International Journal of Information System & Technology
Akreditasi No. 36/E/KPT/2019 | Vol. 5, No. 4, (2021), pp. 407-414

Customer Experience Management (CEM) Supports the Quality of School Based on NFC

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Abstract

Schools as providers of educational services are a gateway to the progress of a nation. Many prospective students look for schools with good quality in order to get something that they aspire to. While the reference for assessing school services for prospective students can only be known from students who have graduated or through poster media. Meanwhile, the assessment of student experience only refers to personal opinions and only one factor such as teaching services or administration. Each student has a different argument about school services. This study will explain the creation of a framework for determining service levels in NFC-based schools. Evaluation of services in schools using information technology through smartphone applications connected to the computer provided at the information service desk. The information generated in the form of evaluating educational services in schools aims to improve the quality of learning and academic administrative services. Furthermore, the information generated will be made a report by the data processor addressed to the leadership. With this service, it is expected that there will be an increase in the quality of education and learning services that are able to produce quality graduates and can become information and references for prospective students in choosing schools as a reference for educational services.

Keywords *: School service,dss with cem,dss*

1. Introduction

Digitalization in all fields has become a challenge in the world of education, especially for schools in Indonesia in achieving their business goals. Schools as formal institutions are expected to be able to produce quality human resources along with technological advances and graduates who have a dynamic mindset so that they can be accepted at the next level of education. One way to improve the quality of learning while promoting schools is to introduce virtual learning that can contribute to the quality of education [1]. In addition, information and communication technology in the form of the use of the internet and online devices must be a concern both as a medium of administration, learning and as a medium of innovation in order to be able to apply technology into a work carried out by computers [2].

IS/IT strategic planning that is built with good planning will help integrate existing systems and can help marketing educational services [3], therefore organizations that involve individuals as decision makers in strategic planning must obtain sufficient information in order to solve problems effectively. accurate and reduce errors. The most appropriate strategy to gain competitive advantage is by restructuring the organization, involving the benefits of Information Systems and Information Technology (IS/IT) on existing processes within the organization [4]. Organizations that want to improve or update infrastructure, as well as

ISSN : 2580-7250

optimize the benefits of Information Systems and Information Technology (IS/IT) should do strategic planning[5,6]. Strategic planning is useful for identifying the main goals, focus, and needs needed for strategic innovation and renewal [7]. However, management of quality human resources and learning facilities accompanied by good administrative services must be prioritized in order to achieve the school's vision and mission [8].

The use of information technology in educational institutions is not only in the learning process but also in the process of educational administration services in schools. School administration services begin with registration, the education process and graduation [9]. Student data administration is very important to know the educational history and limitations of students as a guide in the learning process. Meanwhile, in order for students to enjoy the learning process, good service is needed. Good service is in the form of cleanliness of the school environment, excellent teacher service and completeness of adequate facilities [10,11]. The success of educational services in schools can be helped by evaluating students and parents using customer experience management combined with technology, namely NFC. The level of satisfaction of administrative services, teacher services, cleanliness of the learning environment and the availability of learning facilities are barometers so that schools can survive with satisfactory quality or improve their quality for the better. The determinants of business success involving student and parent satisfaction are called customer experience management[12],[13].

This study will discuss the evaluation of the level of student satisfaction with services in schools as a support for successful learning using NFC. NFC technology on smartphones is currently capable of off-line data retrieval and processing and is able to store data in smartphone devices and can be sent to servers for educational purposes. These technologies are Near Field Communication (NFC) tag reader and raspberry pi. NFC tag reader can retrieve data and process it off-line, then the data can be sent to the server for wider use. In addition, administrative and service data can be used as references and outputs to improve service quality in the form of teacher performance reports and the availability of existing facilities for leaders.

This study took references from electronic medical records conducted by [14], [15], and [16]. In investigated the benefits of RME that facilitate administrative personnel in retrieval of patient information. Furthermore, the development of smart card-based medical records (NFC) was developed by [17], [18], and [19]. The three studies used RFID cards to store medical record data. Data in the form of output about administrative services and learning in schools can be analyzed based on the level of satisfaction using an algorithm. Furthermore, the data can show the value of the level of stakeholder satisfaction in each part of the registration and graduation administration services, students and curriculum and become data for school management to take action in the form of service improvements and rewards for the efforts that have been achieved. Important data that can be retrieved relating to educational services are: Student records and Management. Student record is information recorded in written or electronic form about student identity, school activities, student achievements and violations. Student records can be seen in the main activities consisting of student admissions, academic operations and student releases. Meanwhile, data management contains everything that makes the learning process take place, such as: teacher administration, school infrastructure and school policies in achieving its vision and mission.

2. Research Methodology

2.1. Customer Experience Management

Customer Experience Management is a strategic process to manage the overall customer experience with a product or company"[20]. CEM with IT is adapted in almost all business

environments to better manage the relationship between the customer and the service provider.

