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Development of a School Management Information System with Linktree and Google Workspace Integration

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ABSTRACT

This study aims to determine the development of a school management information system with the integration of Linktree and Google Workspace. The method used is Research and Development (R&D) with a Mixed Methods approach, combining quantitative and qualitative analysis. The development follows the ADDIE model through five stages: (1) analysis of potential and issues, (2) system design, (3) development, (4) testing, and (5) evaluation. Data was collected through observation, interviews, expert validation questionnaires (content, media, and design), as well as limited testing and field testing at experimental and control schools. The research findings indicate that this system is highly feasible, practical, and effective in supporting school administration, supervision, and communication for school principals, and has the potential to be replicated in other elementary schools.

1. Introduction

The global digital world is growing rapidly in the era of the 4.0 industrial revolution. Technology is no longer just a tool but has become integrated into people's daily lives. Schools, as educational institutions, play a crucial role in the use of technology, especially in the fields of information and services. The importance of developing management information systems in educational institutions cannot be overlooked. With a good management information system, schools can optimize the management of various aspects of education, such as school administration, the learning process, and data on educators, educational staff, students, and parents in a more efficient manner (Hansen, 2020).

A study conducted by (Rahmawati et al., 2023) shows that the implementation of cloud-based technology in school administration can increase work efficiency by

up to 40%. Meanwhile, research by Nugroho et al. (2022) confirms that the use of digital platforms in education management can improve transparency and accountability. However, these studies are still limited to school management systems in general and are not yet specific.

According to the Diffusion of Innovation Theory by (Lili, 2014), innovations that are simple, easy to adopt, and have direct benefits tend to be more quickly accepted by users. This is the basis for the opinion of (Melianti, 2023), where the aspects related to innovation that are measured are complexity, relative advantage, compatibility, and self-efficacy toward technology. Thus, the use of Linktree can be an effective first step in introducing information technology to school principals and staff who may still have limited understanding of technology. By using Linktree, supervision is no longer limited to physical visits to classrooms but can be done online through documentation and data uploaded to the platform. This innovation not only improves the efficiency of the principal's tasks but also creates a more collaborative and transparent work environment.

With the introduction of a new learning environment at the beginning of the 21st century, individual and community responsibilities have increased, along with the growing need for education (Sardiyanah, 2020). A system can be defined as a network of interrelated procedures that work together to carry out an activity or achieve a specific goal (Mulyati, 2017). Management Information Systems (MIS), according to (Sari, 2021), are internal controls within a business that involve people, documents, technology, and procedures to solve problems such as product costs, services, or business strategies. (Pamungkas, 2020) adds that MIS is a system that provides information in the form of reports and images used by managers and professionals, for example, for sales analysis, production performance, or cost reporting. MIS aims to support a group of managers representing specific organizational units, either based on management level or functional area. From this explanation, it can be concluded that this system is an information-based technology that securely stores educational data and enables the reuse of such data.

Currently, technology is developing very rapidly, especially mobile technology such as smartphones (Hadrian et al., 2023). (Saptaria, 2022) mentions learning media that are often used in teaching and learning activities, including Linktree, Google Forms, YouTube, and an online quiz application called Quizizz. Linktree is an interactive and user-friendly platform, even for beginners. The Linktree app is a learning platform that consolidates various links into a single application (Zulkarnaen, 2021). As a web-based platform, Linktree is designed to support distance learning with features such as embedding materials, quizzes, attendance tracking, and more. According to Kartika (2022), Linktree is one of the web-based learning tools designed to support various learning needs such as embedding materials, quizzes, attendance tracking, and more. This service is available for free, making it easier for users to conduct online learning.

Google Workspace is a service that provides various features to support school principals, teachers, and students in carrying out tasks and learning (Iqbal Fawwaz et al., 2023). (Malikah, 2022) also emphasizes that Google Workspace helps

English teachers in the online learning process. Additionally, (Tanjung, 2023) concludes that the Google Workspace for Education platform is highly beneficial for teachers in ICT-based learning aligned with the 2013 Curriculum.

The integration of Linktree with Google Workspace offers significant advantages for supervisory task efficiency through centralized link and information management. Furthermore, the combination of Linktree with Google Workspace enables better monitoring and analysis of school stakeholder engagement. This system aims to provide a digital platform that accelerates access to school information, simplifies data collection, and supports online supervision and evaluation processes. As a result, school principals can more easily manage their tasks while addressing the challenges of digitalization in educational management. The use of Google Workspace supports document management functions, online collaboration, and the integration of calendars, forms, and classrooms, all of which can be neatly organized into a single Linktree link.

This study is expected to contribute to the development of literature in the field of educational technology and digital-based school management. In practical terms, the results of this study can serve as a reference for elementary schools in adopting more effective digital solutions to improve administrative and school management efficiency.

