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Design and Build Application of Web-Based Practice Material Management Information System (SIP-BATIK JKG) in the Laboratory of the Department of Dental Health Poltekkes Ministry of Health Semarang

Khasiah Saadah[1], Lanny Sunarjo[1], Rasipin[1], Dyah Fatmasari[1], Masrifan Djamil[1]
[1]*Postgraduate Program Poltekkes Kemenkes Semarang, Indonesia*
Corresponding author: Khasiah Saadah[1]

ABSTRACT

The quality of material management in the JKG Semarang laboratory has not been maximized because the material management is done manually. Manual management creates problems in management quality and user satisfaction. The SIP BATIK JKG model is an information system designed to be able to overcome problems in the laboratory. The purpose of this study is a practical material management model with SIP-BATIK JKG that is feasible and effective to improve the quality of material management and increase user satisfaction in the JKG Semarang laboratory. This study uses the R&D method, the trial model uses a pre-experimental design method with purposive sampling. The independent variable is the web-based SIP BATIK JKG model and the dependent variable includes the quality of material management and user satisfaction. Respondents in this study were 50 people consisting of 40 students, 8 lecturers and 2 laboratory workers.The data from the model test used the proportion test and the different pair test. The results of expert validation using the kappa coefficient test with a value of 0.737 (k>0.6) satisfactory category means that the SIP BATIK JKG model is relevant and feasible as a material management system in the laboratory. Most of the respondents' assessments stated that the quality of SIP BATIK JKG was in the good and very good categories. The subject's ability to the quality of material management and user satisfaction after treatment increased significantly compared to before with p = 0.000. The results of the effect size test on aspects of user satisfaction (d=1.30) and materials management (d=1.26) in the strong effect category mean that the SIP BATIK JKG model is very effective in improving the quality of material management services in the JKG lab. Conclusion The application of the SIP BATIK JKG model is relevant and suitable for use in management by users to improve the quality of information systems in the JKG laboratory.

Keywords: Lab Materials, SIP BATIK JKG Model, Quality of Materials Management, Users Satisfaction

Pendahuluan

Indonesia has had an impact on the industrial revolution 4.0 with the phenomenon of disruptive innovation, namely the era of innovation that transforms a system with speed, practicality, ease of access, accuracy and economical costs.[1]

Based on PP through the head of BPPSDMK in 2016 concerning Guidelines for supporting facilities for education providers, in this case regarding laboratories. The laboratory must be able to guarantee the availability and affordability of efficient, effective and rational bhp.[2] The laboratory is a place for a group of people to carry out research activities and scientific testing between theory and practice from various sciences.[3]

In practicum activities, students need consumable materials (BHP). BHP is a practicum material used in the practical learning process in the laboratory.[4] Material management starts from the process of planning, requesting, storing, distributing, reporting and evaluating. The aim is to ensure the availability and affordability of materials

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that are efficient, effective and rational in realizing an information system and service quality control.[5]

Laboratory management information system is a process of processing, integrating and coordinating human resources in the laboratory. to achieve goals so that it is more effective and efficient and makes it easier for someone to make decisions.[6] One form of evaluation of the information system seen from the satisfaction of system users. User satisfaction is a feedback and user response after using the information system. The user's attitude towards the information system is a subjective matter regarding how much the user likes the system used.[7]

System user satisfaction is a feedback and user response after using the information system. The user's subjective attitude regarding how much he likes the information system used.[8] User satisfaction can be fulfilled through how much the quality of the product and the suitability of the user's perception of the information system. This perception can be formed by the level of knowledge, experience, and user needs for services.[9]

Laboratory management includes planning, organizing, actuating and supervising. Implementation of laboratory management aims to be able to support lecture activities in the laboratory as well as research activities for both students and lecturers so that they take place optimally. l.[10]

Menurut *George Terry* ada empat fungsi manajemen yaitu *planning, organization, actuating dan controlling*[11]

