

From Files to Databases: The Dynamics of Digitalization of Personnel Management in the Public Sector of Education

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Abstract

This research aims to examine the implementation of digital systems in personnel management in regional educational institutions, focusing on the organizational adaptation process and the challenges faced during the transition from manual to digital systems. Using a qualitative approach of case studies, data were collected through direct observation, semi-structured interviews with staff, and internal agency documentation. The results of the study show that the implementation of applications such as SIMPEG and Srikandi has significantly changed the pattern of personnel services, especially in digital archiving, online leave applications, and employee data validation. However, digitalization also faces various obstacles, ranging from limited networks and upload capacity to digital literacy gaps between generations of employees. Emerging adaptation strategies include intergenerational collaboration, informal mentoring, and the use of dual technologies (cloud and local devices) to anticipate systemic constraints. This study shows that the success of staffing digitization depends not only on infrastructure but also on the readiness of work culture, internal collaboration, and responsive strategies of bureaucratic actors. These findings make a theoretical contribution to the study of digital transformation in the public sector and have practical implications for local governments in designing inclusive and sustainable digitalization policies.

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INTRODUCTION

In the digital era that increasingly demands efficiency and accountability, public institutions are faced with an urgent need to transform personnel services that previously relied on manual processes such as physical filing, form-based leave submissions, and employee data management spread across various units (Damar et al., 2024; Latupeirissa et al., 2024; Omar et al., 2024). In the Indonesian context, this transformation is in line with the policy of electronic-based government (*E-Government*) and the target of improving the quality of public services (Abdussamad, 2024; Aminah & Saksono, 2021; Pramuditha et al., 2025). However, various regional agencies still face significant challenges.

Digital infrastructure is inadequate, technological literacy varies across generations of employees, and integration between work units has not run optimally. Research conducted by Rohayati & Abdillah (2024) confirms that the digitalization of the public sector in Indonesia is still constrained by limited access to technology and the readiness of human resources. This phenomenon is an important issue in personnel management because the process, originally administrative, has now shifted to a digital system that includes online submissions, electronic data management, and cross-unit application integration. Therefore, this research focuses on the challenges and adaptation strategies involved in the digital transformation of personnel services in regional educational institutions.

Previous literature has highlighted various aspects of the digitalization of human resource management (HR) in the public and private sectors. Zhang & Chen (2024) examine digital transformation in *Human Resource Management* (HRM), integrating recruitment, training, and performance evaluation processes with digital technology. They find that internal customer needs and competitive pressures are the main drivers of the change. Moreover, Profiroiu & Negoită (2022), through a study on public organizations in Romania, show that the digitization of public process management accelerates bureaucratic reform and improves service efficiency. On the other hand, Zolak Poljašević et al. (2025) emphasized that although many countries have implemented HRM reform regulations, bureaucratic cultural barriers and resistance to change remain the main obstacles in implementing digitalization.

Overall, the literature highlights three main themes. First, technology plays an important role in improving the efficiency and accuracy of human resource management. Second, the readiness of human resources and organizational culture is the primary determinant of the success of digital transformation. Third, bureaucratic characteristics and the complexity of public regulations also affect the results of digital system implementation. However, these studies are still limited in explaining in depth the dynamics of implementing the digital personnel system in regional educational institutions, which face infrastructure challenges, inter-unit integration, and technological literacy disparities among generations of employees. Thus, this study aims to fill this gap by examining how the digital transformation process occurs in regional education personnel services, the obstacles faced, and the adaptation strategies developed to realize an efficient, integrated, and sustainable personnel system.

This research offers a unique contribution by exploring the experience of implementing digital systems in personnel management in regional educational institutions through an in-depth qualitative approach. In contrast to previous research that emphasized technical and efficiency aspects, this study will explore holistically how employees adopt applications such as SIMPEG (*Sistem Informasi Manajemen Kepegawaian Badan Kepegawaian Daerah*) and SRIKANDI (*Sistem Informasi Kearsipan Dinamis Terintegrasi*) applications, how bureaucratic units collaborate in the digital transition, and how technical constraints (network, upload capacity) and HR readiness affect the process. In addition, this study will extend the context to secondary urban educational institutions—which are often under-represented in the literature—to provide contextual findings that are relevant to similar regions. Thus, this study not only assesses the successful implementation of digital systems but also maps the adaptation and collaboration strategies between employees that emerge informally in the field, offering a conceptual framework for the transformation of digital bureaucracy in the public sector.

