments. The advancement of information technology, cloud computing, automation systems, digital information management, and collaborative platforms has shifted administrative activities from conventional document-based processes toward integrated, data-driven, and technology-supported workflows. These changes indicate that administrative work is no longer limited to routine clerical activities but increasingly requires the ability to manage digital information, utilize technology effectively, and adapt to technology-based work environments (OECD, 2021). Therefore, administrative professionals in the digital era are expected to possess not only administrative skills but also digital competencies that support work effectiveness.

The transformation of the workplace has direct implications for the competencies that need to be developed among Digital Office Administration students as prospective administrative professionals. Digital competence is not merely associated with the ability to operate specific software applications but also includes the ability to manage information, communicate and collaborate through digital technologies, create and manage digital content, understand information security, and use technology responsibly (Vuorikari et al., 2022). In higher education, digital competence has become increasingly important because students are expected not only to understand technology conceptually but also to apply it in solving authentic tasks and professional challenges within workplace contexts (Falloon, 2020). (Zhao et al., 2021; Vishnu et al., 2022).

In the field of Office Administration, the demand for digital competence has become increasingly complex because modern administrative work involves various interconnected activities, including electronic document management, data processing, digital organizational communication, information system utilization, and work coordination through digital platforms. These conditions indicate that Office Administration education should not only focus on teaching the use of office applications but also develop students' abilities to apply technology in completing administrative tasks systematically and contextually. Previous studies on students' digital competence have demonstrated that

technological skills need to be developed through practical experiences, problem-solving activities, and learning approaches that connect technology with professional requirements (Lucas et al., 2021).

However, Digital Office Administration learning still faces challenges in connecting technological knowledge with authentic administrative practices. Learning approaches that emphasize theoretical materials and software demonstrations often provide limited opportunities for students to understand how technologies are applied within comprehensive administrative workflows. Students may understand the functions of digital applications but may not necessarily be able to apply them to solve complex administrative tasks, such as managing electronic documents, coordinating activities, preparing reports, and processing information for decision-making. This condition highlights the need for learning approaches that emphasize practical activities, simulations, and authentic task completion. (Santos et al., 2023).

The integration of digital technology into education provides opportunities to create more interactive and contextual learning environments. The use of digital learning applications, simulations, and task-based activities enables students to gain learning experiences through direct practice rather than only through conceptual understanding. Research on technology-enhanced learning indicates that properly designed digital learning environments can improve student engagement and support competency development through flexible and contextual learning experiences (Bond et al., 2021). Therefore, the development of digital learning environments that integrate learning materials, administrative practices, job simulations, and competency assessment has become an important requirement in Digital Office Administration education.

In addition to learning processes, competency evaluation also represents a challenge in developing students' digital administration skills. Assessments that rely primarily on written examinations tend to measure conceptual knowledge rather than students' ability to apply technology in completing real administrative tasks. Digital competence frameworks emphasize that digital abilities should be assessed not only based on theoretical understanding but also on individuals' capacity to utilize technology effectively and responsibly in specific contexts (Vuorikari et al., 2022). Therefore, learning systems are needed that allow students to practice digital administrative activities while receiving evaluations of the competencies they develop. (Saltos-Rivas et al., 2021).

Several studies have demonstrated that digital technologies can support educational transformation by providing learning resources, communication platforms, collaborative environments, and technology-based assessment systems. However, many existing digital learning platforms remain focused on material distribution, assignment submission, and general learning communication. There is still a need for learning environments specifically designed to represent professional activities, including digital administrative tasks aligned with the characteristics of modern office work (UNESCO, 2023). Therefore, developing learning applications that function not only as instructional media but also as simulation environments for administrative practices is essential. (Lacka et al., 2021; Jiménez-Cortés et al., 2017).

Based on these considerations, several research gaps can be identified. First, Digital Office Administration learning requires an approach that integrates digital competence with authentic administrative practices. Second, there is a need for digital learning environments that provide administrative simulations so that students can gain experiences similar to real workplace conditions. Third, learning systems need to incorporate competency assessment mechanisms that measure students' abilities through practical activities rather than solely through conceptual knowledge evaluation.

To address these gaps, this study develops the Cyber Office Administrator Application based on Digital Administration competencies for Digital Office Administration students. The application is designed as a digital learning environment that integrates learning materials, digital document management, administrative activity simulations, digital communication, and competency evaluation. Unlike general learning management systems that primarily focus on content delivery and assignment submission, the developed application is designed to represent digital administrative workflows through contextual learning activities.

