



A Google Sites-Based Virtual Workspace Model for Enhancing the Efficiency of Teachers' Administrative Tasks

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Abstract: This study aims to develop a Google Sites-based virtual workspace model to enhance the administrative efficiency of early childhood educators. The study employed a Research and Development (R&D) method using the 4D model (Define, Design, Develop, and Disseminate) and applied a concurrent triangulation mixed-methods design. The research participants consisted of 13 kindergarten teachers at TK Kristen 03 Eben Haezer, Salatiga, Indonesia. Data were collected through semi-structured interviews, non-participant observations, questionnaires, and pretest-posttest performance assessments. Qualitative data were analyzed using the interactive model of Miles, Huberman, and Saldaña, including data reduction, data display, and verification. Quantitative data were analyzed using descriptive statistics and paired-sample t-tests. The findings indicate that, prior to the intervention, teachers faced significant challenges, including limited time, fragmented data storage, and ineffective document archiving, resulting in substantial administrative workload demands. The developed virtual workspace integrates key Google Workspace tools (Google Drive, Docs, and Sheets) into a centralized, dashboard-style interface. Validation results confirmed high feasibility, with IT experts rating the system at 95.55% ("very valid"). Practicality assessments from teachers indicated a "very practical" category, while effectiveness testing showed a statistically significant improvement in administrative efficiency, with mean performance scores increasing from 11.76 to 17.53 ($p < 0.05$). This study demonstrates that a low-cost, integrated digital workspace can significantly reduce administrative burdens, offering a sustainable and scalable solution for resource-limited educational settings.

Article History

Received: 13-03-2026

Revised: 25-04-2026

Accepted: 22-05-2026

Published: 20-06-2026

Key Words:

Teachers' Workspace;
Administrative Tasks;
Work Efficiency; Google
Sites.

How to Cite: Rimbata, W. A. R., Wahyudi, & Satyawati, S. T. (2026). A Google Sites-Based Virtual Workspace Model for Enhancing the Efficiency of Teachers' Administrative Tasks. *Jurnal Kependidikan : Jurnal Hasil Penelitian Dan Kajian Kepustakaan Di Bidang Pendidikan, Pengajaran, Dan Pembelajaran*, 12(2), 804-815. <https://doi.org/10.33394/jk.v12i2.20104>



<https://doi.org/10.33394/jk.v12i2.20104>

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Introduction

Teachers play an important role in determining the quality of education. They are the main figures who influence the success of learning process in the classroom (Stang-Rabrig et al., 2022; Hoy & Miskel, 2013, p. 323; Riyanto & Sayer, 2022). All efforts to create quality education cannot be implemented without teachers's active role (Sumanasena & Mohamed, 2022; Dantes et al, 2024).

In addition to their primary instructional tasks, teachers also have significant administrative responsibilities, including developing lesson plans and reporting on student progress, as well as other additional duties such as being a school treasurer or operator. These administrative tasks are one of the teachers' professional tasks (Munawir et al., 2022). However, excessive administrative burdens often become a source of emotional pressure that triggers stress and burnout, thereby reducing teachers' focus on teaching quality. This phenomenon is supported by preliminary research data showing that teachers often lack time

to complete administrative tasks at school, resulting in delays in primary work or a workload spillover into personal life (Rahmawati et al., 2024; Fatimah & Ilyas, 2024; Magtalas & Eduvala, 2024; Ayeni, 2018; Jomoad et al., 2021; Tiggelaar, Groeneveld & George, 2023).

Previous research has predominantly focused on school digitalization through a School Management System that offered a solution to these efficiency issues (Ibrahim et al., 2022; Choirinisa & Ikhwan, 2022), thus improving teachers' performance (Ibrahim et al., 2022). However, many educational institutions, particularly those at the early childhood education (PAUD) level, are hampered by high development costs and complex infrastructure. Many previous studies had also been conducted concerning in school digitalization, but most of them used more complex and highly cost platforms. Therefore, innovative administrative management is needed that is not only effective but also affordable and easy to operate. This research develops a Google Sites-based virtual workspace model as a solution to integrate various teacher administrative needs into one centralized digital platform.