Semarang Ministry of Health Health Polytechnic is one of the largest ministry of health polytechnics in Indonesia with 9 majors and 33 study programs. One of the majors is the Department of Dental Nursing (JKG) with DIII and DIV JKG Semarang Study programs. Based on observations that researchers have made, the condition of the materials in the Semarang JKG laboratory has not gone well because material management is done manually, there are various problems. These problems can be grouped into three categories, namely in the process of planning, use, and reporting. In the planning process, it is difficult to find information on requests, receipts, usage and stock of materials, material data is not easy to obtain, takes a long time, is inaccurate and incomplete. The problem with use is that in practicum learning in the laboratory there is often a shortage of practical materials due to uncontrolled management of materials which disrupts the practicum process, some expired materials are found because they do not use the FEFO (First Expiry First Out) method, namely by issuing Expired Date (ED) BHP. shorter first than the long ED and the FIFO (First in First Out) method, which is to issue materials in the order in which they receive the expiration date.[12] The problem found in the reporting process is that there is no periodic reporting. The existence of material management based on information systems is needed to overcome material problems in the laboratory. This system is one of the technological solutions in carrying out to overcome management problems with ease in the process of collecting data, monitoring activities, saving costs, saving time and reducing errors.

The innovation that will be developed in a website-based laboratory material management information system involves students and lecturers in charge of practical courses (PJMA). The APKAL application only involves laboratory staff because time and human resource constraints make the application less effective. The involvement of students as users or users in the process of requesting and returning materials has a positive influence because students know best the situation of immediate needs in the laboratory and involve the role of PJMA lecturers in procuring materials will result in better quality management and quality of

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materials in the laboratory. Based on these problems, the researcher is interested in analyzing how the feasibility and effectiveness of the website-based practical material management information system model in the Dental Health Department laboratory (SIP-BATIK JKG) has on the quality of practical material management and user satisfaction in the laboratory. The goal is to be able to produce a management information system model. website-based practice materials (SIP-BATIK JKG) that are feasible and effective to improve the quality of materials management and user satisfaction in the JKG Semarang laboratory.

Research methods

This study used the Research and Development (R&D) method with model trials using the pre-experimental design one group prepost test method with purposive sampling. This study aims to develop a new product, namely a website-based information system model for materials management in the laboratory. Research and development procedures with five steps, namely: 1) Gather information, 2) design product builds, 3) expert validation and revision, 4) product trials and 5) produce products.[13]

In-depth interviews were conducted with 5 respondents including head of department, secretary of department, laboratory staff, BMN officer and department treasurer. Respondents were 50 people including 40 students, 8 lecturers and 2 laboratory workers. The independent variable is the web-based SIP BATIK JKG model and the dependent variable includes the quality of materials management and user satisfaction. Research data used an interval scale and expert validation data used the Kappa coefficient test. The results of the model test use the proportion test and the two means pair different test. If the data is normal, use the Paired T-Test and if the data is not normal use Wilcoxon.

A. Results and Discussion

Information Collection

Information collection was carried out by in-depth interviews and observation. In-depth interviews were conducted with 5 respondents. The results of the in-depth interviews concluded that the material management services that have been running so far have not been maximized because they are done manually. The manual process raises many problems, including problems with the quality of materials management and user complaints. An information system-based model is needed that can help laboratory staff with limited human resources to overcome various material management problems in the JKG laboratory.

B. Product/Model Design

From the results of gathering information, a model of SIP BATIK JKG was designed. Model design using the SDLC (System Development Life Cycle) method. SDLC consists of several stages, namely: data collection stage, system planning, implementation, testing, and maintenance.[14]

C. Expert Validation

Expert validation was carried out to 2 experts, namely an Information Systems expert and a laboratory management expert. The results of expert validation using the kappa coefficient statistical test can be seen in this table:

Table 1. Kappa coefficient statistical test

	Value	Asymptotic Standard Error[a]	Approximate T[b]	Approximate Significance
Measure of Agreement Kappa	0.737	0.138	3.819	0.00
N of Valid Cases	25			0

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Based on the results of the expert validator's assessment, a value of 0.737 can be interpreted in the satisfactory (good) category because the kappa k coefficient value is > 0.6. This means that there is agreement between experts that the website-based SIP-BATIK JKG model is relevant and feasible as an information system for materials management in the JKG laboratory.