The novelty of this study lies in the development of a competency-based digital learning environment that combines digital learning and administrative work simulations within a single application. The integration of learning materials, administrative practices, digital document management, task simulations, and competency evaluation provides an approach that differs from conventional learning media and general digital learning platforms. This approach is expected to assist students in developing more applicable Digital Administration competencies that align with the demands of modern workplaces.

Based on this background, this study aims to develop the Cyber Office Administrator Application based on Digital Administration competencies for Digital Office Administration students. Specifically, this study focuses on producing a digital learning application that is feasible, practical, and capable of supporting learning processes through the integration of administrative activities, job simulations, and student competency evaluation.

2. Method

Type of Research/Design

This study employed a Research and Development (R&D) approach aimed at developing the Cyber Office Administrator Application based on Digital Administration competencies to support the learning process of Digital Office Administration students. Development research was selected because this study was not only focused on examining a phenomenon but also involved a systematic process of needs analysis, product design, development, validation, implementation, and evaluation of the developed product.

The development model used in this study was the ADDIE model, which consists of five main stages: Analysis, Design, Development, Implementation, and Evaluation. The ADDIE model was selected because it provides a systematic framework for developing educational products, beginning with identifying user needs, designing the product, developing the application, implementing it in the learning process, and evaluating the developed product. This model is considered appropriate for research that aims to produce digital learning products requiring gradual validation and improvement processes (Branch, 2009).

In this study, expert validation was conducted after the Development stage and before the Implementation stage. The validation process aimed to evaluate the feasibility of the application in terms of functionality, content, interface design, and alignment with learning requirements. Feedback from the validators was used as the basis for improving the product before it was implemented with students.

Subjects/Population and Sample

The research was conducted in the Digital Office Administration Study Program, Faculty of Economics and Business, Universitas Negeri Jakarta. The participants consisted of 35 students enrolled in the Digital Records Management course. All students in the class were involved as application users; therefore, no sampling technique was applied.

In addition to students as application users, product validation involved two experts consisting of one subject matter expert and one instructional media/technology expert. The subject matter expert evaluated the suitability of the Digital Administration competencies and learning content included in the application. Meanwhile, the media expert assessed the interface design, navigation, functionality, usability, and technical aspects of the application.

Instrument

Data were collected using three main instruments: needs analysis instruments, expert validation instruments, and user response questionnaires.

The needs analysis instrument was used to obtain information regarding students' requirements for digital learning media and Digital Administration practice activities. The expert validation instrument was used to assess application feasibility from the perspectives of subject matter and media experts. Meanwhile, the user response questionnaire was used to determine the practicality and acceptance of the application after implementation.

The assessment used a four-point Likert scale, where a score of 1 represented the lowest rating and a score of 4 represented the highest rating. The user response questionnaire consisted of 15 statements covering usability, interface design, learning material clarity, benefits, navigation, and user experience.

Before being used for data collection, the student response instrument was tested for validity and reliability. Validity testing was conducted using Pearson Product Moment correlation to determine whether each item accurately measured the intended aspects. An item was considered valid when the calculated r value exceeded the r table value at a 5% significance level.

Reliability testing was conducted using Cronbach's Alpha. The instrument was considered reliable when the Cronbach's Alpha coefficient met the required reliability criteria. In this study, the instrument demonstrated adequate validity across all items and obtained a reliability coefficient of 0.92, indicating excellent internal consistency.

Procedure/Data Collection

The development of the application was carried out using the ADDIE model, consisting of five stages as follows.

Analysis

The Analysis stage was conducted to identify learning needs, student characteristics, required competencies, and problems encountered in Digital Office Administration learning. The analysis involved reviewing learning outcomes, Digital Records Management course materials, characteristics of digital administrative work, and students' needs for practical and contextual learning media.

The results of the analysis were used to determine the main requirements of the application, namely providing a learning environment that enables students to understand digital administration concepts while performing activities representing administrative tasks. At this stage, the competencies integrated into the application were also identified, including digital document management, information management, digital tool utilization, administrative procedures, and completion of administrative tasks.

Design

The Design stage involved developing the application framework based on the results of the needs analysis. The design process included application structure, navigation flow, interface design, learning materials, simulation activities, task instructions, and competency evaluation mechanisms.

The application was designed using an activity-based learning approach, where students were not only provided with learning materials but were also guided to complete tasks related to digital administrative activities. The application design was then represented through flowcharts, user flows, menu structures, and interface prototypes before entering the development stage.

Development

The Development stage involved transforming the application design into a functional product. The development process included interface creation, integration of learning materials, development of administrative simulations, preparation of learning tasks, and implementation of competency evaluation features.