The Google Sites-based Virtual Workspace in this study, functions as a Dashboard Integrator. It integrates workflow logic, rather than simply serving as a file repository. This approach transcends simple content housing to function as an active, centralized command center that orchestrates organizational processes. By embedding live data visualizations, automated feedback loops, and conditional navigation paths directly into the interface, the workspace evolves into a cohesive operational framework. Rather than acting as a static destination for information retrieval, the Dashboard Integrator serves as an active guide, synchronizing disparate tools and tasks to reduce user cognitive load, enforce workflow continuity, and streamline the transition from information access to actionable execution.

The administrative burden placed upon educators is a systemic challenge that transcends geographic and economic boundaries, directly threatening the realization of Sustainable Development Goal 4 (SDG 4) regarding the provision of quality education. As teachers are increasingly diverted from pedagogical duties to manage complex bureaucratic requirements, the quality of classroom instruction suffers—a phenomenon that is particularly pronounced in resource-constrained educational settings worldwide. By conducting this research at TK Kristen 03 Eben Haezer in Salatiga, Indonesia, this study utilizes the school as a representative case for the broader cohort of resource-limited institutions globally. Through the analysis of existing administrative practices and challenges within this environment, the research aims to establish an accessible, scalable digital framework that can be adapted to support educators and enhance administrative efficiency in similar contexts across the globe. This study aims to develop a Google Sites-based virtual workspace model by analyzing teachers' existing administrative practices and challenges in order to improve the efficiency of their administrative tasks.

Research Method

This study utilizes a Research and Development (R&D) method based on the 4D model—Define, Design, Develop, and Disseminate—to construct a Google Sites-based virtual workspace. The study employs a mixed-methods concurrent triangulation design, integrating qualitative data (derived from observations and interviews) with quantitative data (derived from questionnaires and performance testing) to ensure comprehensive analysis. The primary participants consisted of 13 active kindergarten teachers at TK Kristen 03 Eben Haezer, Salatiga. The dissemination phase expanded the scope to include 15 early childhood education principals within the Tingkir District, Salatiga.

Define

This phase focuses on establishing instructional and administrative requirements. This includes: 1) Needs Analysis: Conducting a literature review and a survey of 12 teachers in the Melon Group PKG, Tingkir District, to identify administrative burdens and operational bottlenecks; 2) Problem Identification: Pinpointing systemic issues such as excessive workload, limited time for lesson plan development, and restricted access to costly management systems; and 3) Feasibility Analysis: Evaluating Google Sites as a cost-effective, efficient, and accessible solution.

Design

In this stage, the initial design of the virtual workspace system to be developed is carried out. 1) Design Concept: Determining system structure, required features, and user workflows for using Google Sites; 2) Prototyping: Developing the initial site interface with various key features, such as document storage, lesson schedules, communication, and administrative task management.

Develop

This phase involves the realization and refinement of the system. 1) Development Implementation: Building the platform based on the design specifications. Prior to trials, the system undergoes validation by subject matter experts (educational management) and IT/media experts; 2) Limited Trial: The system is tested for practicality and functionality with 13 teachers at TK Kristen 03 Eben Haezer, Salatiga. This trial is conducted twice: first to gather user perceptions, and second to assess product effectiveness; 3) Revision and Improvement: Refining the system based on trial data to optimize performance and user satisfaction.

Disseminate

The final stage focuses on scaling the innovation. This stage includes: 1) Widespread Implementation: Distributing the system to 15 kindergartens affiliated with the IGTKI in Tingkir District. And 2) Continuous Evaluation: Conducting ongoing assessments to update the system based on user feedback and technological advancements.

Research instruments were validated through both qualitative and quantitative lenses: 1) Qualitative Validation: Source triangulation (obtaining data from diverse respondents) and technical triangulation (comparing data across questionnaires, interviews, and document studies) were employed to ensure credibility; and 2) Quantitative Validation: Instrument validity and reliability were tested using SPSS software. The instrument validity were determined by comparing the calculated r -value with the r -table at a 5% significance level. Items with a calculated r -value greater than the r -table (0.553) were deemed valid. Following testing, two invalid items were removed, leaving six valid items. The instrument reliability were measured using Cronbach's Alpha. An alpha value of 0.740 (exceeding the 0.60 threshold) confirmed that the instrument maintained internal consistency.

