

SCHOOL ADMINISTRATION TRANSFORMATION: IMPROVING THE PERFORMANCE OF PRINCIPALS, ADMINISTRATORS, AND SCIENCE TEACHERS WITH A MANAGEMENT INFORMATION SYSTEM (SIMA) MODEL

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Abstract

This study aims to develop and evaluate a digital-based archive management model for a quality assurance system in elementary schools, addressing the inefficiency of traditional archiving practices and the absence of digital archive management. The research employs a Research and Development (R&D) approach using the Successive Approximation Model (SAM) and a mixed-methods strategy. The population consists of science teachers in Bekasi Regency, with data collection conducted through pre-tests and post-tests. The SIMA application was validated by three experts, followed by small-group trials with 40 teachers and large-group trials with 750 respondents. The effectiveness of the SIMA application was tested using significance testing with a paired-sample t-test. The results reveal that (1) expert validation categorized the digital-based archive management application as "Feasible" for testing; (2) small group trials yielded "Effective" results, with minor revisions; (3) large group trials confirmed the application as "Appropriate" for broader implementation; and (4) the effectiveness test showed a significant difference in respondents' understanding of archive management between pre-test and post-test scores ($p = 0.001 < 0.05$), indicating the application's impact. The Archive Management Information System (SIMA) introduces a breakthrough in digital archive management at the elementary school level, offering significant efficiency, accuracy, and user satisfaction advantages. The SIMA application modernizes administrative processes and enhances the quality assurance system in schools. This research provides a practical, scalable solution for improving archiving practices in educational institutions.

Keywords: Digital, Quality Assurance System, Records Management, SIMA Application, Science Teacher.



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INTRODUCTION

One important source of information that can support the smooth running of the administrative process is archives or records (Touray, 2021; Timotheou et al., 2023; Asia, Kinda, & Edwards, 2024). Archives have a central role as a conduit of memory for various activities, humans cannot possibly remember all the documents and records that are complex in nature (Ding et al., 2023; Tian, 2024;

Trisnasari, & Oksiana, 2024). As time goes by, archives continue to grow, so they need to be managed effectively and efficiently so that they can then be accessed more easily (Chandramouli & Pinhas, 2020; Gusenbauer & Haddaway, 2020; Justina et al., 2022; Supriyati, 2024). This has encouraged the development of tools that can facilitate the management of a large number of archives, known as electronic archives. Electronic archives require technology capable of storing information, which can be used on computers and software for management (Andriyani et al., 2024; Helliwell et al., 2024). The emergence of electronic records is the result of advances in information technology in response to the importance of records management in various types of organizations, including government agencies, educational institutions, libraries, companies, and so on.

In Indonesia, the development of information technology in the Industry 4.0 and Society 5.0 era has had a significant impact, especially in the field of education (Abdulrahman et al., 2024; Hidayati et al., 2024; Hoesny & Darmayanti, 2021). The existence of information technology in the current era has resulted in several impacts that are important enough to be considered, such as increasing the efficiency and effectiveness of education management. The presence of technology will have an impact on administrative management so that educational management tasks can be simplified, including student data management, assessment, and general administration (Pan et al., 2021; Bhati & Dahiya, 2024; Firmansyah, Baluta, & Elfaituri, 2024). This opens up opportunities for a more well-organized education management system, making the process more efficient and effective by reducing the cost and time required for administrative tasks.

However, there are problems that are often faced in archive management, especially in elementary schools. Based on the results of research by Herlina et al., (2022) There are around 73% of the total 127 primary schools in Bandung City that lack an understanding of records management. Many primary schools in Indonesia do not understand the importance of records management and do not consider it a priority in school operations (Sujaya, 2022; Iqbal et al., 2023; David et al., 2024). The result is a lack of attention to the essential elements of records management, including the collection, storage and retrieval of information from records. This lack of understanding also results in limited resource allocation for records management, such as manpower and budget (Rawlings et al., 2021; Pratama et al., 2023; Elpianora et al., 2024). As a result, records management in primary schools is often disorganized and unstructured, which can lead to difficulties in finding the information needed (Novriani et al., 2023; Almustapha & Abbas, 2024; Chumburidze et al., 2024). In addition, according to (Nascimento et al., 2023) various other obstacles such as lack of facilities, lack of skills and knowledge of operators about information technology, and archival systems (Trace, 2022) that are still manual, are also problems that are often faced in managing primary school archives (Yemelianova, 2021).

