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Android-based health service management application development to improve service quality at HSC UNY

Rozwój aplikacji do zarządzania usługami zdrowotnymi oparty na systemie Android w celu poprawy jakości usług w HSC UNY

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Abstract

This study aims to (1) design and develop an application for the HSC FIK UNY health service management information system that is used to address the limited health services that are done manually to become Android-based health services, (2) determine the feasibility of the Android-based HSC FIK UNY health service application, and (3) determine the effectiveness of Android-based health service applications on service quality at HSC FIK UNY.

This research is developmental research employing the ADDIE approach model, which includes the stages of analyzing, designing, developing, implementing, and evaluating. Patients, members, and visitors to HSC UNY are the subjects of this study. The trials were divided into two stages: a small-scale trial with 20 participants and a large-scale trial with 50 participants.

The results of this study are (1) an Android-based HSC UNY application product, (2) The material validation assessment defines the feasibility level of this product by obtaining the average results of the material aspect assessment from two experts in the Very Suitable/Very Feasible category, as well as the results from media experts in the Very Suitable/Very Feasible category. This product also passed the small-scale and large-scale trial stages, with both receiving results in the very feasible category. As a result, it is possible to conclude that the product in this developmental research is suitable/feasible for usage, and (3) based on the effectiveness test, it is effective in improving services at HSC UNY.

Keywords

development, service, Android application

Streszczenie

Celem tego badania jest (1) zaprojektowanie i rozwój aplikacji do zarządzania informacjami o usługach zdrowotnych HSC FIK UNY, która ma na celu przeciwdziałanie ograniczonym usługom zdrowotnym, które są wykonywane ręcznie, poprzez stworzenie usług zdrowotnych opartych na systemie Android, (2) określenie przydatności aplikacji do usług zdrowotnych HSC FIK UNY opartej na systemie Android, oraz (3) określenie skuteczności aplikacji usług zdrowotnych opartej na systemie Android na jakość usług w HSC FIK UNY.

Badanie to jest badaniem rozwojowym, wykorzystującym model podejścia ADDIE, który obejmuje etapy analizowania, projektowania, rozwijania, wdrażania i oceniania. Pacjenci, członkowie oraz odwiedzający HSC UNY są przedmiotem tego badania. Próby zostały podzielone na dwa etapy: próbę małoskalową z udziałem 20 uczestników oraz próbę dużoskalową z udziałem 50 uczestników.

Wyniki tego badania to (1) produkt aplikacji HSC UNY opartej na systemie Android, (2) Ocena walidacji materiału określa poziom przydatności tego produktu, uzyskując średnie wyniki oceny aspektu materiałowego od dwóch ekspertów w kategorii Bardzo Odpowiedni/Bardzo Wykonalny, jak również wyniki od ekspertów mediowych w kategorii Bardzo Odpowiedni/Bardzo Wykonalny. Produkt ten przeszedł również etapy prób małoskalowych i dużoskalowych, przy czym oba otrzymały wyniki w kategorii bardzo wykonalnej. W rezultacie można stwierdzić, że produkt w tym badaniu rozwojowym jest odpowiedni/wykonalny do użycia, oraz (3) na podstawie testu skuteczności, jest skuteczny w poprawie usług w HSC UNY.

Słowa kluczowe

rozwój, usługa, aplikacja Android

Introduction

The Health and Sport Center (HSC) is one of the units of the Faculty of Sports Science (FIK) at Yogyakarta State University (UNY). The Health and Sport Center serves two objectives of education and teaching, and also for research and community service. This purpose is consistent with the three major pillars of the university school of thought or the academic community's obligations, known as the Tri Dharma of Higher Education (education and teaching, research and development, and community service). The Health and Sport Center focuses on health-related services. The community can receive treatment at the health service unit on the first floor, manipulative and rehabilitative therapy on the second floor, and maintain fitness by participating in sports at the fitness center unit on the third floor. Sports, in addition to maintaining health, can be a source of community leadership development [1]. Proper management is required in managing HSC, particularly for managers, one of which is by implementing management functions. The management function is divided into four stages: planning, organizing, directing, and controlling [2]. Furthermore, managers have to evaluate the following components of service: timely assistance, employees care, good communication, and employee willingness to help [3]. Organizations that can effectively manage all employees will get significant benefits, including higher customer satisfaction, increased revenue, and more satisfied employees [4]. As a result, one option to meet one of HSC's goals is to make the services provided at HSC FIK UNY available to the general public.