2.2. Near Field Communication Tag Reader

Digitization in all fields makes the flow of information faster, more accurate and of high quality. Information technology designed on smartphones is also developing with the addition of features that make it a device capable of performing various functions. The addition of the Tag Near Field Communication (NFC) feature allows smartphones to communicate with other mobile devices without using the cellular network at a distance of about 4 cm [21] Near Field Communication (NFC) is a technology that supports short-range wireless communication, which was developed from the process of combining interconnection technology and non-contact identification. which exists. NFC is also part of Radio Frequency Identification (RFID) technology with a high frequency of 13.56 MHz and runs in various data transmission speeds such as 106 kbps, 212 kbps, and 424 kbps. NFC is a short-range wireless communication technology, in which an NFC phone taps a few centimeters onto an NFC chip. The NFC chip or NFC tag is formed from an antenna and an IC like a sticker, where the antenna will read the external sign from the NFC phone and activate the IC. Communication between two NFC-enabled devices occurs when the distance is between 0 to 10 cm [21] In addition, NFC smartphones can read data stored in smart cards (NFC tags) and are compatible with Bluetooth or wi-fi technology. NFC is faster in terms of communication settings than Bluetooth because it can be activated at the same time as activating the cellular and is equipped with a device capable of managing secure elements. Connection between 2 NFC devices can be done instantly (<0.1 seconds) [22] with a communication radius closer than Bluetooth, less than 10 cm. Although in reality, the maximum data transfer for NFC is 424 Kbps, lower than Bluetooth, which is 721 Kbps. However, NFC provides a higher level of security and makes it very suitable for crowded areas and is compatible with RFID technology. NFC has elemental advantages over RFID, which can be used for two-way communication and installed on smartphones [23] .

2.3. Propose Ide

Information technology architecture displays the basic framework of the software system to be built. The architecture for developing web-based student experience information systems and Android-based Near Field Communication (NFC) is designed for schools that want to improve and improve service quality. This system will be developed in schools as a model for decision making based on input and evaluation of services and service complaints such as speed of service, availability of facilities and convenience of learning. The computer will be installed on the administrative information desk at the school or in each class that can be easily accessed by students. NFC mobile phones will provide a link that can be used by students to provide whatever information they want related to school administration services. An NFC cell phone can be connected to the system using a Wireless Access Point (WAP) so that information will be forwarded to school management and the principal.

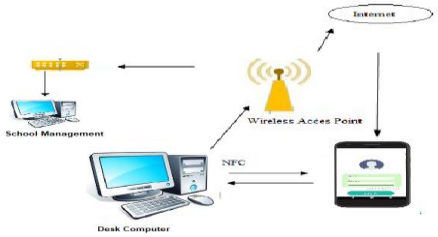
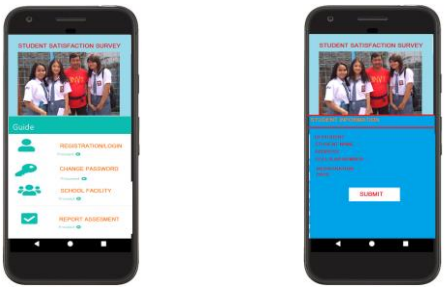


Figure 1. System Architecture Conection with NFC

The application architecture design presents the basic framework of the software system that is built. Web and Android-based Near Field Communication (NFC) architecture to support student satisfaction surveys as shown in Figure 1. The system will be developed in schools as a step to evaluate employee performance and the infrastructure provided. Passive NFC will be installed on the school picket teacher's desk. NFC-enabled phones will be marked as NFC passive and will provide a link that students can use to get survey links and any information they want. NFC phones can connect to the system using a Wireless Access Point (WAP) to connect to the system. This mobile application will be downloaded from playstore and install it. Surveys can be filled out at any time after class hours. Students can also use this application to get reports on the learning outcomes of certain teachers, discuss difficulties in learning certain materials, and so on. The results of the survey are in the form of reports that are used by leaders in making decisions to improve the quality of education in schools.



(a) **(b)**

Figure 2. (a),(b) Main Menu User Interface

Figure 3(a)(b) shows the main menu of the mobile application. As previously mentioned, both teachers, school admins and students, they need to download this e-teach mobile app and install it on their NFC mobile app and register by entering their data like ID Students,students name, address, cellular number and date registration.

Figure 3. Questionnaire

3. Result and Discussion

Making questioners with questions covering several fields, namely :

a) People
   Example: School employee services at the registration and information desk and teacher services
b) Facilities
   Example: supporting facilities used for learning and support such as toilet cleanliness and parking lots
c) Technology

Example: availability of learning information, classroom facilities including the availability of wifi for students as learning support.