In general, public primary schools in Bekasi district do not have more school administration personnel. This is due to the absence of formal appointment of school administration personnel by the government with ASN/PNS status. Although there are some public primary school principals in Bekasi district who already have school administrators or operators with honorary status, the selection of these honorary staff is still not optimal due to the inadequate amount of honorarium. In addition, most principals do not have adequate skills in managing school records, either manually or electronically.

Based on the results of observations and interviews that have been conducted, it is also known that the low understanding of teachers, especially science teachers, about administrative management. the same as the understanding of science teachers, the principal's understanding of administrative management is also still low. This can be seen, the principal always asks the administration or operator in managing personal administration. Meanwhile, the school operator is considered as a place to store all school documents and individual teachers. Based on the observations that have been found, it can be concluded: (1) The unavailability of a special archive storage area; (2) The management system in archive management still uses a physical/manual system; (3) Facilities and infrastructure in archive management are less supportive and adequate; (4) Administrative personnel in elementary schools rarely use online archive facilities; (5) The academic qualifications of operators are not linear; (6) There is no additional operational cost for operators.

Furthermore, the results of an interview conducted by one of the school principals also said that elementary schools do not yet have a digital archive storage system. Archives are still stored in cabinets that are not neatly arranged and organized. According to Mojapelo, (2022) The results show that there is no standard system in place for managing school records, although administrators and principals work hard to do so. Their main job is teaching. However, they also have the responsibility to take care of student, class and school administration. As a result, they have difficulties in managing records because

operators easily and quickly. Based on this description, there are problem formulations, namely: (1) how is the description of the needs of the archive management model in public elementary schools?; (2) how is the modeling of the school administration information system for principals, teachers and operators in public elementary schools?; (3) how is the validity of the digital-based quality assurance system archive management model in public elementary schools?; (4) how is the evaluation system of the archive management model of the school quality assurance system in public elementary schools?; (5) How is the effectiveness of the application of the archive management model in public elementary schools?.

RESEARCH METHOD

This type of research is development research (Research and Development). The population of public primary schools in Bekasi Regency is 712 schools, so it is necessary to calculate the number of samples using the generic formula. Based on the calculation of the “general formula”, 250 schools were found to be the population with each respondent as many as 3 people as school representatives. The instruments used in this research are divided into (1) needs analysis instrument; (2) Product Test Instrument and (3) effectiveness test instrument. The method used in this research is combined research. Quantitative research methods are carried out with descriptive statistics while qualitative research with development research (*Research and Development*). The model used in research and development (RnD) using the SAM (*Successive Approximation Model*) model by Michael Allen, 2012.

Table 1. Lattice of Records Management Instrument

No.	Dimensions	Indicator	Instrument Item
1	Planning	1. Completeness of archive equipment	1,2
		2. Archive storage room	3,4
		3. Archive storage rack	5,6
2	Organizing	1. Creation of archives properly and correctly	7,8
		2. Quick and thorough distribution of archives	9
		3. Systematic organization of archives	10
3	Briefing	1. Providing motivation	11,12
		2. Maintain good communication	13
4	Surveillance	1. Archives program evaluation	14,15
		2. Program to supervise the implementation of archival activities	
Total			15

The types of data, instruments and data analysis techniques in this study can be seen in the Table 2.

Table 2. Types of Data, Instruments and Data Analysis Techniques

Design	Subject and object	Data Type	Instrument	Analysis Technique
Needs Analysis	- Principal	Understanding of records management	- Observation sheet	Descriptive
	- Teacher		- Interview sheet	
Records management model	- School administration personnel	- National Education Standards (SNP)	- School Administration Information System (SIMA) Website	Descriptive
	- Principal	- Archive management model design worksheet	- Effectiveness instrument	
	- Teacher			

Design	Subject and object	Data Type	Instrument	Analysis Technique
Validity test	- Content Validator - Media Validator - Instrument Validator	- Content quality - Flexibility - Usability - Feasibility - Accuracy	- Rating scale - Model assessment results - School Administration Information System (SIMA) Website - Effectiveness instrument	Descriptive
Small group test	- Principal - Teacher - School administration personnel	- Content quality - Flexibility - Usability - Feasibility - Accuracy	- Rating scale - Model assessment results - SIMA website - Effectiveness instrument	Descriptive
Large group test	- Principal - Teacher - School administration personnel	- Content quality - Flexibility - Usability - Feasibility - Accuracy	- Rating scale - Model assessment results - School Administration Information System (SIMA) Website - Effectiveness instrument	- Descriptive - T test

Data analysis techniques are divided into two, namely qualitative and quantitative analysis techniques. For qualitative analysis techniques using the SAM Development Model design which has 3 major steps consisting of (1) Preparatory stage consisting of information gathering and savvy start; (2) Iterative design stage consisting of review, design, and prototype development; (3) Iterative development stage consisting of development, implementation and evaluation.