2. Methodology

The type of research in this study is research and development. Development research is necessary research where development aims to develop products, test product benefits, and assess the effectiveness and efficiency of the developed products. Development research as research produces something new to be applied in elementary schools. According to (Waruwu, 2021), Research and Development is a research method that is widely adopted in the academic world today to design and test the effectiveness of products. The research and development method aims to produce a specific product through a process of discovering potential and problems, designing and developing a product as a solution to the problem.

According to Sugiyono (2019) in (Tanzeh & Arikunto, 2004), research methods are scientific actions carried out to obtain data used for specific purposes. In data processing, a study is conducted using various approaches as a way to analyze the results of the experiments conducted. This study uses a quantitative research approach, where data processing is done using quantitative methods. Quantitative methods are research methods that analyze data statistically or numerically (Sugiyono, 2019). The data obtained in this study were tested using statistical formulas, the results of which are numbers that indicate the results of the research that has been carried out.

The research design applied by the researcher in this proposal is part of Research and Development (R&D). According to (Waruwu, 2023), research and development aims to design solutions to problems in research by creating a product

based on the results of needs analysis, which is then tested and evaluated for improvement. The research was conducted using the ADDIE development research model.

According to Arikunto (2006), if the population size is less than 100 people, the sample size is taken in its entirety; however, if the population size is greater than 100 people, 10%-15% or 20%-25% of the population size can be taken. This study uses the Non-Probability Sampling method with a saturated sampling technique. According to Sugiyono (2016: 84), Non-Probability Sampling is a sampling technique that does not give equal opportunities or chances for every element or member of the population to become a sample.

Questionnaires were used to conduct surveys and final assessments during the activity process. According to Arikunto (2012) in (Prestasi, 2014), a questionnaire is a list of questions that must be filled out by the person being measured (respondent), with the aim of finding out their circumstances/personal data, experiences, knowledge, attitudes, and opinions.

Table 1. Effectiveness Test Sheet

No	Statement	Measured Aspects	Indicator	Variable	Types of Instruments
1	Digital management information system applications are necessary to improve the effectiveness of the principal's duties	User needs for digital applications	Perception of SIM importance applications to support the principal's duties	Effectiveness of SIM Applications	Questionnaire (Likert scale)
2	Digital management information system applications	Availability of information systems	The existence and availability of digital SIM applications in schools	Utilization of digital Information Technology in Schools	Questionnaire (Likert scale)
3	How much knowledge do you have about digital management information system applications?	User knowledge	Level of understanding of the features, functions, and objectives of the application	Level of Digital Literacy	Questionnaire (Likert scale)
4	The use of digital SIM applications is more effective than manual systems.	Efficiency of technology use	Comparison between the use of digital systems and manual systems	Work Effectiveness	Questionnaire (Likert scale)
5	Teachers have introduced how to use digital SIM	Education on application use	Frequency of experience training/introduction to	Teacher Support or for Technology Implementation	Questionnaire (Likert scale)

No	Statement	Measured Aspects	Indicator	Variable	Types of Instruments
	applications so that they are easy to understand.		the application by teachers		
6	Digital applications are easier to use than manual ones.	SIM Ease of use of the system	Perception of the interface, navigation, and user experience	User-Friendly SIM Applications	Questionnaire (Likert scale)
7	Digital applications make it easier to receive and share documents from the principal.	SIM Digital collaboration and share communication	Ease of document exchange through digital systems	Effectiveness of Digital Communication and Collaboration	Questionnaire (Likert scale)
8	Digital applications adapt to developments in z	SIM Technology adaptability	The suitability of the application to current needs and the latest technology	Suitability of Applications for the Digital Age	Questionnaire (Likert scale)

The type of instrument used was a questionnaire with a Likert scale (1–4):

1 = Strongly Disagree

2 = Disagree

3 = Agree

4 = Strongly Agree

After calculating the percentages, the criteria for the presentation were determined, and the validation criteria for the developed product were presented. The formula used was:

$$P = \frac{f}{n} \times 100\%$$

Explanation:

P : percentage

f : score obtained

n : overall score

Analysis of the responses of students, teachers, and principals was used to determine the responses of students and teachers to the product being developed. Feasibility testing used descriptive data, which is the conversion of quantitative data into qualitative data. (Arikunto, 2009) explains that validity is a measure that indicates the levels of validity, reliability, and effectiveness of an instrument. Analysis of respondent responses is used to test the level of validity, whether the use of a management information system application with Linktree and Google Workspace integration is valid for improving the effectiveness of school principals' performance.

3. Result and Discussion

The student needs questionnaire is used to obtain initial data on student needs for the information system application being developed.