The developed initial product was then reviewed by experts. At this stage, the subject matter expert and media expert evaluated the application based on predetermined assessment instruments. The validation results and suggestions provided by the experts were used as references for revising and improving the application.

Implementation

The Implementation stage was conducted after the application was considered feasible based on expert validation results and product revisions had been completed. The application was then implemented in the Digital Records Management course.

The implementation involved 35 students. Students were given opportunities to use the application, participate in learning activities, complete digital administrative simulations, perform assigned tasks, and utilize the competency evaluation features available in the application.

After using the application, students provided responses regarding usability, interface design, clarity of instructions, application benefits, content suitability, and their overall learning experience.

Evaluation

The Evaluation stage was conducted through formative and summative evaluations. Formative evaluation was carried out throughout the development stages, including analysis, design, development, and expert validation, to identify weaknesses and improve the product.

Meanwhile, summative evaluation was conducted after implementation to determine the feasibility and practicality of the application based on user experiences. The evaluation results were used to identify aspects requiring further improvement and to determine whether the application fulfilled its purpose as a competency-based digital learning environment.

Data Analysis

The data obtained from expert validation and student responses were analyzed using descriptive quantitative analysis. The analysis involved converting obtained scores into percentages to determine the feasibility and practicality levels of the application.

The percentage calculation was performed using the following formula:

$$\text{Percentage} = (\text{Obtained Score} / \text{Maximum Score}) \times 100\%$$

The obtained percentages were interpreted based on the following criteria:

Table 1. Percentage Interpretation Criteria

Percentage	Category
81–100%	Highly Feasible / Highly Practical
61–80%	Feasible / Practical
41–60%	Moderately Feasible / Moderately Practical
21–40%	Less Feasible / Less Practical
0–20%	Not Feasible / Not Practical

Expert validation results were used to determine the feasibility level of the application before implementation. Meanwhile, student responses were analyzed to determine the practicality level of the application after use in the learning process.

In addition to feasibility and practicality analysis, student learning outcomes were analyzed as supporting data to identify changes in student performance after using the application. Learning outcomes were analyzed by comparing pre-test and post-test scores and calculating the Normalized Gain (N-Gain). This analysis was used as an initial indicator of learning improvement and was not considered the primary basis for determining experimental effectiveness.

3. Results And Discussion

Needs Analysis

The needs analysis stage was conducted to identify the characteristics of Digital Office Administration learning, students' needs for digital learning media, and the Digital Administration competencies that need to be developed. The analysis involved 35 students enrolled in the Digital Records Management course through questionnaires, classroom observations, and interviews with the course instructor.

The needs analysis instrument consisted of five indicators: digital learning access, administrative activity simulation, digital document management, competency evaluation, and collaborative activities. The assessment used a four-point Likert scale ranging from 1 (strongly disagree) to 4 (strongly agree).

The results showed that students had a high demand for learning media that could integrate learning materials with digital administrative activities. The results of the needs analysis are presented in Table 1.

Table 2. Results of Student Needs Analysis

Indicator	Percentage	Category
Digital learning access	86%	Very High
Administrative activity simulation	92%	Very High
Digital document management	90%	Very High
Competency evaluation	88%	Very High
Collaborative activities	84%	High
Average	88%	Very High

Based on Table 1, the administrative activity simulation indicator obtained the highest percentage (92%). This finding indicates that students require learning experiences that represent administrative activities similar to those performed in real workplace environments. In addition, the need for digital document management also showed a high percentage (90%), indicating that students require learning media that enable them to directly practice electronic document and archive management.

Interviews with the course instructor revealed that current learning activities were still predominantly focused on conceptual explanations and separate use of office applications. This condition resulted in limited opportunities for students to experience integrated digital administrative workflows. Therefore, a learning application that connects learning materials, administrative activities, job simulations, and competency evaluation is needed.

These findings became the basis for determining the structure, features, and functions of the Cyber Office Administrator Application.

Application Design

The application design stage was developed based on the results of the needs analysis. The design referred to the principles of competency-based learning, which emphasize not only conceptual understanding but also students' ability to perform authentic digital administrative activities.

Application Design

The design process resulted in six integrated main modules representing digital administrative workflows.

Table 2. Structure of Cyber Office Administrator Application Features

Table 3. Structure of Cyber Office Administrator Application Features

Module	Function
Dashboard	Displays learning information and student progress
Learning Materials	Provides competency-based Digital Administration materials
Digital Archive	Enables electronic document management practice
Administrative Simulation	Provides case-based administrative tasks
Digital Communication	Facilitates communication between lecturers and students
Competency Evaluation	Measures students' competency achievement

The Digital Archive module enables students to practice electronic document management according to administrative procedures. Students can upload, categorize, and manage documents similar to activities performed in digital workplace environments.