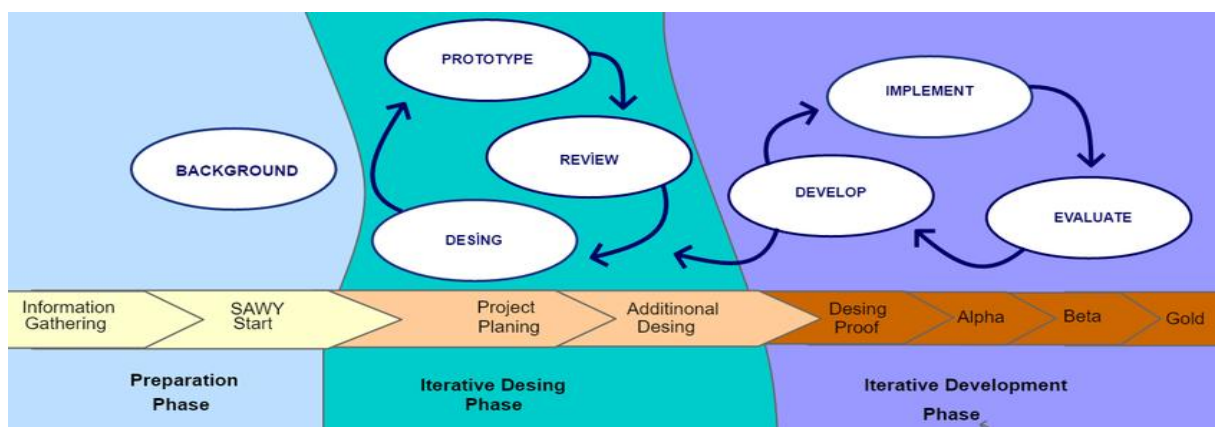


Figure 2. The Eight Stages of SAM by Michael Allen

While the quantitative analysis technique uses:

(1) Expert validity test using Aiken's formula,

$$V = \sum s / [n(c-1)]$$

(2) Practicality test using the percentage formula

$$P = \frac{f}{N} \times 100$$

(3) effectiveness test using the one group pretest-posttest design formula.

Table 3. Research Design for Model Effectiveness Test

Group	Pre-Test	Treatment	Post-Test
Experiment	O1	X	O2
Control	O3	-	O4

RESULTS AND DISCUSSION

Model Development Results

1. Preparation Stage

Needs Analysis

In an effort to support government programs related to service quality, Public Elementary Schools need an archive management system that can be used by school operators, teachers and principals to improve service quality. Where currently, the archive management system is only done manually, and archives are stored in storage cabinets in an unstructured manner, as well as various other problems so that a digital-based archive management model is needed in State Elementary Schools. Public Elementary Schools in Bekasi Regency as education providers, still experience obstacles in the archive management process. Constraints that occur such as (1) lack of human resources who have educational qualifications that are not in accordance with the task, (2) the process of administrative activities that interfere with time because most school operators are class teachers, (3) documents that are stored are not organized, causing a long process in searching, especially when needed during accreditation.

Based on the results of the analysis conducted by conducting a pre-research survey in 100 public elementary schools in Bekasi Regency, the average score was 2.99 in the “sufficient” category. The average score for each statement is above 3, indicating that respondents are quite satisfied with the school administration process. Based on the problems that have been found, it is necessary to recommend and formulate a digital-based archive management application to improve the efficiency and effectiveness of school administration.

Savvy Start

This initial savvy start stage involves discussions with the supervisor regarding the concept or content that will be used as material for the archive management model. Then evaluate school needs, and identify appropriate technology solutions. Furthermore, potential solution ideas will be generated and realized in the form of prototypes. The next stage is a discussion with IT experts, related to the appearance design, layout and workflow of the archive management model application to be developed. From this savvy start activity, it is expected that a comprehensive perspective on the needs and challenges faced can be obtained. Research will be conducted to understand the current state of records management, evaluate the school's needs, and identify appropriate technology solutions. These steps aim to reduce risks and increase the chances of successful implementation of the proposed digital-based records management model. Based on the results of discussions by IT experts, at this stage an initial draft was prepared which can be seen in the figure 3.