This research aims to understand in depth the process of implementing digital systems in personnel management at a regional education institution, focusing on how technology, infrastructure, and human resources interact during the transition from manual to digital services. In particular, the research will explore the experiences of employees and personnel application operators using digital platforms, identify technical and human resources barriers that arise, and document the internal adaptation and collaboration strategies used to deal with bureaucratic changes. Using a qualitative approach of case studies, this study will answer the question: *How does the implementation of the digital personnel system work in daily practice, and what are the key factors that affect its effectiveness?* The research results are expected not only to provide an empirical understanding for these agencies but also to offer recommendations applicable to other government agencies in the digital transformation of personnel management.

RESEARCH METHOD

This study employs a qualitative approach using case study research (Cleland et al., 2021; Naeem & Thomas, 2025; Renjith et al., 2021) to deeply understand the implementation of digital-based personnel service management at the Palangka Raya City Education Office. This design was chosen because it corresponds to the need to explore the phenomenon of digital system implementation in a specific and real context (Bryda & Costa, 2023; Martinsuo & Huemann, 2021; Monteiro et al., 2022). The research focuses on the General and Personnel Sector (Umpeg), the central implementing unit of the SIMPEG and Srikandi applications, where the researcher conducts four-month internship activities. The direct presence of researchers in the field allows for the naturalistic observation of interactions between employees, technical constraints, and the digital adaptation process. The qualitative approach is used because it allows an understanding of the meaning, experience, and perception of digitalization implementers in the context of government bureaucracy (Garrels et al., 2022; Grekousis & Liu, 2021; Scharp, 2021). This research is based on the interpretive paradigm (Chen et al., 2021), which views social reality as a subjective construct influenced by interactions and organizational dynamics.

The data in this study were collected through three main techniques: participatory observation, semi-structured interviews, and documentation. The researcher was directly involved in a four-month internship in the General and Personnel Sector (Umpeg), which allowed for intensive observation of daily work practices, the use of the SIMPEG and Srikandi applications, and interactions between employees. The research informants consisted of the head of the field, implementing staff, digital system operators, and fellow interns. The selection of informants is conducted through purposive sampling, targeting individuals with a deep understanding and direct experience in implementing digital services. The research is located at the Palangka Raya City Education Office. To maintain the credibility of the data, triangulation techniques of sources and methods were used, as well as member checking on the narrative of the interview results (Janis, 2022; Morgan, 2024; Vella, 2024).

The data analysis in this study was conducted using an interactive model developed by Miles and Huberman (Bustamante et al., 2022; Karmina et al., 2021; Sari et al., 2022), which comprises three main stages: data reduction, data presentation, and conclusion/verification. At the data reduction stage, the researcher filters information from interviews, observations, and documentation to identify important themes related to digitalization in staffing. The data is then presented in the form of thematic matrices

and structured narratives to make it easier to trace the relationship between categories. Next, the researcher concludes a continuous reflective process, while cross-verifying using triangulation and confirmation from the informant. The validity and credibility of the data are maintained through the involvement of researchers in the field, daily field recordings, and discussions of preliminary results with key informants (Donnelly et al., 2023; Muhoza et al., 2021; Sdunzik et al., 2025). This process results in an in-depth interpretation of the dynamics of the digital bureaucracy, allowing a contextual understanding of the obstacles and adaptive strategies that develop within the Palangka Raya City Education Office.

RESULT AND DISCUSSION

Result

Implementation of Digital Systems in Personnel Management

The implementation of digital systems in personnel management refers to the process of switching personnel administration services from a manual model to an electronic-based model by utilizing information technology. In the context of government agencies, this implementation is aimed at increasing efficiency, accuracy, and transparency in employee data management. The implementation of the digital system includes digitizing archives, applying for online leave, preparing online SKP, and integrating data through applications such as SIMPEG (Personnel Management Information System) and Srikandi. This theme is relevant to the research because it shows how public institutions, such as the Palangka Raya City Education Office, have implemented the SPBE (Electronic-Based Government System) policy in practice. This focus is important for understanding the extent of digital transformation implementation and its impact on general personnel governance, including changes in staff work patterns, the use of digital platforms, and inter-unit integration in employee administration data management.