The Administrative Simulation module provides students with various case studies that must be solved through digital administrative activities. This module is designed to provide learning experiences that resemble actual administrative work situations.

Furthermore, the Digital Communication module allows lecturers to provide announcements, feedback, and learning instructions directly. All student activities are recorded through the Competency Evaluation module, allowing competency development to be monitored continuously.

Application Development

The development stage involved transforming the application design into a functional product that could be implemented in learning activities. The application was developed as a web-based platform, allowing access through computers and mobile devices without requiring additional installation.

The developed Cyber Office Administrator Application consists of six main features: Dashboard, Learning Materials, Digital Archive, Administrative Simulation, Digital Communication, and Competency Evaluation. These features were designed to support the integrated development of students' Digital Administration competencies.

Unlike conventional learning media that primarily provide learning materials, this application enables students to directly perform administrative activities, including managing electronic documents, completing administrative tasks, conducting digital communication, and receiving feedback on completed activities.

Before implementation, the initial product underwent expert validation by subject matter and media experts. The validation process aimed to obtain evaluations regarding application functionality, content suitability, interface design, navigation, and usability. Feedback from validators was used as the basis for product improvement.

The product revisions based on validator feedback are presented in Table 3.

Application Development

Table 3. Product Revision Based on Validator Feedback

The revisions resulted in an application with improved accessibility and simpler navigation. In addition, the automatic feedback feature enabled students to receive evaluation results immediately after completing learning activities. After revision, the application was considered ready for implementation.

Expert Validation Results

The validation stage aimed to determine the feasibility level of the Cyber Office Administrator Application before implementation. Validation involved two experts consisting of one Digital Office Administration subject matter expert and one digital learning media expert.

The validation instrument consisted of five aspects: content suitability, application functionality, interface design, navigation, and usability.

Table 4. Expert Validation Results

Table 4. Product Revision Based on Validator Feedback

Validator Feedback	Improvement Implemented
Add QR Code for application access	QR Code was added to the main application page
Font size was too small	Font size was increased for better readability
Navigation menu was too extensive	Menu structure was simplified using navigation icons

Based on Table 4, application functionality obtained the highest score (90%). This indicates that the developed features successfully supported Digital Administration learning activities according to the intended development objectives.

Meanwhile, interface design obtained the lowest score (85%), although it remained within the highly feasible category. Validators provided recommendations related to color consistency, font readability, and navigation simplification.

Expert Validation Results

Application Practicality

Application practicality was evaluated based on responses from 35 students after using the application in the learning process. The assessment consisted of five indicators: usability, application appearance, material quality, application usefulness, and user satisfaction.

Table 5. Application Practicality Results

Table 5. Expert Validation Results

Assessment Aspect	Percentage	Category
Content suitability	86%	Highly Feasible
Application functionality	90%	Highly Feasible
Interface design	85%	Highly Feasible
Navigation	88%	Highly Feasible
Usability	87%	Highly Feasible
Average	87%	Highly Feasible

The usefulness aspect obtained the highest score (89%), indicating that students perceived the application as helpful in understanding Digital Administration concepts while providing more structured administrative practice experiences.

Meanwhile, user satisfaction obtained the lowest score (82%). Based on student comments, several respondents suggested additional features such as task notifications and automatic saving functions to improve learning efficiency.

Overall, the high practicality score indicates that the application is easy to use and positively accepted by students as a Digital Administration learning medium.

Student Learning Outcomes

Application Practicality

Table 6. Descriptive Statistics of Learning Outcomes

The results showed that students' average scores increased by 4.06 points after participating in learning activities using the application.

Table 6. Application Practicality Results

Indicator	Percentage	Category
Usability	88%	Highly Practical
Application appearance	84%	Highly Practical
Material quality	87%	Highly Practical
Application usefulness	89%	Highly Practical
User satisfaction	82%	Highly Practical
Average	86%	Highly Practical

Table 7. Paired Sample t-Test Results

Student Learning Outcomes

Furthermore, the Normalized Gain (N-Gain) analysis showed a value of 0.24, which is categorized as low. This condition was influenced by the relatively high initial scores of students, resulting in limited room for improvement.

Therefore, although the learning outcomes showed statistically significant improvement, the magnitude of improvement remained relatively low. These findings indicate that the application provides positive support for learning processes; however, stronger experimental research designs involving control groups are required to confirm its effectiveness.