Despite the advancement of increasingly sophisticated technology, HSC UNY, as one of FIK UNY's service units focusing on community services, has not fully utilized technology in its existing procedures. In reality, technology is quite vital in the modern 4.0 era [5]. This is evident in the manual registration and service systems that are still in use. It means that prospective patients or members must come directly to HSC FIK UNY to learn about the facilities and services offered and to register. According to Government Regulation No. 46 of 2014, the Article explains that the regulation of the Health Information System aims to ensure the availability, quality, and access to Health Information that has the value of knowledge and is accountable, to empower community participation in the implementation of the Health Information System, including professional organizations, and to realize the implementation of the Health Information System within the scope of an efficient and effective national health system, especially through strengthening cooperation, coordination, integration, and synchronization in supporting the implementation of sustainable health development. According to Article 1 paragraph 5 of the Indonesian Government Regulation No. 46 of 2014, a Health Electronic System is a collection of electronic devices and procedures that function to prepare, collect, process, analyze, store, display, announce, transmit, and/or disseminate Health Data and Information. It is related with the rapid growth of information technology in today's increasingly complex society. The progress of information technology is currently very beneficial to the community's daily activities. Currently, the majority of Indonesians use the internet to obtain information more easily. According to Suara.com,

the number of internet users in Indonesia reached 202.6 million people through January 2021. This figure increased by 27 million people, or 15.5 percent, over the previous year. Smartphone media can connect to the internet. One type of media is android-based media, and many people are currently switching to using android-based devices to act as a medium for simply and rapidly accessing information [6]. On cellphones, there are three operating systems (OS): iOS, Android, and Windows. Android is one of the most popular operating systems. Android is a Linux-based mobile phone and tablet operating system [7]. One of the advantages of Android over other smartphone operating systems is that it is open-source code, allowing anyone to customize features that are not yet available in the Android operating system to their liking [8]. Although Android is the youngest mobile OS, it has been popular first, and according to survey statistics conducted at the end of 2011, Android controls 43% of the mobile OS market share and outperforms other competitors [7]. The level of features and communication can be determined by the functionality of known applications [9].

The use of Android-based applications aims to establish brand identity and build ties with the community [10]. Furthermore, it seeks to improve patient satisfaction. Because satisfaction is a direct effect of perceived quality and value, any strategy targeted at enhancing quality and value will affect satisfaction [11]. Health facilities must be built for the benefit of education and training, as well as research and development of science and technology in the field of health, according to Law No.23 of 1992, article 57. As a result, HSC FIK UNY, as one of the health units located at FIK UNY, must use technology to assist the community by building an android-based application that allows patients to conveniently access information and services as a form of community service that satisfies one of academia's obligations.

Materials and methods

Study design

The research and development (RnD) research design was used in this research. The research and development method, often known as development research, is a research method used to develop products and test their effectiveness [12]. The ADDIE development model (Analysis, Design, Development, Implementation, and Evaluation) was employed in this study. The goal of this study is to develop an android-based service and test its effectiveness in providing services. The product developed was an android-based application for HSC UNY services. The prospective users of HSC UNY's health care services served as the study's research sample. The sample selection stage is critical since it limits the scope of the research. The experiments were done in two stages: a small-scale trial with 20 participants and a large-scale trial with 50 participants. Following the large-scale study, an effectiveness test was performed to evaluate effectiveness. The design process, production of validation of production results, small- and large-scale trials, and effectiveness testing were all part of the development process.