Data were collected through a concurrent triangulation approach: 1) Qualitative: Semi-structured interviews (pre- and post-implementation), non-participatory observation of administrative activities, and document analysis of the school database; and 2) Quantitative: Questionnaires measuring product practicality and pre- and post-tests measuring product effectiveness. Expert validation was conducted to ensure the system's suitability for teachers' administrative needs, assess design, content, and practicality, and obtain input on the product's strengths and weaknesses so researchers could improve it. The experts requested to conduct the validation were educational management/educational administration experts to determine the product's content validity and media/technology experts to determine the practical validity of the design used. Once it is validated, the product is then being conducted for a limited trial. The first and second product trials involved 13 teachers at TK Kristen 03

Eben Haezer, Salatiga. The dissemination phase involved 15 early childhood education institution principals in Kecamatan Tingkir, Salatiga.

Following the Miles, et al. (2014) model, the qualitative data is processed through three interactive steps: 1) data reduction: sorting, simplifying, and abstracting raw data. This involves summarizing interviews, coding themes, and categorizing information to maintain focus on the research objectives; 2) data display: organizing the reduced data systematically into narrative text, tables, or charts to make it easily readable and understandable; 3) conclusion drawing & verification: identifying patterns and correlations to draw initial conclusions. These are then verified against field notes to ensure validity, objectivity, and direct relevance to the research questions.

Quantitative data is analyzed using descriptive statistics, including scoring, percentages, and categorization. Expert feedback is measured using a Likert Scale to calculate the average score:

$$\text{Average Score} = \frac{\sum \text{Scores Given}}{\text{Number of Items}}$$

Table 1. Validity Categories (Widoyoko, 2012)

Average Score	Validity Categories
1.00 – 1.99	Invalid
2.00 – 2.99	Less valid
3.00 – 3.99	Fairly valid
4.00 – 4.49	Valid
4.50 – 5.00	Very valid

The practicality of the product is determined by calculating the percentage of the total score:

$$\text{Percentage} = \left(\frac{\text{Total Score Obtained}}{\text{Maximum Score}} \right) \times 100\%$$

Table 2. Practicality Categories (Riduwan, 2015)

Percentage	Practicality Category
0% – 39%	Impractical
40% – 59%	Less practical
60% – 79%	Fairly practical
80% – 100%	Very practical

To measure the effectiveness of the product, a Paired-Sample T-Test is used to compare pre-test and post-test results.

- Hypothesis:
 - H_0 : No significant difference between pre-test and post-test scores.
 - H_a : Significant difference between pre-test and post-test scores.
- Decision Rule: H_0 is rejected if the Sig. (2-tailed) value < 0.05, indicating that the "Virtual Workspace" is significantly effective in assisting teacher administration.

Results and Discussion

At TK Kristen 03 Eben Haezer, the administrative landscape is defined by a systemic overlap of pedagogical and bureaucratic duties, creating a significant "dual-role" strain on educators. Teachers function as structural and managerial stakeholders, balancing daily lesson planning with long-term accreditation requirements like the Credit Point Assessment (PAK); this proliferation of responsibilities creates a prioritization conflict where administrative rigor often competes with the quality of instructional preparation, forcing teachers into a form of "strategic triage" to protect the core learning experience. This workload is further compounded by "temporal friction," as a rigid weekly reporting cadence leaves little room for flexibility, causing

administrative tasks—when combined with extracurricular committees and workshops—to encroach upon non-teaching hours and erode personal work-life boundaries. Furthermore, the school's current digital infrastructure functions as a fragmented repository rather than an integrated workspace; the absence of a centralized, navigable system imposes an unnecessary cognitive load on educators, as they must expend significant mental effort merely locating and retrieving documents instead of focusing on pedagogical output. These findings underscore a critical need for a transition toward a dashboard-oriented architecture that aligns technology with operational workflows to resolve the current disconnect between administrative demands and digital efficiency. The developing process of a Google Site-based Virtual Workspace Model using the 4D model (Define, Design, Develop, and Disseminate) has been carried out with the following steps:

1) Define

In the initial development phase, an in-depth analysis was conducted to establish instructional requirements based on the 4D model proposed by Thiagarajan et al. (1976). This process began by mapping administrative needs in accordance with the Regulation of the Minister of Elementary and Secondary Education Number 11 of 2025, which defines the teacher workload as a complex combination of teaching processes, additional duties, and administrative obligations. These responsibilities are systematically categorized into the planning stage (Yearly Program, Semester Program, syllabus, and lesson plans), the implementation stage (journals, attendance, and grade analysis), and the evaluation stage (Dwi Wijayanti et al., 2024). A survey of 12 early childhood education (PAUD) teachers in Tingkir District identified that the preparation of student progress reports and additional assignments constituted the most significant administrative burdens; although institutional support was generally deemed adequate, teachers reported significant variation in their ability to manage tasks like Educational Data (Dapodik) and annual program development. These findings underscored a critical discrepancy between mandatory administrative obligations and the teachers' operational capacity, revealing severe time constraints and an urgent need for school management support. As a strategic solution, the implementation of a Google Sites-based workspace was determined to be highly viable due to its accessibility, cost-efficiency, and seamless integration with the broader Google ecosystem, including Drive, Docs, Sheets, and Meet. By embedding these tools directly into the workspace interface, the platform facilitates real-time collaboration and centralized data storage, effectively enhancing time efficiency without requiring specialized technical expertise, while simultaneously ensuring data security through organized access controls.

2) Design

At this design stage, initial planning of the digital workspace is carried out. The concept and structure of the virtual workspace are as follows:

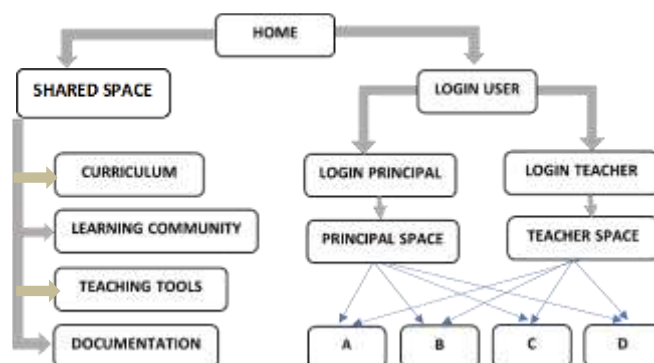


Figure 1. The Structure of Teacher Virtual Workspace Design

3) Develop

The prototype utilizes the Google ecosystem to construct a centralized, user-friendly virtual workspace tailored for teacher administration. By seamlessly integrating core applications—including Google Sheets, Docs, Calendar, and Forms—into a unified interface, the design optimizes workflow efficiency and simplifies the management of diverse administrative tasks. The main features of the product being developed:

Home Page

The Home Page contains a navigation menu to the Workspace and the login page.



Figure 2. Virtual Workspace Home Page

Shared Space

A freely accessible page to all users containing school profile data, curriculum menus, teaching tools, learning communities, and documentation.



Figure 3. Shared Space Layout

Login User Page

At the login page, teachers and principal are directed to entering their private space by filling the username and password form.



Figure 4. Login Page Layout

The Personal Space

The Personal Space page is accessible only to logged-in users. Teachers can manage their personal documents, including personal files and class documents. Teachers can also report directly to the principal on their task progress via a Google Sheet connected to the Principal's Space. Principals can manage school and teacher documents in the Principal's Space.