D. Product/Model trials

Respondents in this study amounted to 50 people consisting of 40 students, 8 lecturers and 2 laboratory workers. Respondents, lecturers and laboratory staff, because they have functions and characteristics that are not much different from the system, the researchers grouped them in the same column.

Table 2. Respondent characteristic data

No	Karakteristik	Mahasiswa		Dosen dan petugas laboratorium	
		n	%	n	%
1	**Jenis kelamin**	6	15	1	10
	Laki-laki	34	85	9	90
	Wanita				
2	**Pendidikan**				
	D3	10	25	2	20
	D4/S1	30	75	1	10
	S2			7	70
3	**Lama menggunakan lab**				
	2 tahun	21	50	1	10
	3 tahun	15	37,5		
	4 tahun	5	12,5		
	> 5 tahun			9	90

Table 2 describes the characteristic data of 50 respondents with the highest proportion of sex being female students by 85% and male by 15%, for lecturers and laboratory workers the highest was female by 90% and male by 10%. The educational level of the highest D4 education students is 75%, while the Masters education lecturers are 70%. Based on the experience of using the laboratory for a long time, the highest number of students for 2 years was 50%, while the highest for lecturers and laboratory staff for 5 years was 90%.

Table 3. Results of Material Management Quality Analysis After Giving the SIP BATIK JKG Model

No	Aspek Penilaian	Kategori	n	%
1	Perencanaan bahan	Baik	28	56
		Sangat Baik	10	20
		Cukup	12	24
2	Pengadaan Bahan	Sangat Baik	24	48
		Baik	14	28
		Cukup	12	24
3	Penggunaan Bahan	Baik	33	66
		Sangat Baik	10	20
		Cukup	7	14
4	Penyimpanan Bahan	Baik	23	46
		Sangat Baik	18	36
		Cukup	9	18
5	Pelaporan Bahan	Baik	29	58
		Sangat Baik	19	38
		Cukup	2	4

The table above shows that the majority of respondents' assessment of the material planning aspect stated good and very good, totaling 38 respondents (76%) because the SIP BATIK JKG model was considered to be able to overcome student complaints, namely lack of material during practicum, using the SIP BATIK JKG model, material planning could be regulated by easily as needed.

The majority of respondents assessment of the material procurement aspect stated that it was very good, totaling 24 respondents (48%) because it was considered that the SIP BATIK JKG model would later facilitate the procurement of materials so that it could overcome the problem of delays in the material. The majority of respondents evaluation of the material storage aspect stated good and very good, totaling 41 respondents (82%) because with the SIP BATIK JKG model, all users can know directly where the material is and what the condition of the material is in each lab.

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Respondents' assessment of the reporting aspect stated that the majority were good and very good, totaling 48 respondents (96%) because by using the BATIK JKG SIP Model system all users can evaluate ongoing material management so that it is easy to do data recapitulation and finally it will be easy to report materials periodically and in total. 2 respondents (4%) stated that it was sufficient because they did not really understand the new system model.

Table 4. Results of Analysis of User Satisfaction After Giving the SIP BATIK JKG Model

No	Aspek Penilaian	Kategori	n	%
1	Efektivitas	Sangat Baik	28	56
		Baik	19	38
		Cukup	3	6
2	Efisiensi	Baik	33	66
		Sangat Baik	15	30
		Cukup	2	4
3	Kepuasan Menyeluruh	Baik	25	50
		Sangat Baik	18	36
		Cukup	7	14

This table shows that the majority of respondents' evaluation of the effectiveness aspect rated it as very good and good by 47 respondents (94%) because the SIP BATIK JKG model was considered very effective in managing materials, using technology-based systems, managing materials could be more practical, easier with time which is shorter. Respondents' assessment of the efficiency aspect stated that on average it was good and very good, totaling 48 respondents (96%) because with limited human resources the SIP BATIK JKG model was more efficient in managing materials than the old system.