Statistical data analysis

Following the completion of data collection, research data analysis was performed to determine the assessment of the product

that had been developed. Questionnaires completed by media experts, material experts, and prospective members or patients were used to collect research data. Analyzing data consists of three steps: (1) preparation, (2) tabulation, and (3) application of data in accordance with the research approach. The preliminary process comprised activities such as verifying the participant's name and identity, verifying the quality of the data, and verifying the type of data entry. Data analysis can take the form of scoring items that must be scored at the tabulation stage. The

instruments used in this development study were structured on a Likert scale with intervals ranging from 1 to 5.

Results

Following the process of designing the applications, the next stage is to develop designed applications. Materials and media must be reviewed in the application to synchronize their applicability. The validation from material experts and media experts achieved the following results:

Table 1. Validation results from material experts

Experts	Aspect	Score obtained	Maximum score	Percentage
Media Expert 1	Android Application	49	50	98%
	Application Manual Book	58	60	96,6%
Media Expert 2	Android Application	46	50	92%
	Application Manual Book	56	60	93,3%
Average				94,9%

The results of material expert 1 validation on the android aspect were 95.2% in the very feasible category. The validation result for the aspect of the application manual was 96.6% in the very feasible category. Furthermore,

material expert 2 gave a score of 92% in the very feasible category to the android aspect. The percentage for the application manual was 93.3%, placing it in the very feasible category.

Table 2. Validation results from media experts

Experts	Aspect	Score obtained	Maximum score	Percentage
Media Expert 1	Android Application	76	80	95%
	Application Manual Book	58	60	96.6%
Media Expert 2	Android Application	75	80	93.8%
	Application Manual Book	55	60	91.7%
Average				94.3%

The validation results from media expert 1 on the android aspect were 95% in the very feasible category. The score for the application manual was 96.6% in the very feasible category. Furthermore,

media expert 2 gave a score of 93.8% in the very feasible category to the android aspect. Then, in the aspect of the application manual, the score was 91.7%, placing it in the very feasible category.

Table 3. Small Scale Trial Results

No.	Interval	Category	Frequency	Percentage
1.	81% to 100%	Strongly agree	15	75%
2.	61% to 80%	Agree	5	25%
3.	41% to 60%	Fairly agree	0	0%
4.	21% to 40%	Disagree	0	0%
5.	0% to 20%	Strongly disagree	0	0%
Total			20	100%

According to the findings of a small-scale trial of the HSC UNY application on 20 respondents, 75% (15 visitors) strongly agreed,

while 25% (5 visitors) agreed. Therefore, the HSC UNY application is feasible to be developed to support services at HSC UNY.

Table 4. Large Scale Trial Results

No.	Interval	Category	Frequency	Percentage
1.	81% to 100%	Strongly agree	37	74%
2.	61% to 80%	Agree	13	26%
3.	41% to 60%	Fairly agree	0	0%
4.	21% to 40%	Disagree	0	0%
5.	0% to 20%	Strongly disagree	0	0%
Total			50	100%

According to the results of large-scale trials on the HSC UNY application conducted with 50 respondents, 74% (37 visitors) strongly agreed and 26% (13 visitors) agreed. As a result, the HSC UNY application is feasible for development to support

services at HSC UNY. Following small and large-scale trials, an effectiveness test is carried out. The purpose of the effectiveness test is to determine the effectiveness of the developed product.

Table 5. Descriptive results of pretest and posttest Service Quality Effectiveness Tests

No.	Interval	Category	Frequency	Percentage
1.	98 – 120	Very Satisfied	31	62%
2.	76 – 97	Satisfied	19	38%
3.	53 – 75	Dissatisfied	0	0
4.	30 – 52	Very Dissatisfied	0	0
Total			50	100%

Based on the table above, the level of satisfaction of HSC UNY patients, members, and visitors with services before and after using the HSC UNY application was determined.

The mean value, greatest value, lowest value, and standard de-

viation of the pretest and posttest results of personal service quality at HSC UNY are determined using descriptive statistics data from the pretest and posttest of customer satisfaction.