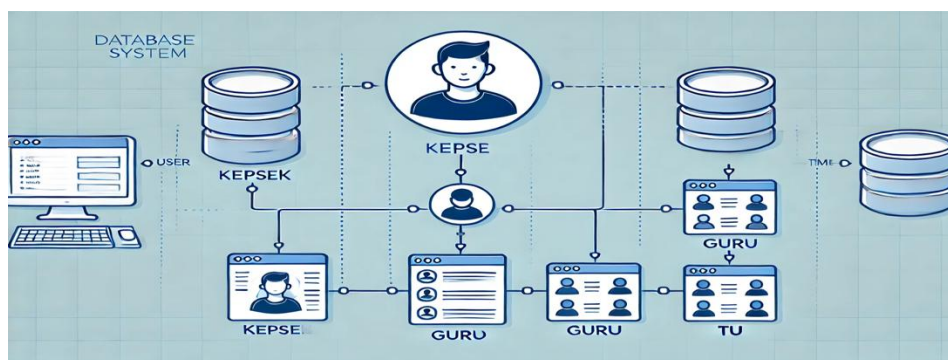


Figure 3: Initial Draft of Records Management Model

Iterative Design Stage

Evaluation

The evaluation process is carried out in discussion with the IT team and also the supervisor. The evaluation is carried out in the form of content display, dashboard, layout, color nuances, and logo. The selection of content or content of this archive management application is adjusted to the eight National Education Standards, namely Graduate Competency Standards, Content Standards, Process Standards, Educational Assessment Standards, Educator and Education Personnel Standards, Facilities and Infrastructure Standards, Management Standards and Financing Standards.

Design

From the results of the needs analysis and needs evaluation that has been carried out, an initial design is made in the form of a website at (www.figma.com)

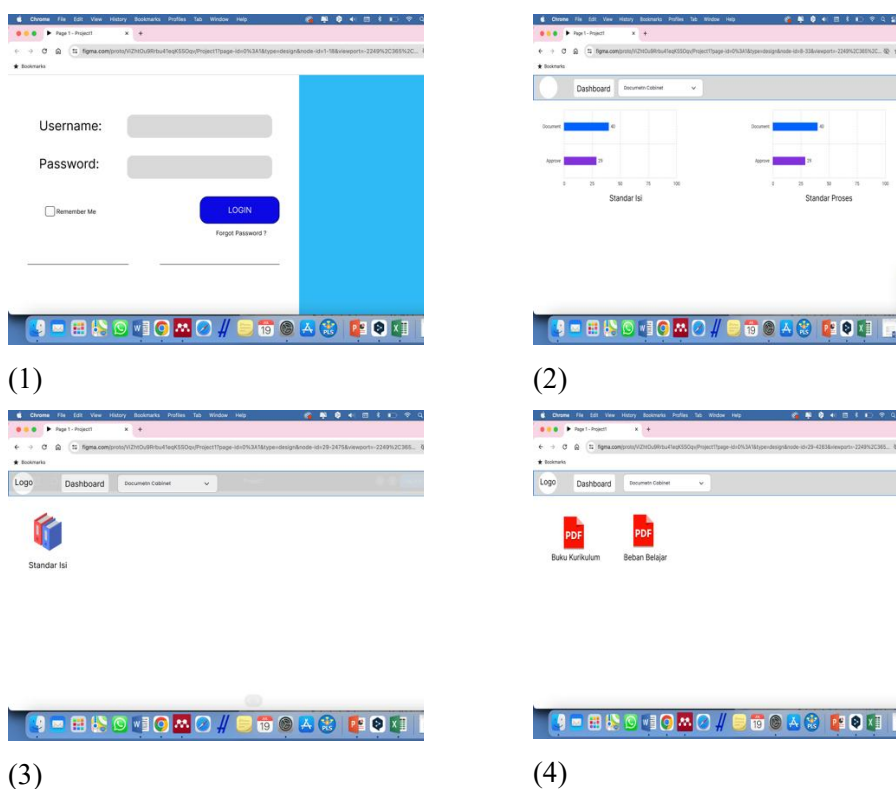


Figure 4: Initial Design of Archive Management Model Application

Prototype Making

Application refinement is done by creating a prototype by adjusting the content layout, colors, fonts, images and other elements. At this stage will be produced: (a) Archives Management Information System Application (SIMA) version 1.0 in the form of a website; (b) Application Usage Video; (c) Guidebook/Instructions for Application Usage; (d) Product instruments and archival management understanding questionnaire.

After developing the initial product based on needs analysis and product design planning, the next step is to conduct expert testing or expert validation (*expert judgment*) of the product model design that has been made. Model validation is carried out by experts in the fields of Archives Management, Media, and Instruments.