Respondents' assessment of the highest overall satisfaction aspect stated good in the amount of 43 respondents (86%) because in terms of the menu display which was considered attractive, the ease of accessing the system which was equipped with notifications on each display, the navigation menu which was considered accurate and practical because it was adjusted to the needs of each users and with a history menu and material reports make it easier for officers to control and evaluate material management and respondents stated that all aspects of the assessment of satisfactory satisfaction were sufficient because they were still not used to using the SIP BATIK JKG model.

Table 5. Results of Menu Assessment Analysis on Menu Feasibility Analysis Results System on the SIP BATIK JKG Model

No	Aspek Penilaian	Kategori	n	%
1.	Menu Pada SIP BATIK JKG	Layak	30	60
		Sangat Layak	12	24
		Cukup	8	16

The table above shows that the majority of respondents' assessment of all menus in the SIP BATIK JKG model stated that it was feasible, 30 respondents (60%), 12 respondents (24%) said it was very feasible, while 8 respondents (16%) said it was sufficient. The majority of respondents stated that the SIP BATIK JKG menu was feasible and very interesting as a material management system

1. Bivariate analysis

a. Material Management Information System Assessment Analysis of Laboratory Practices Before and After the Implementation of the Model

Table 6. Results of Different Test Analysis of User Satisfaction Before and After Providing the Information System

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Aspek Penilaian	Statistik		
	Sebelum	Sesudah	*P - value**
Aspek Efektivitas			
a. Mean ± SD	12.18±2.616	14.78±3.247	0.000
b. Min-Max	6-17	7-20	
Aspek Efisiensi			0.002
a. Mean ± SD	11.46±2.950	13.26±3.445	
b. Min-Max	4-16	5-20	
Aspek Kepuasaan.			
a. Mean ± SD	12.26±2.546	14.24±3.027	0.002
b. Min-Max	5-18	7-20	
Total skor aspek kepuasan penguna			
a. Mean ± SD	35.90±5.104	42.28±4.899	0.000
b. Min-Max	26-48	30-54	

Wilcoxon *Paired test

The results of the analysis on the criteria for user satisfaction show that the P-value before giving the new system on the effectiveness aspect is P < 0.000. This shows that there are differences in user satisfaction on the aspect of effectiveness before and after the introduction of the new system. The use of the SIP BATIK JKG model provides more benefits compared to the old system. The P-value before giving the new system on the efficiency aspect is P < 0.002. This shows that the use of the SIP BATIK JKG model provides benefits that are more efficient than the old system. The P-value before giving the new system for the satisfaction aspect was P <0.002 meaning that there was a difference in the satisfaction aspect before and after giving the new system. The use of the SIP BATIK JKG model provides more satisfaction than the old system. Overall there is a difference in the total score on aspects of user satisfaction before and after the new system is given with a P-Value <0.000. It was concluded that the use of the SIP BATIK JKG model was more effective in providing user satisfaction than the old system

Table 7. Results of paired test aspects of Materials Management in Laboratory Practice before and after Model Implementation

Aspek Penilaian	Statistik		
	Sebelum	Sesudah	*P-Value*
Aspek Perencanaan			0,001
a. Mean ± SD	13.38±3.232	15.28±1.679	
b. Min-Max	6-20	10-20	
Aspek Pengadaan			
a. Mean ± SD	11.68±2.559	13.92±3.056	0,004
b. Min-Max	5-15	8-19	
Aspek Penggunaan			
a. Mean ± SD	13.72±2.703	5.38±3.129	0,000
b. Min-Max	5-20	8-20	
Aspek Penyimpanan			
a. Mean ± SD	11.92±2.578	2.90±3.215	0,019
b. –Max	5-15	6-19	
Aspek Pelaporan			
a. Mean ± SD	11.98±2.543	3.18±2.616	0,016
b. Min-Max	5-15	7-19	
Total skor aspek Manajemen Bahan			
a. Mean ± SD	62.68±9.911	70.66±6.314	0,000
b. Min-Max	38-83	55-87	

