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Website-Based Digitalization as an Effort to Improve the Identification of Clinical Material Needs in Dental Health Laboratories

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ABSTRACT

Background: The problems encountered in identifying material needs in the Banjarmasin Dental Health Department laboratory are still carried out conventionally, namely by recording in books with the condition of students who increase every year so that the application of conventional systems is no longer effective to be implemented. This study aims to optimize the identification of website-based clinical material needs in the Banjarmasin JKG laboratory. This study uses the Research and Development (R&D) method with a model trial using the pre-experimental design one group prepost test method with purposive sampling. With a total sample of 50 people. The results based on the Willcoxon statistical test with a p-value of material needs identification before and after the application using the website of 0.000 <0.05 this shows that there is a difference in the effectiveness of identifying material needs before by 12.82 and after using the website by 15.44 there is an increase of 2.62. This means that the application of the website is more effective in identifying material needs compared to the previous system. The use of this new system presents data and information that can be utilized by users .

INTRODUCTION

The technological development known as the Industrial Revolution 4.0 is an era of rapidly developing innovation, enabling the creation of new technologies (Satya 2018). Science and technology are increasingly driving innovation in the use of technological innovations for application in the learning process. Consequently, educators are required to be able to utilize these technologies as learning media in the teaching and learning process, keeping pace with increasingly modern technological developments.

Information technology has a significant impact when utilized to its full potential. Its use can increase effectiveness and efficiency in carrying out processes more quickly. Faster and higher-quality information is expected to improve public service processes, including healthcare. Therefore, the use of technology is also crucial in the healthcare sector. Technology is expected to address various challenges that can be minimized by utilizing increasingly sophisticated technology (Kurniawan, 2023) .

A website-based information system is a tool within a computerized system equipped with features and designed to meet the needs of specific data input, aiming to simplify, accelerate, and accurately process the processed data. A website is a collection of components consisting of text, images, and sound animations, making it an attractive and highly sought-after information medium for sharing information (Iswanto and Mulyono 2021). Website technology processes data into information by identifying, collecting, managing, and providing it for shared access. Given the importance of information system development methods, this study collected data from previous research on information systems to determine the development method for website-based information systems (Wahyudin and Rahayu 2020).

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The implementation of this website-based system is also essential for laboratory staff at the Banjarmasin Department of Dental Health Laboratory to handle the loan and return of laboratory equipment. This is because the service process has long been manual, requiring bookkeeping. With the number of students increasing annually, the manual system is no longer efficient or effective. This is because the increasing number of students also increases the intensity of laboratory needs (Kuncoro, Purnomo, and Kusuma 2018).

A clinical laboratory is a health laboratory that provides clinical examination services to obtain information about individual health, especially to support disease diagnosis, disease treatment, and health recovery (Ministry of Health Regulation No. 411/MENKES/PER/III/2010, 2010). The information contained in the health examination results forms the basis for further examination decisions by students for the individual concerned (Sari, Dayana, and Farida 2018).

Guidelines for supporting facilities for educational providers, in this case regarding laboratories. Laboratories must be able to guarantee the availability and affordability of BHP that are efficient, effective, and rational. In practical activities, students require consumable materials (BHP) (Supriadi and Lismawati 2018). BHP are practical materials used in the practical learning process in the laboratory. Material management begins with the planning process, so it must be well coordinated to function optimally. Lack of good planning will result in inefficiencies in the existing material supply system, the aim of which is to ensure that materials are available and can be accessed efficiently, effectively, and rationally for the implementation of information systems and quality control of material management (Satrianegara, Bujawati, and Guswani 2018).

Dental materials in dental services require special handling because the process of managing and selecting materials differs from that of general laboratory materials. Purchasing materials in dental laboratories is challenging because only dental stores sell these materials, while these are few in number and expensive in Indonesia. Each dental material is used differently; different brands, preparations, and production sources create different handling options because each type of material has different properties, indications, manipulation methods, and strengths and weaknesses (Powers, Wataha, and Nasution 2018).

Laboratory management without proper planning will negatively impact the vision and mission. Without planning, a laboratory will stagnate and fail to grow and develop. Without a well-thought-out plan for laboratory management (whether related to the application of scientific theory, theoretical testing, experimental verification, research, and so on), the laboratory can be likened to an organism that only operates on basal metabolism. In other words, all laboratory activities are unfocused on growth and development, resulting in sterile research productivity. The negative impact is that all activities—the application of scientific theory, theoretical testing, experimental verification, and research—conducted in the laboratory will always be incidental (impromptu).

METHOD

In this study, the type of research used in this study is Mix-method is a study using a combination of qualitative and quantitative approaches. This study aims to develop a new product, namely a website-based application model as an effort to improve the quality of practical material management planning in the Laboratory. The ADDIE model was developed by Dick and Carry in 1996 to develop an application system, there are five steps, namely: 1) Needs analysis 2) Design 3) Expert validation 4) Effectiveness test / end user and 5) Evaluation / E-dyklinik application model. Participants consisted of lecturers, laboratory coordinators, PLP and students totaling 50 people in the Banjarmasin Dental Health Department. The duration of data collection was one month.