Based on the results that have been calculated using Aiken's formula, it is known that the value of $V = 13.5 > 0.6$, so that the validation results are in the "Valid" and "Appropriate" categories to be used and can be tested in small groups and large groups.

Iterative Development Stage Development

The development stage is carried out as a refinement of the products produced at the iterative design stage referring to the evaluation of the expert test results. At this stage, editing of web layouts, images, dashboards, management flow, and instructional videos were also carried out. The development of this application also included an improvement in the name, which was originally SIRPRIM to SIMA (School Administration Information System) with the website: <https://sirprim.my.id/login>.

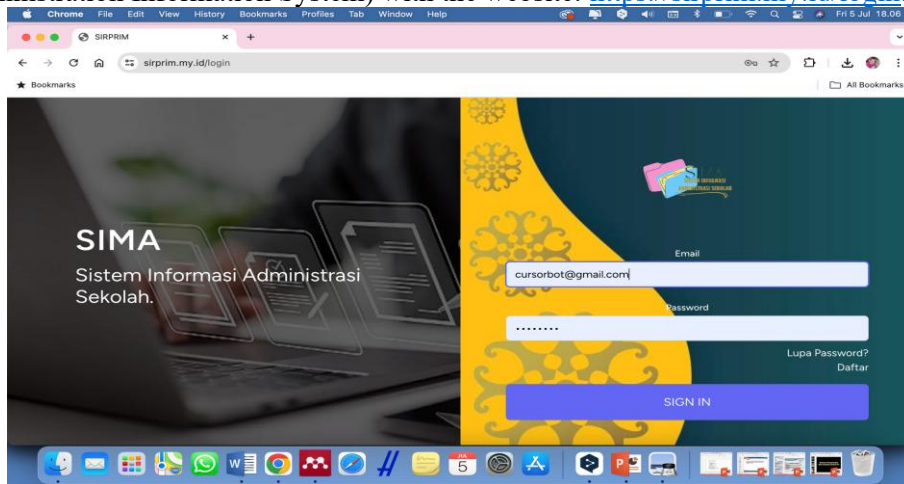


Figure 5. SIMA (School Administration Information System) with the website

Implementation

At this stage, the implementation of the application development is carried out by conducting small group trials. The small group trial was conducted at A accredited primary school. There were 40 participants as respondents consisting of the principal, 3 school operators and 46 teachers. After revisions were made from the results of the small group trial, a large group trial was then conducted involving 750 respondents from 250 public elementary schools in Bekasi Regency consisting of 250 principals, 250 school operators and 250 teachers.

Evaluation

Evaluation of the Small Group Trial

After conducting a small group trial, the results of the evaluation of the use of the SIMA application were obtained. Based on the results of the small group trial, it can be concluded that all archive management activities in the SIMA application are feasible, although there are several model items that need to be revised to make it easier and more detailed instructions and menu choices. After the revision, the next step is to conduct a large group trial, namely by testing this application in Public Elementary Schools in Bekasi Regency.

Evaluation of the Large Group Trial

Based on the suggestions and input on the field notes obtained during the large group trial, there were revisions that did not change the structure in the SIMA application, but added a data security system that had been set up by researchers, the data security system was controlled by the school operator account and the super admin.

Model Effectiveness

The design of the effectiveness test in the research used is a pretest-posttest control group design, where there is a control group and an experimental group. The control and experimental groups involved 100 participants, where each group consisted of 50 people taken from 100 schools. This effectiveness test was carried out at the GTK Bara-Bere Webinar activity facilitated by the Bekasi Regency Education Office and the Webinar held at A accredited primary school. Each was given a different treatment, where the experimental group was given the use of the developed SIMA application, while the control group understood about archive management.

Descriptive Statistical Analysis

Based on the data obtained from the results of the pretest and posttest in each group can be seen in the following table 4.

Table 4. Control Group Pretest and Posttest Results Data

	N Statistic	Range Statistic	Minimum Statistic	Sum Statistic	Mean		Std. Deviation Statistic	Variance Statistic
					Statistic	Std. Error		
Pretest_Control	50	8.00	5.00	13.00	411.00	.28613	2.02323	4.093
Possttest_Control	50	8.00	5.00	13.00	428.00	.26978	1.90766	3.639
Valid N (Listwise)	50							

Based on table 4, it can be described that in the pretest session of the control group, the minimum score for the results of respondents' understanding of archive management was 5, the maximum score was 13, the average was 8.22 and the standard deviation was 2.02. While in the posttest session the minimum score was 5, the average score was 8.56 and the standard deviation was 1.90.