The implementation of the digital system has become an integral part of managing personnel administration at the Palangka Raya City Education Office. This is confirmed through the following interview narration,

"Based on the results of observations and interviews, it is known that most of the administrative processes have utilized digital systems such as SIMPEG and Srikandi, although the implementation is not yet fully optimal" (I_StafUmpeg_2024).

In line with that, the direct experience of operators also shows the important role of this system: "The results of interviews with SIMPEG operators and Umpeg staff also reveal that the digitization process runs effectively when the network is stable and the application functions well" (I_OperatorSIMPEG_2024).

The results of the interview above indicate that the UMPEG field has actively implemented the digital system through the SIMPEG and Srikandi applications. This information indicates that the digitalization process is no longer a topic of discussion but has become part of daily practice in personnel management. However, this implementation is not entirely optimal, mainly when technical glitches like unstable networks or unresponsive applications occur. Implicitly, the success of digital systems is highly dependent on infrastructure support and human resource readiness. The emphasis on "stable network" conditions suggests that the quality of service is

particularly vulnerable to technical barriers. Thus, the implementation of the digital system is ongoing, but it remains in the adaptation stage, requiring continuous improvement in hardware, software, and user training within the agency.

In addition, the use of digital applications has become part of the official work system in the field of Umpeg. Processes such as document filing, leave submission, and updating personnel data are carried out through the SIMPEG and Srikandi platforms. This practice speeds up data search and reduces reliance on physical documents. In addition, the service has also utilized cloud-based storage and hardware (hard disk/SSD) to ensure data security. However, the archive and metadata classification system is not fully organized, so document searches are sometimes still complex. Employees are also getting used to validating data independently through digital application interfaces, although there is still a gap in technical skills among employees. These findings indicate that, despite digital transformation being undertaken, its effectiveness remains highly dependent on device readiness and the individual capacity building of system users. Departing from this, the form of implementation of a digital system that replaces traditional personnel service practices is presented in Figure 1.

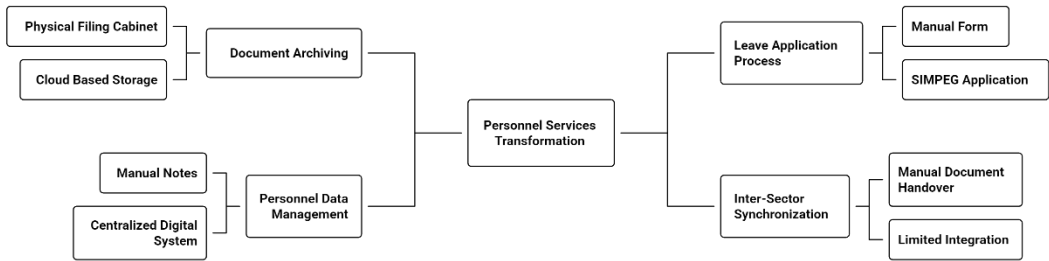


Figure 1. Staffing Services Transformation: Traditional to Digital

Figure 1 presents a comprehensive comparison between the traditional personnel service system and the digital system implemented at the Palangka Raya City Education Office. Digital transformation is shown through the SIMPEG and Srikandi applications, which replace manual processes in archiving, applying for leave, and managing data. However, it was found that the integration between units is still not optimal, indicating that digitalization has not comprehensively affected all aspects. The structure of this table supports key findings and provides a visualization of ongoing changes in the agency.

The implementation of the digital system in personnel management at the Palangka Raya City Education Office shows a progressive bureaucratic transformation. The use of the SIMPEG and Srikandi applications has replaced most manual practices in employee administration management, including filing, leave submissions, and updating personnel data. The findings of interviews and field data show that this digitization process accelerates services and improves data accuracy. However, it still faces challenges such as network limitations, document upload size, and human resource readiness. This change reflects a transition from the traditional system to a system that is more efficient and adaptive to the demands of bureaucratic digitalization. Overall, this study highlights the importance of sustainability in human resource capacity building and technology integration as the primary key to successfully implementing digital-based personnel systems in local government environments.

Technical and Human Resources Constraints in the Digitalization Process

Technical and human resources (HR) obstacles in the digitalization process refer to the obstacles that arise during the implementation of technology-based systems, both in terms of infrastructure and individual user readiness. In the context of personnel services, technical obstacles include limited internet networks, system upload capacity, and unstable application performance. Meanwhile, HR constraints are related to employees' ability to operate digital systems, their adaptation to new technologies, and the need for adequate technical training. This research reveals a dimension that is often overlooked in the digital transformation process, namely, the structural and cultural readiness of institutions. The identification of these constraints provides a realistic picture of the extent to which digitalization can be effective. It forms the basis for designing policy interventions that are responsive to the bureaucratic realities on the ground.