Wilcoxon *Paired test

The results of the analysis on the highest material management criteria from other aspects are the storage aspects. The P-value before the administration of the new system on the material storage aspect was the highest from the other aspects of P <0.019. This shows that there are differences in the management of laboratory practice materials in the aspect of material storage before and after the introduction of the new system. The use of the JKG BATIK SIP model further improves the management of laboratory practice materials in the aspect of material storage compared to the old system. The aspect with the lowest P-value is found

on the aspect of use shows that the use of the SIP BATIK JKG model has further improved the management of laboratory practice

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materials in the aspect of material procurement compared to the old system. The P-value before after giving the new system on the aspect of material use was P <0.000. This shows that there are differences in the management of laboratory practice materials in the aspects of material use before and after the administration of the new system. The use of the JKG BATIK SIP model further improves the management of laboratory practice materials in the aspect of material use compared to the old.

Overall there is a difference in the total score on aspects of materials management before and after the introduction of the new system with a P-Value <0.000. It can be concluded that the use of the SIP BATIK JKG model is more effective in improving the quality of materials management compared to the old system.

1. Effect Size Analysis

Effect size is a statistical method to find out how big the scale or difference in the effectiveness of the model that has been tested and applied. The following is the effect size formulation according to Cohen for single group one group.[15]

$$\delta = \frac{\bar{Y}_a - \bar{Y}_e}{S_e}$$

Keterangan:
δ: *Effect size*
$\bar{Y}_a$: Nilai rata-rata *pretest*
$\bar{Y}_e$: Nilai rata-rata *posttest*
S_e : Standar deviasi

Tabel 8: Interpretasi *Effect Size* untuk *single group*

SIZE	*INTERPRETATION*
0-0,20	*Weak effect* (Efek Lemah)
0,21-0,50	*Modest effect* (Efek Sederhana)
0,51-1.00	*Moderate effect* (Efect Sedang)
>1,00	*Strong Effect* (Efect Tinggi)

Table 9. test results and effect size calculations from the SIP BATIK JKG model

K omposit	***Pretest***	***Posttest***	***Effect Size***		
Aspek kepuasan Pengguna	35,90	42,28	4,89	1,30	Strong Effect
Aspek manajemer Bahan	62,68	70,66	6,31	1,26	Strong Effect

The table above shows that all composite variables have effect sizes above 1 so that they can be categorized as having a high effect, meaning that overall the SIP BATIK JKG model has a large effect on material management in the JKG laboratory in terms of user satisfaction and quality of material management. The highest effect size value on the aspect of user satisfaction is 1.30, meaning that the SIP BATIK JKG model can have a major influence on user satisfaction. So it can be concluded that the SIP BATIK JKG model is very effective in improving the quality of materials management services in the JKG lab

B. Product Result/ Model of SIP BATIK JKG

The JKG BATIK SIP Model Integrates Technological Developments With Website-Based Information Systems With Management Concepts in Laboratories whose specifications are practical materials that are expected to overcome all problems in material management by laboratory staff with a manual system so far. trials conducted on respondents who in this case are active users and managers in the sip batik jkg model laboratory prove that this model is feasible to be applied in practical material management services in laboratories because it can provide an effective change to the old system, which is proven to improve quality practical material management information system. As for the information system model developed by

Variabel	**Nilai Rerata**	**SD**	**Interpretasi**

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researchers as follows

Figure 1: Main menu display

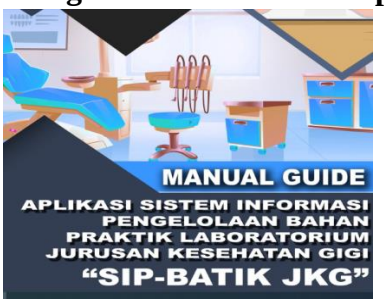

Figure 2: The JKG BATIK SIP Guide Manual

Access rights to the SIP BATIK JKG model can be exercised by 3 different users (students, lecturers and lab staff) with different logins and passwords.

Conclusion

The application of a website-based practical materials management information system model (SIP BATIK JKG) is relevant for use in managing practical materials based on respondents' assessments and is effective for improving the quality of materials management and the quality of users to improve the quality of materials management services in laboratories majoring in dental health

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