Table 5. Experimental Group Pretest and Posttest Result Data

	N Statistic	Range Statistic	Min Statistic	Sum Statistic	Mean		Std. Deviation Statistic	Variance Statistic
					Statistic	Std. Error		
Pretest_Control	50	10.00	3.00	454.00	9.08	.345	2.43981	5.953
Possttest_Control	50	10.00	3.00	514.00	10.28	.345	2.44148	5.961
Valid N (Listwise)	50							

Based on the results of table 5, it can be seen that the pretest score in the experimental group has a minimum score of 3, an average of 9.08 and a standard deviation of 2.43. While the posttest score has a minimum score of 5, a maximum score of 15, an average of 10.28 and a standard deviation of 2.44. Based on tables 4.8 and 4.9 there is an increase in the average score in each group.

Analysis Prerequisite Testing

Data Normality Test

Based on the results of data processing and analysis that has been carried out using the SPSS version 27 program using the One-Sample Kolmogorov-Smirnov Test analysis, the following results are obtained Table 6.

Table 6. Data on Normality Test Results for Control and Experimental Group

Group	Normality Test Statistic	Asymp. Sig (2-tailed)	Description
Control	0.084	.200	Normal
Experimental	0.088	.200	Normal

Based on the results of normality testing using one-sample kolomogrov-smirnov in table 6, it is known that the Asymp.Sig value. (2-tailed) at 0.200 > 0.05 which means that the data is normally distributed. Based on the results of normality testing using one-sample kolmogrov-smirnov in table

4.10, it is known that the Asymp.Sig value. (2-tailed) at $0.200 > 0.05$ which means that the data is normally distributed.

Data Homogeneity Test

The following are the results of the two variance homogeneity test which can be seen in the following table 7.

Table 7. Control and Experimental Group Homogeneity Test Result Data

Group	Homogenitiy Test Statistic	Description
Control and Homogeneity	0.349	Normal
Understanding the archive management model	0.933	Normal

Based on the analysis results shown in table 7, it is obtained that the significance value of understanding the asip management model is $0.349 > 0.05$, meaning that the data on the results of understanding archive management in the experimental group have the same variance or homogeneous. Based on the analysis results shown in table 4.12, it is obtained that the significance value of understanding the asip management model is $0.933 > 0.05$, meaning that the data on the results of understanding archive management in the experimental group have the same variance or homogeneous.

Hypothesis Test

To determine the effectiveness of this digital-based archive management model, a hypothesis test is carried out by conducting a t-test on the experimental group and the control group.

Table 8. Data of Paired Sample T-Test Results Experimental Group

	Mean	Std. Deviation	Std. Error Mean	Paired Differences		t	df	Sig. (2-tailed)
				95% Confidence Interval of the Diffenrence				
				Lower	Upper			
Pretest_eksperimen - Posttest_eksperimen	-1.5600	3.8234	.5407	-2.6466	-.4733	-2.885	49	.006
Pretest_control - Posttest_control	-1.0800	2.6560	.3756	-1.8348	-.3251	-2.875	49	.006

Based on the analysis results shown in table 8, it can be seen that there is a difference in the mean value between the pretest and posttest scores of -1.56 with a t score of -2.885 with $df = 49$ and a p-value or sig. (2-tailed) = $0.006 < 0.05$. This means that there is a difference in the results of understanding archive management on the pretest and posttest in the experimental group after being given treatment in the form of the SIMA application. Based on the results of the analysis shown in table 4.5 too above, it can be seen that there is a difference in the mean value between the pretest and posttest scores of -1.08 with a t-count score = -2.875 with $df = 49$ and a p-value or sig. (2-tailed) = $0.006 < 0.05$. This means that there is a difference in the results of understanding archive management on the pretest and posttest in the control group after being given treatment in the form of a manual model.

Table 9. Independent Sample T-Test Result Data of Experiment Group and Control Group

		Lavene’s Test for equality of variance		T-test for equality of means				95% Confidence Interval of the Difference		
		F	Sig	t	df	Sig. (2-tailed)	Mean Difference	Std. error difference	Lower	Upper
Control and Experiment	Equal variances assumed	.856	.357	-3.376	98	.001	-1.5600	.46212	-2.477	-.6429
	Equal variances not assumed			-3.376	96.721	.001	-1.5600	.46212	-2.477	-.6429

Based on the results of the independent sample t-test analysis shown in table 9, it can be seen that the F value = 0.856 with a p-value score or Sig. = 0.357 > 0.05, which means they have the same variance or homogeneous. Therefore, significance testing can be seen in the Equal variances assumed column and t-test for Equality of Means. Based on the results in the column, it can be seen that the t score = -3.376, df = 98 and the p-value score or sig. (2-tailed) = 0.001 < 0.05. This means that there are differences in the results of the archive management understanding test between the experimental group and the control group, where the results of the skills test in the experimental group are better than the control group with a Mean Difference score of -1.56. Based on the results of the description that has been presented, it can be concluded that the archive management model developed has a greater influence than the conventional method. This can also be used as reinforcement that the archive management model is very effective in increasing respondents' understanding of archive management.