Figure 5. The Personal Space Layout

Following the system's development, the virtual workspace underwent rigorous validation by experts in both information technology (with a total score of 86, the product achieved an average score of 4.78 and a success rate of 95.55%, indicating that the product quality falls into the very good/very valid category) and educational management (with an accumulated score of 65, resulting in an average score of 4.64 and a percentage of 92.85%. This score places the product in the "Very Good" or "Very Valid") to ensure its technical functionality and pedagogical relevance. These evaluations confirmed that the platform is highly mature, featuring an intuitive interface that seamlessly aligns with key administrative workflows—encompassing planning, organizing, and supervision—while successfully fostering professional collaboration. To assess practical impact, a two-stage trial was subsequently conducted with 13 educators at TK Kristen 03 Eben Haezer. Initial observations revealed that teachers were previously hindered by time-consuming file retrieval and the persistent need to manage administrative duties outside of official working hours. However, following systematic training and the implementation of the virtual workspace, educators reported a substantial shift in operational efficiency. The intervention successfully resolved common technical bottlenecks and streamlined data access, effectively alleviating the teachers' administrative burden and demonstrating that the workspace is both a feasible and highly impactful solution for modern school management.

Post-training, post-test results showed a drastic improvement in performance, with the average efficiency score rising from 11.76 to 17.53. Specifically, the ease of

finding supporting files increased sharply from 1.92 to 3.77. This was supported by the results of the Paired-Sample T-Test, which showed a significance value of 0.001 (<0.05), concluding that the use of the Virtual Workspace effectively reduced teachers' administrative burden.

Table 3. Paired-Sample T-Test Result

Test	Mean Score	Correlation	Significance (Sig.)	Conclusion
Pre-test	11.76	0.887	0.001	Significantly effective
Post-Test	17.53			

In terms of practicality, the questionnaire showed a very high response rate across three main dimensions. Regarding time, teachers felt it was faster to compile teaching modules and locate curriculum documents (CP/ATP), allowing assignments to be completed on time at school without having to be taken home. Regarding ease of access, teachers gave the highest score (4.38) for ease of retrieval of stored files, demonstrating that the centralized digital filing system successfully addressed the issue of data loss. Meanwhile, regarding workload, this model was proven to reduce administrative stress and increase teacher independence without the need to rely on IT staff or colleagues.

4) Disseminate

The final phase of the research concluded with a dissemination program to 15 kindergarten principals in Tingkir District. The principals' response was very positive, considering this model a practical and easy-to-learn solution for improving school bureaucracy. While there were suggestions to optimize the display on mobile devices for greater flexibility, overall, the dissemination activity demonstrated that the Virtual Workspace was well-received as an urgent need to continuously improve teacher work efficiency.

Discussion

Carrying out administrative tasks is an integral part of a teacher's role (Munawir et al., 2022). Although not a primary task, these activities often take up a significant amount of time and energy, thus requiring effective management to prevent a decline in instructional performance. Based on research findings, teacher administrative tasks are divided into four main categories: routine learning administration (teaching modules, assessments, and reporting) which functions to support the smooth running of primary tasks (Wijayanti et al., 2024); administration of committee activities; personnel administration (PAK files); and additional managerial duties such as BOSP treasurer and infrastructure coordinator.

The weaknesses faced by teachers in managing their administrative duties can be categorized into seven areas: 1) Lack of Time and Deadline Pressure: The most significant obstacle teachers face is the limited time available to complete administrative tasks amidst their busy teaching schedules, often compounded by pressing deadlines. If left unaddressed, these pressures can ultimately negatively impact teacher performance (Creagh et al., 2023; Stacey et al., 2024); 2) Excessive Workload: The accumulation of both routine and additional administrative duties significantly drains teachers' time and energy. This burden frequently hinders or delays their primary instructional responsibilities. Teachers facing excessive administrative tasks often experience overload and stress, which ultimately diminishes the quality of their interactions with students in the classroom (Ayeni, 2018; Jomud et al., 2021; Tiggelaar et al., 2023); 3) Lack of Centralized Data Storage: Schools currently lack a shared

data storage space accessible to all teachers for essential items such as curriculum materials, standard operating procedures (SOPs), and personnel documents; 4) Ineffective Document Management: The archiving and filing systems are poorly organized; although Google Drive is used, the reliance on inconsistent links for different activities creates confusion for teachers. Research by Pradipta, Dewantoro, & Huda (2023) confirms that administrative archiving in the field is frequently poorly managed and ineffective; 5) Time-Consuming Document Searches: Storage fragmentation forces teachers to spend significant time locating necessary documents, often requiring them to seek assistance from principals, administrative staff, or other colleagues; 6) Technical Issues and Data Loss: Teachers regularly encounter technical challenges, including difficulty finding storage locations for past documents or dealing with lost files; And 7) Repeated Data Entry: Before the implementation of an integrated digital system, teachers were required to repeat the same data input across various forms or systems, a process that was considered both tiring and time-consuming.