Various technical obstacles were identified during the digitization process. One of the informants explained:

"... There are still several obstacles, such as limited file capacity that can be uploaded (maximum 2 MB), internet network disruption that causes delays in data input..." (I_StafUmpeg_2024).

Other informants emphasized the HR aspect as an inhibiting factor:

"... lack of technical training for employees who manage the system." (I_OperatorSIMPEG_2024).

The main obstacles in the digitization of personnel services are technical problems and limited human resource capacity. When digital systems are adopted, obstacles such as unstable networks and low upload capacity become systemic problems that hinder work efficiency. Meanwhile, the lack of technical training suggests that the development of individual competencies does not always follow technological transformation. This condition creates an imbalance between the digitalization policy and the actual ability of implementers in the field. So, the solution is not just to provide an application, but also to strengthen training, mentoring, and digital literacy for all staff. Thus, the digitalization process requires a comprehensive approach, including infrastructure, systems, and the readiness of human resources as a unit of the work ecosystem.

This study also found that barriers to digitalization occur in layers. From a technical perspective, the SIMPEG and Srikandi systems still experience disruptions when used simultaneously, especially when document uploads exceed the maximum capacity. This often leads to delays in administrative processes. In addition, unstable internet disruptions cause staff to wait a long time for data input and even require them to repeat the upload process. In terms of HR, it was found that some senior staff are not entirely accustomed to digital platforms and rely on young staff to run applications. The lack of internal training is the main obstacle to building employees' technical skills. This situation impacts inter-employee dependency and slows down workflows. In other words, these obstacles are not only technical but also structural, as they relate to a work culture that is not yet fully adaptive to digital transformation. As a complement to the description, Table 1 below presents the distribution of obstacles that arise in the digitalization process based on system and resource aspects.

Table 1. Distribution of Digitalization Barriers by Systemic and Human Resource Aspects			
Obstacle Category	Specific Barrier	Unit/Role Affected	Impact on Workflow
System Infrastructure	Unstable internet connection	All administrative units	Delay in uploading and validating employee data
Application Limitation	File upload size capped at 2MB	SIMPEG/Srikandi Operators	Redundancy in document processing, repeated uploads
Capacity Development	Lack of technical training	Senior staff in Umpeg	Reliance on juniors, reduced efficiency
Intergenerational Gap	Digital Literacy among Age Groups	Senior vs. junior staff	Imbalanced division of digital tasks, potential miscommunication

Table 1. Presents a map of the distribution of obstacles experienced in the process of digitizing personnel services based on systemic and personal categories. The findings show that digital constraints are not independent; they are interrelated with infrastructure and human resource readiness. Unstable networks and document upload limits are technical obstacles that slow down administrative processes. Meanwhile, the gap in technical skills between generations of employees leads to work imbalances and increased burdens on certain staff. Departing from this, this study emphasizes the need for a holistic intervention approach: not only system improvement, but also human capacity strengthening and managing collaboration between employees.

The main obstacles in the process of digitizing personnel services at the Palangka Raya City Education Office come from two crucial aspects: technical and human resources. From a technical perspective, obstacles such as limited document upload capacity, network disruptions, and unstable application performance hinder the smooth administration process. Meanwhile, in terms of human resources, lack of technical training, digital literacy gap between generations, and dependence on certain staff are structural challenges that slow down digital adaptation. These findings show that the success of digitalization cannot be separated from device readiness and the active involvement of all elements of the organization. Therefore, the strategy going forward must include systematically increasing individual capacity and restructuring more collaborative work patterns so that the transition to a digital bureaucracy can take place effectively and sustainably.

Adaptation and Collaboration Strategies in Overcoming Digitalization Obstacles

Adaptation and collaboration strategies refer to the responsive and cooperative steps taken by institutions and individuals to face the challenges of implementing digital systems. Adaptation involves adjusting behaviors, work systems, and communication patterns to align bureaucratic processes with technological demands. Collaboration involves cooperation among employees of different ages, across fields, and at various management levels to strengthen capabilities and accelerate the resolution of operational bottlenecks. In the context of the Palangka Raya City Education Office, this strategy is evident in the division of roles between senior and junior staff, the strengthening of digital literacy through internal mentoring, and the use of a combination of technology (cloud and hardware) as a solution to system limitations.