This research is a research and development (R&D) with the Successive Aproximation Model (SAM), where there are 3 major steps carried out during the research process. The product produced in this research is a records management model named “School Administration Information System (SIMA)”. Based on the results of the research, it can be concluded that this digital-based archive management model is effective. This is evidenced by the results of the effectiveness test of the developed model compared to the conventional model. Where the test comparison is carried out by testing the hypothesis between the pretest and posttest data and testing the average difference between the final test in the experimental group and the control group which results in a significant difference from the test results of understanding archive management, so that the digital-based archive management model is better than using conventional models.

In education management, there are four general management functions, namely the functions of planning, organizing, implementing and controlling (Sumadi & Ma’ruf, 2020; Bimaruci et al., 2021; Budiarti et al., 2024; Habibi, M. W., Jiyane, L., & Ozsen, 2024). The planning function is an activity of thinking about what will be done related to the resources owned (Budiarti et al., 2024; Lacroix et al., 2024; Simamora et al., 2024). While organizing is the process of gathering human resources, capital, equipment, the most effective way to achieve goals (Zhao et al., 2023; Tamang et al., 2024). The implementation function is the process of mobilizing resources in activities to achieve goals in order to achieve process efficiency and effectiveness of work results (Majumder & Holland, 2020; Lemcke, 2021; Hanoum et al., 2024). The control function is a form of performance assessment activity according to predetermined standards and then changes or improvements are made (Ashfaq et al., 2023; Chha & Peng, 2023; Fähndrich & Pedell, 2024).

To carry out the function of archive management, this research has developed a digital-based application called “School Administration Information System (SIMA)” with content tailored to the National Education Standards needed for school quality assurance systems both internally and externally. The developed application contains contents in archive management, such as document upload menu, document validation, document search, document download/backup as well as videos and user manuals. The archive management carried out in this SIMA application is made simple with the hope that users can easily carry out the archive management process.

Good records management has a significant positive impact in several important aspects, such as storing and retrieving records quickly and precisely, helping to minimize search time and ensuring

data or information can be accessed easily when needed (Barigye et al., 2022; Chaputula, 2022). In addition, well-managed archives provide accurate and relevant data for use by leaders in the decision-making process, allowing decisions to be made based on valid and reliable information (Szukits, 2022; Fanelli et al., 2023; Asmororini, Kinda, & Sen, 2024). An efficient filing system also allows agencies to reduce the number of records that must be stored, avoid duplication, and minimize the storage space required, thereby contributing to savings in operational costs associated with the physical storage of records (Ergüzen & ünver, 2018). Good records management ensures information security, protecting important records from damage, loss, or unauthorized access, which is critical to the continuity and security of the organization (Creemers, 2022; Villegas-Ch & García-Ortiz, 2023; Ledesma-Munive, 2024).

A study in a secondary school Lestyanningrum et al., (2022) found that certain teachers refused to use the new digital system for fear that they would lose important documents. In addition, technical constraints such as the lack of adequate technological infrastructure make the use of modern archival systems more difficult. According to research conducted by Putranto, (2018), some primary schools face difficulties in implementing contemporary archival systems because not everyone can use computers or the internet. In addition, bureaucracy hinders archiving-related decision-making due to complicated and slow administrative procedures. This was seen in research on the purchase approval process (Dwijayanti, 2021).

Research conducted on school principals, administrators and science teachers in Bekasi District found that this archive digitization system significantly increases efficiency in document management, facilitates access, and speeds up the process of searching and using the documents needed. In addition, the use of the digital system also reduces human error in archiving and data management, and reduces the risk of losing or damaging physical documents due to digital backups. However, from the field notes taken during the pilot, some schools faced challenges in terms of technological infrastructure, including hardware limitations and unstable internet connections, as well as the need for further training for school staff in the use of digital records management software.