Table 7. Descriptive Statistics of Learning Outcomes

Measurement	Mean	SD	Minimum	Maximum
Pre-test	83.03	5.42	72	91
Post-test	87.09	4.87	78	95

The findings demonstrate that the Cyber Office Administrator Application has high feasibility and practicality as a Digital Administration learning medium. The high expert validation score indicates that the integration of learning materials, administrative simulations, digital document management, and competency evaluation aligns with students' learning needs identified during the analysis stage.

The highest score in application functionality suggests that students require learning media that allow them to perform administrative activities directly rather than only learn theoretical concepts. This finding supports the importance of competency-based digital learning environments that connect technological skills with authentic workplace activities.

Table 8. Paired Sample t-Test Results

Statistic	Value
t-value	4.287
Sig. (2-tailed)	0.001
Cohen's d	0.72

Regarding learning outcomes, the application was associated with improved student scores after implementation. However, the low N-Gain value indicates that the improvement was not yet optimal. The one-group pre-test and post-test design also limits the ability to attribute learning improvement solely to the application. Therefore, future studies should employ quasi-experimental designs involving experimental and control groups to provide stronger evidence regarding application effectiveness.

Overall, the Cyber Office Administrator Application has potential as a competency-based digital learning environment that connects learning content with practical administrative activities. The integration of digital document management, administrative simulations, communication features, and competency evaluation provides students with learning experiences that are closer to the characteristics of modern administrative work.

Conclusion, Implication, and Recommendation

This study developed the Cyber Office Administrator Application based on Digital Administration competencies to support the learning process of Digital Office Administration students. The application was developed using the ADDIE model, consisting of five stages: Analysis, Design, Development, Implementation, and Evaluation. The developed application functions as a digital learning environment that integrates administrative activities, task simulations, digital technology utilization, and competency evaluation.

Discussion

The findings demonstrate that the Cyber Office Administrator Application has high feasibility and practicality as a Digital Administration learning medium. The high expert validation score indicates that the integration of learning materials, administrative simulations, digital document management, and competency evaluation aligns with students' learning needs identified during the analysis stage.

The highest score in application functionality suggests that students require learning media that allow them to perform administrative activities directly rather than only learn theoretical concepts. This finding supports the importance of competency-based digital learning environments that connect technological skills with authentic workplace activities.

The practicality results also indicate that students accepted the application positively. The systematic presentation of learning materials, simple navigation, and availability of administrative simulations provided students with a more contextual learning experience. This finding aligns with previous studies emphasizing that technology-enhanced learning environments can support student engagement when designed according to learning objectives and professional contexts.

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Overall, the Cyber Office Administrator Application has potential as a competency-based digital learning environment that connects learning content with practical administrative activities. The integration of digital document management, administrative simulations, communication features, and competency evaluation provides students with learning experiences that are closer to the characteristics of modern administrative work.

CONCLUSION

This study developed the Cyber Office Administrator Application based on Digital Administration competencies to support the learning process of Digital Office Administration students. The application was developed using the ADDIE model, consisting of five stages: Analysis, Design, Development, Implementation, and Evaluation. The developed application functions as a digital learning environment that integrates administrative activities, task simulations, digital technology utilization, and competency evaluation.

The expert validation results showed that the application obtained a feasibility score of 87%, categorized as highly feasible, indicating that the application met the required aspects of content suitability, functionality, interface design, navigation, and usability. Furthermore, student responses reached 86%, categorized as highly practical, demonstrating that the application was well accepted and easy to use in supporting Digital Administration learning activities.

The evaluation of learning outcomes showed an increase in students' average scores from 83 in the pre-test to 87 in the post-test. However, the N-Gain value of 0.24 was categorized as low, indicating that although the application provided positive support for learning activities, further investigation is required to determine its effectiveness in improving learning outcomes. The findings suggest that the Cyber Office Administrator Application has strong potential as a competency-based digital learning environment that connects administrative learning concepts with practical digital administrative activities.

This study implies that Digital Office Administration learning should provide more contextual and practice-oriented experiences by integrating technology with authentic administrative tasks. The application can support students in developing digital skills, managing information, and performing administrative activities that align with modern workplace demands. However, this study has limitations, including the limited number of participants, the use of a one-group pre-test and post-test design without a control group, and limited expert involvement in the validation process. Therefore, future research should involve larger and more diverse participants, apply quasi-experimental designs, and develop more comprehensive competency assessment instruments to measure students' practical digital administration skills. Further application development may also focus on integrating collaboration features, learning analytics, automation systems, and artificial intelligence-based functions to create a more representative digital administrative simulation environment.

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