The information collected was processed using a qualitative descriptive approach. The data was interpreted in tabular format, namely by drawing conclusions from the results of interviews and literature reviews, which were then summarised using tables with Likert scale assessments. The questionnaire was

developed by the researcher, taking into account the objectives of this study. The main focus of this study was website-based digitisation as an effort to improve the identification of clinical material needs in dental laboratories. The questionnaire covers aspects of testing the effectiveness of identifying material needs before and after intervention based on material needs identification criteria. This research has been approved by the Research Ethics Commission of the Banjarmasin Ministry of Health Polytechnic with number No. 167/KEPK-PKB//2024.

RESULTS

This research is a study of website-based application development with testing using an expert validation questionnaire. Before entering the main display, users are required to access the URL link https://edy-klinik.online/, which displays the main page with the title E-dyklinik and a login menu.



Figure 1. System Login Menu Display

The expert validation consisted of two validators: Azwar Zani, S.Kom (IT expert) and Anderi Fansurna, S.ST., M.Kes (Head of the Integrated Laboratory Unit). The results of the expert feasibility test can be seen in the following table:

Table 1. Expert Validation Test Results for Website-Based Applications

No.	Name	Position	Score	Average	Category	p-value
1	Azwar Zani, S.Kom	IT Expert	95%	91.0%	Very Worthy	0.00
2	Anderi Fansurna, S.ST., M.Kes	Head of Integrated Lab Unit	92%			

*Interclass Correlation Coefficient

Based on the results of expert validation in the table above, it is known that the system feasibility from the average results of the expert validator assessment produces an average value of 91.0% with a very feasible category, the p-value result of 0.00 shows that the website-based application is very feasible in improving the quality of clinical material management planning in the laboratory.

The results of the univariate analysis to determine the average value of material requirements identification are as follows:

Table 2. Average Value of Material Needs Identification Aspect Before and After Providing Website-Based Application

Variables	Mean	Statistics Elementary School	Min	Max
Pretest Material Needs	12.82	1,438	11	15
Posttest Material Needs	15.44	2,476	11	20

Based on the table above, it shows that there is an increase in the value of the aspect of identifying material needs before and after the provision of the E-dyklinik application from previously 12.82 to 15.44.

Testing the effectiveness of identifying material needs before and after the intervention using a questionnaire in accordance with the material needs identification criteria. The analysis results are as follows:

Table 3. Results of the Effectiveness Test of Material Needs Identification Before and After Implementing the Website-Based Application

Variables	Statistics		*p-Value*
	Before	After	
Identifying Material Requirements			
Mean±SD	12.82±1.44	15.44±2.48	0,000
Delta Δ	2.62±2.76		

*Wilcoxon

Based on the table above, the p-value of material needs identification before and after the application of E-dyklinik is 0.000 <0.05. This shows that there is a difference in the effectiveness of identifying material needs before by 12.82 and after using the E-dyklinik application by 15.44, there is an increase of 2.62. This means that the application of E-dyklinik is more effective in identifying material needs compared to the previous system.

DISCUSSION

Identifying material requirements has the benefit of enabling laboratories to ensure that only the materials needed are available for use, thereby saving costs and reducing excess unused inventory. Identifying material requirements allows laboratories to optimize operational processes and increase efficiency in resource use. (Andriyan, Septiawan and Aulya, 2020)

Information systems are one of the technological solutions in the 4.0 era in planning practical material management in the laboratory, especially in identifying material needs that can provide convenience in the future planning process so as to minimize errors in data collection, Application technology can increase accuracy in identifying material needs with users as well as to update and monitor information more effectively, thus enabling them to improve more effective material management strategies. (Tegalrejo *et al.*, 2023)) This report can also provide recommendations for the procurement of new materials, the required quantity, and the right time to place an order With material needs identification analysis supported by a web-based application, clinical laboratories can optimize resource utilization, avoid shortages or excess inventory, and ensure the availability of materials needed for laboratory activities. This can increase efficiency, reduce costs, and support the smooth operation of the laboratory as a whole.

CONCLUSION

This study concludes that website-based digitalization is a strategic step that can improve the quality of dental laboratory governance, particularly in the process of identifying clinical material needs. Implementing this system has been proven to increase effectiveness, making it faster, more integrated, and more accessible to all relevant parties, thereby reducing communication barriers and delays in material procurement.

The website-based system minimizes manual recording errors, reduces the risk of data loss, and improves the accuracy of presenting information regarding clinical material availability. Real-time data availability simplifies inventory monitoring, supports management transparency, and facilitates more targeted evaluation and needs planning.

With digital transformation, dental health laboratories can create more accountable, efficient, and sustainable management systems. This aligns with the demands of technological developments and the need to improve the quality of healthcare services.

CONFESS

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