Table 1. Respondents for People, Facilities and Technology components

No	Questions	Choice of Respondents					
		STS	TS	N	S	SS	
1	Are cleaning service acting deftly ?	7	12	8	2	0	People
2	Are Administrative staff good performance	11	12	6	0	0	
3	Do teacher provide good service ?	11	12	5	1	0	
4	Do Employees provide good service ?	15	10	4	0	0	
5	Do teachers provide good consultation ?	8	17	4	0	0	
6	Handling problems runs quickly	5	8	15	1	0	
7	Are the toilets Clean ?	0	8	20	1	0	Facilities
8	Are the classroom is clean ?	0	13	16	0	0	
9	Are the Parking area adequate ?	0	2	26	1	0	
10	Availability of lesson information about good enough ?	0	2	12	15	0	
11	The availability of supporting acces wifi is good enough ?	0	1	19	9	0	
12	The availability of library is good enough ?	0	4	17	8	0	

Table 2. Calculate Score and Ideal Score for Components of People

No	Questions	Choice of Respondents					Score	SK
		STS	TS	N	S	SS		
1	Cleaning service acting deftly	7	24	24	8	0	63	870
		24.1%	41.4%	27.6%	6.9%	0.0%	100%	
2	Administrative staff good performance	11	24	18	0	0	53	
		37.9%	41.4%	20.1%	0.0%	0.0%	100%	
3	Teacher provide good service	11	24	15	4	0	54	
		37.9%	41.4%	17.2%	3.4%	0.0%	100%	
4	Employees provide good service	15	20	2	0	0	47	
		51.7%	34.5%	13.8%	0.0%	0.0%	100%	
5	Teachers provide good consultation	8	34	12	0	0	54	
		27.6%	58.6%	13.8%	0.0%	0.0%	100%	
6	Handling problems runs quickly	5	16	45	4	0	70	
		17.2%	27.6%	51.7%	3.4%	0.0%	100%	
	Total						341	

Table 3. Calculate Score and Ideal Score for Components of Facilities

No	Questions	Choice of Respondents					Skor	SK
		STS	TS	N	S	SS		
1	The toilets Clean	0	16	60	4	0	80	435
		0.0%	27.6%	69.0%	3.4%	0.0%	100%	
2	Class rooms for students clean	0	26	48	0	0	74	
		0.0%	44.8%	55.2%	0.0%	0.0%	100%	
3	the Parking area adequate	0	4	78	4	0	86	
		0.0%	6.9%	89.7%	3.4%	0.0%	100%	
	Total						240	

Table 4. Calculate Score and Ideal Score for Components of Technology

No	Questions	Choice of Respondents					Skor	SK
		STS	TS	N	S	SS		
1	Availability of lesson information	0	4	36	60	0	100	435

No	Questions	Choice of Respondents					Skor	SK
		STS	TS	N	S	SS		
	about good enough	0.0%	6.9%	41.4%	51.7%	0.0%	100%	
2	The availability of supporting acces wifi is good enough	0	2	57	36	0	95	
		0.0%	3.4%	65.5%	31.0%	0.0%	100%	
3	The availability of library is good enough	0	8	51	32	0	91	
		0.0%	13.8%	58.6%	27.6%	0.0%	100%	
	Total						286	

The score is obtained by multiplying the number of respondents who choose each assessment multiplied by the weight of each assessment. The weight for assessment is as follows:

a) STS (Strongly Disagree) = 1
b) TS (Disagree) = 2
c) N (Netral) = 3
d) S (Agree) = 4
e) SS (Strongly Agree) = 5

As for calculating the scores on data collection used the following formula:

Score = Respondent value x weight value

SK = Highest score for every question x Number of questions x respondent quantity (1)

From these results a rating scale is used for the percentage of the results for the calculated score and ideal score. If the percentage is assessed:

a) 0 % - 20% = Very Dissatisfied
b) 21% - 40% = Dissatisfied
c) 41% - 60% = Netral
d) 61% - 80% = Satisfied
e) 81% - 100% = Very Satisfied

From the percentage results above from 0% - 100%, we can conclude the following information:

Table 5. Results of satisfaction level

Component	Score	SK	Percentage (%)	Remarks
People	341	870	39.20%	Dissatisfied
Facilities	240	435	55.17%	Netral
Technology	286	435	65.75%	Satisfied

In the assessment item, the human resource component only gets a percentage of 39.20% which describes student dissatisfaction with the condition of employee services. Direct services to students consist of registration and administrative information, counseling services, administrative services, cleaning services. From some of these components, there are elements of administrative services that have a higher unsatisfactory value. Furthermore, the value of the facility gets a percentage of 55.17%. is the cleanliness of the classrooms, parking and toilets are quite good. While the technology component got a score of 65.75%. This means that the need for technology is very adequate, both wifi, school websites that provide information about learning agendas and libraries.

4. Conclusion

Information technology using NFC-based smartphones can contribute in the form of speed, accuracy and convenience for school management to obtain information. The information obtained is in the form of student assessments of administrative staff services, learning facilities and information technology services. Input evaluation can be done every semester or after the distribution of learning outcomes reports. Information received by school management can then be used as a report for evaluation in order to improve the quality of education services in schools. Improving the quality of services in schools is needed so that students get maximum service. In addition, schools can be a comfortable learning place for the development of students' non-academic academic achievements. The ease of accessing and providing information using an Android-based smartphone equipped with NFC can be input for management for further technology development.

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