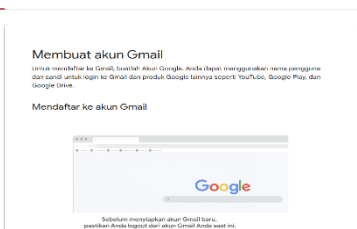
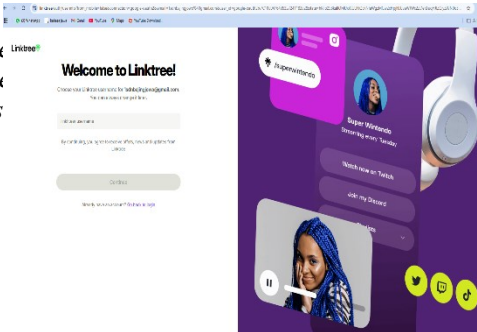
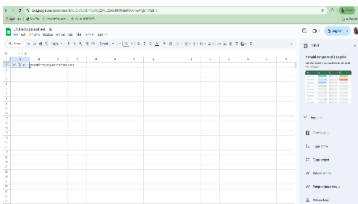
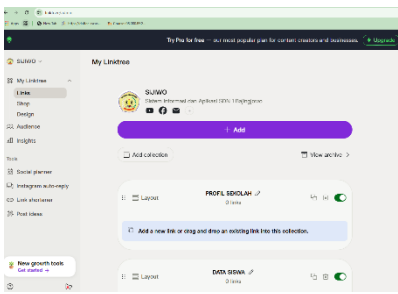
Table 2. The Questionnaire Results

Aspects assessed	Answer	Total	Percentage
1. Is it difficult to search for data at school?	Yes	5	100%
	No		
2. Is the digital management information system application difficult to use?	Yes	5	100%
	No		
3. Do you know about the digital management information system application?	Yes	5	100%
	No		
4. Is the current information system open and easier to access?	Yes	5	100%
	No		
5. Have teachers ever introduced how to use the digital management information system application so that it is easy to understand?	Yes	5	100%
	No		
6. Is the digital management information system application easier to use than manual methods?	Yes	5	100%
	No		
7. Is the storage of the digital management information system application more secure?	Yes	5	100%
	No		
8. Is the digital management information system application developed in line with current developments?	Yes	5	100%
	No		

Analysis of the questionnaire results from all respondents (100%) indicates that finding data at school is still difficult, indicating barriers to accessing information. However, all respondents also consider the digital management information system application difficult to use, indicating challenges in terms of technical aspects or user understanding. The conclusion from the teacher needs survey regarding teachers' needs for the digital management information system application with Linktree and Google Workspace integration is that the level of need and awareness of the digital management application is very high.

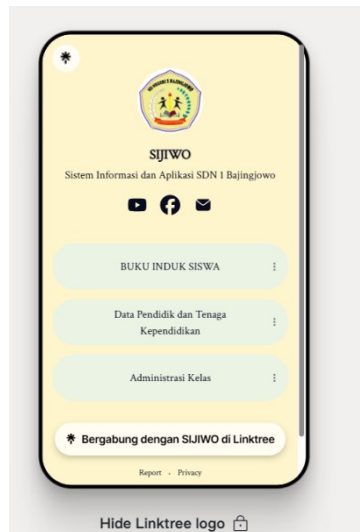
At the design stage, an initial design was developed for the digital management information system application with Linktree and Google Workspace integration, which will be used as an information management and administrative system. The results of the analysis of teachers' and students' needs serve as the main guideline in designing the prototype of the management information system application with Linktree and Google Workspace integration. Each element in the application is designed with consideration of its effectiveness in improving the performance of school principals. The following is the prototype of the management information system application with Linktree and Google Workspace integration developed based on the analysis of teachers' and students' needs.

Table 3. Design Stage

No	Media Section	Design	Description
1	Create an email account first		1. Create a new Gmail account or use the account of the principal/school operator.
2	Create a linktree account using the email you just created		1. Open your browser at liktree 2. Enter your full name or business name. Select the appropriate category (e.g., education, business, creator).
3	Section on the content of the management information system application with integration of Linktree and Google Workspace		1. Access and create a Google Workspace account (Google Spreadsheet, Google Docs, Google Sites, and Google Forms as the first step for integration with the Linktree platform)
4	Section on the content of the management information system application with integration of Linktree and		1. The title corresponds to the application on the home page. 2. Click Add new link to create a new feature as desired.