Table 6. Description of pretest and posttest data on Service Quality

Statistics	Service Quality	
	Pretest	Posttest
Mean	85.83%	95.16%
Standard Deviation	10.15	7.2
Minimum	81	93
Maximum	117	120

Discussion

The findings of the validation stage by material experts obtained an average percentage of 94.4% in the very good/very feasible category, while the results of the validation stage by media experts obtained an average percentage of 94.3% in the very good/very feasible category. According to the findings of the material and media expert validation tests, the HSC UNY android-based application produced is very feasible for improving the quality of service at HSC UNY. The term "application" refers to implementation or utilization. An application is a ready-to-use program that may be used by the intended target to perform a function for users or other applications [13].

At the stage of validation, both material and media experts gave

comments and suggestions, such as differentiating the phone numbers of each unit to speed up information delivery and adding a suggestion column that visitors to HSC UNY can use directly.

Small-scale and large-scale trials were conducted after revisions were made based on validation results from material experts and media experts. Small-scale trials have a significant impact on large-scale trials [14]. The average score of the usability aspect in the small-scale trial on 20 respondents was 88% in the category strongly agree/very feasible, the score of the assessment of the information aspect was 88% in the category strongly agree/very feasible, and the score of the assessment of the display aspect was 89% in the category strongly agree/very feasible. The value is converted based on the conversion of

the trial score based on the result of the assessment in order to conclude that the results of the assessment of the usability aspects, information aspects, and display aspects were very feasible. The score on the usability aspect was 90% in the strongly agree/very feasible category at the large group trial stage, with a total of 50 respondents, followed by the information aspect at 90% in the strongly agree/very feasible category, and the display aspect at 89% in the strongly agree/very feasible category.

Furthermore, after making revisions during trials, the application is tested for effectiveness utilizing a questionnaire to determine a more effective service quality. Customer satisfaction is influenced by the services offered by an agency, company, or organization. Several factors can be used to determine service satisfaction. To quantify service quality, there is a "SEVQUAL" theory; the five components of service quality are tangibility, responsiveness, reliability, assurance, and empathy [15]. Service companies can benefit from high service quality, and it is also the key to success [16]. There is a difference in the average level of satisfaction of patients, members, and visitors regarding the services at HSC UNY based on the effectiveness test that was conducted before and after using the application. Before using the HSC UNY application, the average level of satisfaction among patients, members, and visitors was 85.83%, and after using the HSC UNY application, the average was 95.16%. With an increase in the average level of satisfaction, it can be concluded that the quality of service at HSC UNY has improved as a result of the application developed in this study. A good service will have a significant impact on an agency's system. Service quality is critical in acquiring and retaining consumers for an extended period of time. Customer satisfaction has a long-term impact on the connection between customers and service providers [17]. Service prices, service quality, and services provided all contribute to customer satisfac-

tion [18]. Good service results must be maintained, if not improved. Quality service will be a major indicator of customer satisfaction, and it will spread through word-of-mouth communication to the larger community [19]. Customer satisfaction is a critical component that not only encourages customers to remain loyal to service providers, but also serves as a marketing tool that may be communicated through word of mouth [20].

Conclusions

Based on the effectiveness test that has been conducted during the pretest, the results showed that the visitors were very satisfied with a percentage of 62%, and the other visitors were in the satisfied category with a percentage of 38%. No visitors provided ratings in the categories of dissatisfied or very dissatisfied. Visitors reassessed the entire service at HSC UNY after the HSC UNY application had been effectively launched after passing the material and media expert validation process, small- and large-scale trials. Based on the assessment results after using the HSC UNY application, the majority of visitors gave ratings in the very satisfied category with a percentage of 94% and the other visitors gave ratings in the satisfied category with a percentage of 6%. There were no dissatisfied or very dissatisfied patients, members, or visitors. The overall satisfaction rate was 86.83% prior to using the HSC UNY application, and it increased to 95.16% after using the application.

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