Adaptation strategies are not always formal, but often arise from the daily practice of employees. Young employees informally provide training to colleagues who are not yet familiar with digital applications, especially senior staff. This process is unstructured, but runs naturally in a collaborative work setting. In addition, the utilization of dual storage devices (cloud and external SSDs) is used to anticipate possible system outages. The agency also distributes digital workloads based on the technical capacity of each employee, without waiting for formal training from the center. This shows that adaptation strategies grow from micro-initiatives based on work solidarity and collective awareness to maintain service efficiency. These findings reinforce the importance of building a work ecosystem that supports spontaneous and responsive innovation, especially in the bureaucratic digital transition process.

The success of implementing the digital system within the Palangka Raya City Education Office is determined not only by technological devices but also by adaptation strategies and employee collaboration. Intergenerational collaboration is a practical approach to bridging the digital skills gap, while technical strategies like dual storage and capacity-based division of labor are contextual solutions to infrastructure limitations. Adaptation takes place not only at the institutional level, but also informally through collective work mechanisms and solidarity between staff. These findings confirm that the digitalization process requires a flexible and participatory approach, positioning bureaucratic actors as active subjects who can creatively respond to challenges. Therefore, strengthening a collaborative and adaptive culture is an important prerequisite for driving sustainable digital transformation in the public sector.

Table 2. Adaptation and Collaboration Strategies in the Personnel Digitalization Process

Types of Strategies	Implementation Practices	Executive	Purpose/Benefits
Intergenerational Collaboration	Young staff guide senior staff in the use of the app	Junior and senior staff in the field of Umpeg	Bridging the digital skills gap between employees
Dual Technology Adaptation	Use cloud storage and SSDs to store employee data	SIMPEG operator and documentation team	Avoid the risk of data loss and upload system limitations
Capacity-Based Task Allocation	Adjust digital tasks according to employee competencies	Head of field and unit coordinator	Work efficiency and reduced errors due to technical limitations
Informal Internal Mentoring	Spontaneous technical training between employees	Performed in daily work interactions	Knowledge transfer runs dynamically without waiting for formal training

Table 2 presents a variety of adaptive and collaborative strategies found in the implementation of digitalization within the Palangka Raya City Education Office. Each strategy is developed from empirical practice and not just a formal policy. Intergenerational collaboration shows that institutions respond to challenges with an approach based on internal solidarity. Meanwhile, technical strategies such as the use of dual technology are a form of functional improvisation against the limitations of the system. Overall, these strategies show that sustainable digital transformation requires more than just infrastructure — it is a work culture that is flexible, responsive, and based on cooperation among bureaucrats.

Based on the research findings above, the success of implementing the digital system within the Palangka Raya City Education Office is determined not only by technological devices but also by adaptation strategies and employee collaboration. Intergenerational collaboration is a practical approach to bridging the digital skills gap, while technical strategies like dual storage and capacity-based division of labor are contextual solutions to infrastructure limitations. Adaptation takes place not only at the institutional level, but also informally through collective work mechanisms and solidarity between staff. These findings confirm that the digitalization process requires a flexible and participatory approach, by placing bureaucratic actors as active subjects who can respond creatively to challenges. Therefore, strengthening a collaborative and adaptive culture is an important prerequisite for driving sustainable digital transformation in the public sector.

Discussion

The results of this study confirm that implementing the digital system in personnel management at the Palangka Raya City Education Office represents a concrete form of bureaucratic transformation towards more efficient, transparent, and adaptive governance. Key findings show that the SIMPEG and Srikandi applications have been actively operational, replacing most of the manual processes in filing, applying for leave, and managing personnel data. The focus of this research is to understand the forms of implementation, challenges, and adaptation strategies in the context of digital personnel services, which align with the national SPBE policy framework. The relevance of the findings lies in how the city-level education office responds strategically and practically to the demands of public digitalization. Thus, this discussion will be studied in three main themes: the form of digital system implementation, technical and human resource constraints, and adaptation and collaboration strategies between personnel.