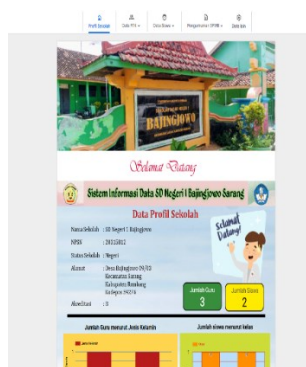
Google Workspace

5 *Section on filling out the management information system application with Linktree and Google Workspace integration d*



1. Title according to the application on the home page.
2. The home page contains school data features, school website, PTK and student forms
3. Link to Google Workspace account

6 *Final appearance*



1. Aplikasi yang terintegrasi antara linktree dan google workspace sebagai penyimpanan database

Integration with Google Workspace enriches the material aspect by providing a comprehensive collaborative ecosystem for document management and communication. The management information system application integrated with Linktree and Google Workspace is designed to simplify information access and coordination in the school environment. From a material aspect, this application contains important content directly related to the managerial needs of school principals, teachers, and educational staff.

Based on the results of a survey conducted by media experts on the suitability of the management information system application with integration with Linktree and

Google Workspace, the following results were obtained: The secure and user-friendly login process received a score of 4 with the criterion of “very good,” the system effectively protects user data received a score of 4 with the criterion of “very good,” user access aligns with authorization levels received a score of 3 with the criterion of “good,” and the automatic logout system after a period of inactivity received a score of 4 with the criterion of “very good.” The total score obtained is 15 out of a maximum score of 16, with a suitability percentage of 93.75%, which falls into the “very suitable” category. This indicates that the management information system application with integration with Linktree and Google Workspace meets high-quality standards in terms of alignment with user characteristics according to school needs.

Based on the survey results, all respondents gave the highest rating (score 4) on every aspect evaluated, indicating a very positive perception of the digital management information system application. Respondents assessed that this application is highly necessary to enhance the effectiveness of the principal's tasks. Respondents' knowledge of this application is also at a very good level, making its implementation in the school environment easier. The use of the application is considered far more effective and practical than manual systems, including in terms of document sharing. Additionally, the application is deemed to have adapted to modern developments, making it relevant and supportive of the needs of modern school management.

Based on the research conducted, there is a relationship between the research findings and theoretical and empirical studies. Therefore, the researcher further examines the research findings in the discussion chapter. The discussion of this research includes the development of a management information system application with integration with Linktree and Google Workspace, the feasibility of a management information system application with integration with Linktree and Google Workspace, and the effectiveness of a management information system application with integration with Linktree and Google Workspace.

The management information system application media with integration with Linktree and Google Workspace was developed based on the identification of problems encountered in the field and has been limited as the focus of the problem, including the infrequent use of information system applications by schools and the lack of integration of digital technology in the applications used, as well as the manual data management system in schools that has not been integrated. Based on these problem limitations, an alternative solution was proposed using the management information system application integrated with Linktree and Google Workspace.

Based on the results of the problem limitations and the development foundation obtained from the needs survey and theoretical review, the researcher then created an initial product design. The information management system application integrated with Linktree and Google Workspace was chosen by the researcher as the product for this development research because it aligns with the schools' needs for a digitally integrated information management system application, which is still

not widely used, and it includes content with explanatory updates. The next stage is the development of the design that has been created. This stage falls under the ADDIE research development procedure, specifically the development phase or prototype creation (development). The management information system media with integration with Linktree and Google Workspace was developed through application- and web-based software, including Google Docs, Spreadsheets, Drive, Forms, and Sites, which were used to design the application, starting from the display, storage, data acquisition, and finishing. Then, Web Linktree was used to create content containing features that are easy to access.

The test results show that the SIM application integrated with Linktree and Google Workspace obtained an average score of 65.03%, which falls into the highly practical category. This figure reflects that the majority of respondents feel that this application is easy to operate and has advantages over previous conventional methods. Research on management information system applications integrated with Linktree and Google Workspace contributes significantly to the development of management information system theory in the context of basic education. The research results reinforce the concept that information technology integration can enhance managerial effectiveness, particularly in supporting the planning, implementation, and evaluation of educational activities.

The widespread use of Google Workspace, which is user-friendly, accelerates technology adoption in the elementary education environment. Linktree, as an application connector, provides easy navigation and a single-entry point, which is highly beneficial for non-technical users. The widespread implementation of this system will help improve the overall quality of educational services. Therefore, it is important for elementary schools to incorporate this integration into their long-term school management development strategies.

4. Conclusion

Based on the research findings, the Linktree-based management information system integrated with Google Workspace is deemed valid based on evaluations by subject matter experts, media experts, and design experts. All indicators of content, appearance, and functionality meet the established criteria, making the system suitable for supporting the principal's managerial, supervisory, and administrative tasks. The ease of navigation, fast access time, and simple interface allow users to operate the system without requiring complex technical training. The system enhances the efficiency of the principal's work, accelerates reporting, improves administrative organization, and facilitates supervision and communication.

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