DESIGN AND DEVELOPMENT OF DENTAL AND MEDICAL SYSTEM

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Abstract

The use of a computerized dental and medical systems may improve the management of patient records. The aim of this study is to systematically review the effectiveness of computerized dental and medical systems in providing accurate, up-to-date, and complete information about patients and how the system may help the health service department to increase productivity.

Introduction

The Medical and Dental Provider or Health Service Provider is a computerization of the medical and dental records of the students/employees as well as its updates. Its user accounts limit the number of people who can access the system. It also determines whether the given student is cleared or not depending on his medical record. This information is relevant to the staff because it determines whether the student is fit for enrolment or not. The system also performs inventory of the medicines available. Though not intended for accounting purposes, the inventory keeps an accurate track of how many of the medicines are dispensed to the students and how many are left. Converters and calculators are also added as auxiliary features of the system in order to help the staff perform their duties together with the system. The Health Services Provider renders consultation as its primary goal. The physician and other staff perform first its main concern by checking the condition of the patient; they check the medical records and the vital signs. The physician mainly gives prescriptions and advises the patients. There are also times when assessments are also performed. Based on the patient's condition, the patient

will be advised either to stay or to rest for a while. The Health Service Provider also covers existing problems. The system necessitates improvements for faster, more convenient and more efficient procedures. The said department is unofficially tied up with other health institutions but rather it is partnered with Medical Clinic and Laboratory located at Brgy. Molino. During the enrollment, enrollees are referred to have initial health check-ups on the said clinic. Information were gathered from there and transferred to the system using thumb drives. From that phase onwards, more time were consumed.

Background of the Study

Everyday many people come to clinics or health facilities to ensure that they have a healthy body and mind. Patients spend an essential amount of time waiting for services provided by the doctors or health professionals. Patients' waiting time for medical care has a direct impact on patient satisfaction and patient attitudes toward clinicians, staff, and clinics in general. As the number of patients continually increase, managing a clinic can also become increasingly difficult, especially if everything is done manually. A manual method of managing medical and dental records, prescriptions, billings, and appointment schedules of patient are still being done since this is the easiest way and it is cheaper unlike having a computerized system. But, as years passed by, the population of the community is growing as well as the number of patients. Therefore, managing the records manually is not practical anymore. While the technology is moving fast and becoming modern, a system can be created that will help make the work faster.

In this study, a web-based application is developed that minimizes manual records keeping, allows a staff to keep track of patients, reduce patients' waiting time, and increase the number of patients to be served.

The objective of this study is to design and develop an online clinic management solution that will help health professionals save time and resources with automated daily clinic operations.

This study aimed to design and develop a Medical and Dental Provider for universities and colleges. Specifically, this research study sought to answer the following:

1. Problems encountered with the existing manual process of clinics.
2. Creation of accurate and complete records of patients.
3. Faster retrieval of patients' record that is time consuming.
4. Privacy and security of patient data.

This system is designed to eradicate an array of problems of health services mainly the medical and dental provider with efficiency, convenience, less manpower used and less time consumed.

Method

The proponent used the descriptive-survey to determine the problems encountered with the existing manual processing of clinics. A survey questionnaire was used. "This approach is appropriate wherever the object of any class vary among themselves and one is interested

in knowing the extent to which different conditions obtain among these objects." (Good and Scates, 1972)

Each data on the questionnaire may determine the impact of the proposed online clinic management system on the patient's satisfaction and attitude towards health service providers, staff and the service itself.

The Medical Clinics and Laboratories in Barangay. Molino used as the locale of this study. The students / employees who visit the health facility for check-ups or any other medical queries are the respondents of the study.

The proponents used the purposive sampling method in gathering data. This helped the proponents choose the appropriate respondents who visit the Health Centers/Health Care Facilities in Barangay.Molino.

The proponent used the survey questionnaire as an instrument of this study. The questionnaire helped the proponent to determine the impact on patient's satisfaction and attitude towards health service providers, staffs and the service itself.