The success of the Google Sites-based Virtual Workspace provides a compelling case for the role of "frugal innovation" in educational management. In the context of early childhood education (PAUD/TK), many institutions operate within significant resource constraints, making the adoption of expensive, enterprise-level School Management Systems (SMS) unsustainable due to high development costs and the need for complex, specialized infrastructure. Frugal innovation—defined here as the strategic application of accessible, low-cost cloud-based tools to solve complex institutional problems—offers a more sustainable path toward modernization. By repurposing the free, interconnected Google ecosystem into a centralized "Dashboard Integrator," this model bypasses the financial and technical barriers that typically hinder digital transformation in smaller schools.

The transition to this model proved that administrative efficiency does not inherently require heavy capital investment, but rather a strategic redesign of existing operational workflows. Unlike conventional digital filing that often confuses teachers with disparate links, the integrated workspace reduced cognitive load by providing a cohesive architecture for document retrieval. Empirical findings from the Paired-Sample T-Test ($p < 0.001$) confirm that this approach is statistically effective in alleviating administrative burdens. Teachers reported increased autonomy and reduced reliance on IT staff, demonstrating that the platform is both functionally effective and user-friendly.

These results align with broader research indicating that digital administrative systems allow educators to reclaim time for classroom innovations. Ultimately, this study demonstrates that for resource-constrained educational settings, a frugal digital innovation strategy—leveraging accessible platforms like Google Sites—is a highly viable and scalable solution. By transforming a conventional, manual workspace into an integrated digital ecosystem, schools can significantly enhance administrative efficiency without the unsustainable overhead of expensive, high-complexity systems.

Conclusion

This research concludes that the implementation of a Google Sites-based Virtual Workspace significantly mitigates the administrative burden traditionally faced by early childhood educators. Prior to the intervention, teachers at TK Kristen 03 Eben Haezer experienced substantial "workflow spillover" due to decentralized and manual data management. The development of the virtual workspace via the 4D model successfully transformed these fragmented processes into a centralized digital ecosystem. Rigorous validation from IT and educational management experts confirms the system's feasibility as a robust platform for real-time collaboration and professional documentation. Quantitatively,

the model's effectiveness is evidenced by a statistically significant increase in work efficiency ($p < .001$), with mean performance scores nearly doubling from 9.76 to 17.53. Qualitatively, the system fostered greater professional autonomy and reduced administrative-induced stress by eliminating redundant data entry. Ultimately, this study demonstrates that frugal digital innovation—utilizing accessible cloud-based tools—is a viable and scalable strategy for enhancing administrative efficiency in resource-constrained educational settings.

Recommendation

Based on the findings, there are some suggestions for developing and maintaining the sustainability of a Google Sites-based virtual workspace: 1) Establish an Admin and Management Structure. To ensure system sustainability, schools need to appoint one person (teacher/IT coordinator/school operator) as the Main Admin who is fully responsible for managing access (sharing permissions) and the site's main navigation structure. 2) Schools need to conduct regular link maintenance at the end of each month to ensure all supporting documents, such as CP, ATP, and Teaching Modules, are accessible without technical issues. Backing up old data into a dedicated "Archive" folder is also necessary, for example, at the end of each semester, to maintain optimal site access speed. 3) Establish a Standard Operating Procedure (SOP) for uniform file naming (e.g., Year_Document Type_Teacher Code) to facilitate document search. 4) Conduct routine practicality surveys every six months to gather feedback on new challenges or additional feature needs, so the system remains relevant to school administration requirements.

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