The findings indicate that SIMPEG and Srikandi have become integral to the official work system in personnel administration. This is in line with technology-based management theory that emphasizes the integration of information systems for organizational efficiency (Al-Matari et al., 2022; Cosa & Torelli, 2024; Schiavi et al., 2024). In practice, the use of digital media accelerates data access, minimizes manual errors, and strengthens archive security. Research by Huda et al. (2024) at BKPSDM Jember shows that SIMPEG can increase service efficiency by up to 35%. Similarly, Omar et al. (2024) stated that the digitization of archives speeds up the administrative process, although it still requires an improvement of the metadata system.

Meanwhile, the study by Ismail et al. (2024) at the Palembang City Education Office highlighted the importance of infrastructure readiness as a determinant of the success of digitalization. The similarity of these findings shows that digital systems are effective if competent networks, devices, and human resources support them. However, the context of Palangka Raya shows that implementation is still partial and depends on technical stability, which requires continuous system updates.

Technical constraints and human resource limitations are the main challenges in digitizing personnel services. The perspective of organizational adaptation theory explains that the success of technological innovation is greatly influenced by structural readiness and work culture (Bhuiyan, 2024; Najm & Ali, 2024; Rubel et al., 2023). This study reveals obstacles such as upload capacity limits, network disruptions, and a lack of technical training. This is consistent with the findings of Ismail et al. (2024), which emphasize that technological readiness and digital literacy of human resources are

prerequisites for the success of the digital system. Research French (2025). It also found that managing digital archives requires clarity of metadata and operator skills. On the other hand, Damar et al. (2024) emphasize the importance of human resource development in educational organizations to respond to digital change. Thus, the obstacles at the Palangka Raya City Education Office reflect the gap between the digitalization policy and the institution's actual readiness to implement it comprehensively.

Adaptation and collaboration strategies in the face of digitalization constraints reflect a management approach based on participation and flexibility (Ciacci et al., 2025; Cosa & Torelli, 2024; Zapata-Cantu et al., 2023). The study found that young employees assisted senior staff in using digital applications through informal mentoring and employed dual storage devices to overcome system limitations. This strategy is relevant to the findings of Karmina et al. (2021), which indicate that organizational learning occurs in social interactions, not just through formal training. Huda et al. (2024) emphasized that the effectiveness of SIMPEG increases when users make contextual innovations in response to system constraints. Meanwhile, Ismail et al. (2024) show that a collaborative work culture can accelerate the digital adaptation process. Therefore, the dynamics that emerged at the Palangka Raya City Education Office show that micro and flexible strategies based on intergenerational solidarity are the leading force in maintaining the continuity of the digital transformation of the regional bureaucracy.

In practical terms, this study provides an in-depth overview of how regional education institutions implement digitalization policies into daily staffing practices. These findings can serve as a reference for other agencies in designing adaptive digital policies, particularly to increase human resource capacity and improve digital infrastructure. In addition, intergenerational collaborative strategies can be adopted as an internal training model based on work experience. Theoretically, this study strengthens the technology-based public service management model and organizational adaptation by incorporating the dimension of informal collaboration as a key element in implementing technology in the public sector. This research also contributes to the development of digital management theory in the context of local education, emphasizing the importance of balancing systems, human resources, and work culture.

Overall, the results of this study show that the digitization of personnel management at the Palangka Raya City Education Office has been progressive, although it is not optimal. Three key aspects were identified: the implementation of digital systems, technical and HR barriers, and adaptation and collaboration strategies. These findings confirm that the success of digitalization is not only determined by technology, but also by the readiness of human resources and organizational culture. Therefore, it is recommended that other education agencies strengthen the integration of information systems and develop collaborative work patterns across generations. Further research can be focused on evaluating the long-term effectiveness of digital systems and their impact on employee performance and public service satisfaction.

CONCLUSION

This research reveals that the digitization of personnel service management at the Palangka Raya City Education Office has made significant progress through the use of the SIMPEG and Srikandi applications. Digital systems have been proven to speed up administrative processes, increase efficiency, and reduce reliance on physical

documents. However, the implementation of digitalization still faces technical obstacles such as network disruptions, limited upload capacity, and digital literacy gaps among employees. Informal adaptive strategies, such as intergenerational mentoring and capacity-based division of labor, are pragmatic solutions in overcoming these barriers. These findings confirm that the success of digital transformation depends not only on technology but also on structural readiness and a collaborative work culture. Therefore, strengthening infrastructure, increasing human resource capacity, and creating a flexible work ecosystem are essential requirements for realizing effective, responsive, and sustainable personnel governance in the digital era.

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