Research conducted by Girsang & Aldisa, (2024) conducted extensive research on model development uses the Life Cycle Development of Systems (SDLC) approach, which includes planning, analysis, design, implementation, and maintenance stages. Pangestu et al., (2024) then conducted research on the development of digital-based information systems using the Rapid Application Development (RAD) approach. In addition, Gordon et al., (2022) study on creating a web-based archive management system for government agencies using the User Acceptance Testing (UAT) method shows how important the control and revision phase is. Product evaluation and functionality testing are carried out regularly to ensure the system can be used properly and meets the desired functionality standards.

The results of research on the use of digital archive management models in Bekasi District Public Elementary Schools show some similarities and differences with previous research on digital archive management. As stated by Carbajal & Caswell, (2021), research also confirmed that digital archives significantly improve efficiency and ease of access. A study conducted by Mojapelo, (2022) also found that digital systems speed up the document retrieval process and reduce archiving errors. The results of this study are in line with the research findings. However, there are some important differences. Previous studies often faced problems with technology adoption, mainly due to resistance to change and intensive training needs. In addition, getting support from the local government in the form of resources and technical assistance was helpful in overcoming these barriers.

The results of this study indicate that the implementation of a digital-based archive management model for principals, administrators and science teachers of public elementary schools in Bekasi Regency is effective in improving the efficiency of document management. The digital-based Records Management Information System (SIMA) developed in this study facilitates the storage, search and management of records in a structured and easily accessible manner. The results of the effectiveness test show that the digital model is better than the conventional model, with significant improvements in the efficiency and productivity of principals', teachers' and science teachers' administration. Nevertheless, some challenges such as limited technological infrastructure and the need for intensive training for staff still have to be overcome to ensure the sustainability of the implementation.

This research introduces a digital-based records management model using the Successive Approximation Model (SAM) approach, which has not been widely applied in primary school settings. The developed SIMA application not only provides basic records management features, but also includes tools such as videos and user manuals, designed to ease adaptation and improve users'

technological skills. The study also received technical support from the local government, which is an innovative step in facilitating technology adoption in the education sector. The findings make a significant contribution to the literature on digital records management and demonstrate that records digitization in primary schools can improve the efficiency, transparency and security of administrative data. The lack of manual archive management compared to the model studied is that the process is still done manually without understanding the concepts in archive management so that the files are stored unstructured. Therefore, the products from the results of this study provide an important role for ease of structured archive management in each activity that is classified based on the type of grouping. The resulting product has also been tested at each stage, so that the results are better. Due to the researcher's limited understanding of archive management, some sub-document data has not been inputted in its entirety. This model is still under development, so the security system still needs to be improved and enhanced, although currently the security system is available. The use of this application platform certainly requires school principals, teachers and school operators to always be able to have a quota or internet access in managing archives in this SIMA application.

CONCLUSION

Based on the results of the analysis and development of the digital records management model, the conclusion is that the implementation of a digital-based records management system, developed through the “Records Management Information System (SIMA)” application, can improve the effectiveness and efficiency of the school administration process. This digital records management model, which uses the Successive Approximation Model (SAM), was proven feasible after being tested by experts, which showed results classified in the “feasible” category. The effectiveness test results showed a significant difference between the experimental and control groups, with a sig. (2-tailed) = $0.001 < 0.05$, indicating that the use of SIMA application has a positive impact on the understanding of records management. In addition, the results of the evaluation of ease of use, efficiency of the records management process, speed of document search, and data security and integrity, show that this application meets the needs of users, such as principals, subject teachers, and school operators. Based on these results, it can be suggested that the application of a digital archive management model based on the SIMA application can be an effective solution to improve the quality of archive management in the educational environment. The implication of this research is that this kind of digital model can be applied more widely in various other educational institutions, and can be used as a basis for further development in technology-based archive management systems.

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AUTHOR CONTRIBUTIONS

Satri Dwi Kurnia as the first author contributed in designing the title, conducting observations, interviews, research, drafting reports and financing. Neti Karnati as the second author contributed to mentoring, flow of thought, preparation of a framework, and the output of the research. Rugaiyah as the third author contributed as a companion to scientific writing, preparation of discussions, and validation of instruments.

CONFLICTS OF INTEREST

The author(s) declare no conflict of interest.

USE OF ARTIFICIAL INTELLIGENCE (AI)-ASSISTED TECHNOLOGY

The authors declare that no artificial intelligence (AI) tools were used in the generation, analysis, or writing of this manuscript. All aspects of the research, including data collection, interpretation, and manuscript preparation, were carried out entirely by the authors without the assistance of AI-based technologies.

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