Also, the survey questionnaire was used to investigate the attitude of the respondents toward the changes that the proposed online clinic management system may bring. It is also a tool to gather information to know the impact on the voting preference of the respondents.

The data gathered were consolidated, presented in tables, discussed and interpreted from which findings and conclusions were drawn.

System Development Methodology

The researcher used the Waterfall Method which was developed for software development. The method requires the execution of one phase before proceeding to the next which helped in identifying possible faults during one of the initial phases and will be fixed for correction. Another advantage is it is easy to develop a software through this method in short span of time.

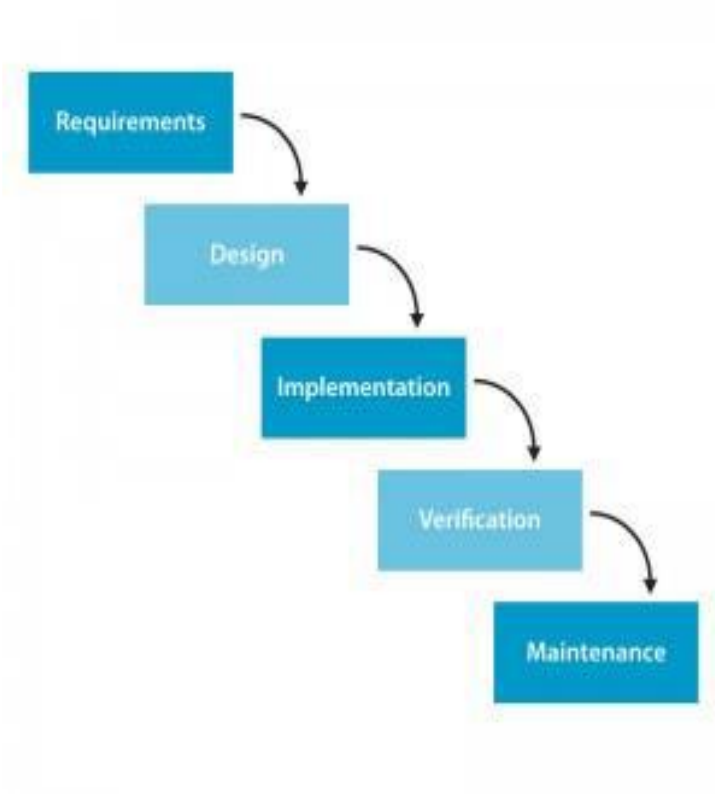

Figure 2.0: Waterfall Model

The Waterfall Model implemented in this research is preceded with the requirement analysis in which new system is to be identified. All the information gathered from the survey questionnaire were analyzed

including the functional and non-functional requirements of the new system. This is followed by the system design phase. In this phase, the requirements of the project are translated into a detailed design so that a complete database for the system will be created. Technical specifications for the new system based on requirements are also identified.

Programs are created in the implementation stage. In this phase, the development of the new system begins. The verification or testing activity involves computer technical people and customers. In this research, the testing will be done based on the actual data to know the system's performance in the real life-working environment. The complete software will be also tested based on the functional and non-functional requirements. Each part of the software will be tested separately to ensure error free software. In this phase, the test reports will be completely and carefully documented.

After the system is implemented and tested, operational modifications or enhancements could be made depends on the customer's needs.

Results

The data gathered were presented, analyzed and interpreted. Questionnaires were given to the intended health services personnel of Barangay Molino Health Center. This was done to be able to obtain the evaluation of the respondents on the system. The results were then tabulated and computed to determine the mean scores. In getting the mean scores, the researchers compared the significance on the difference between the respondent's assessment in terms of functionality, usability, reliability, performance and supportability when grouped according to profile. The result were then presented in tabular chart and textual form for easy comprehension.

Table 1 Assessment of the Respondents in terms of Functionality

Criteria	Mean	Analysis
1. Can access patients' records quickly	4.66	Strongly Agree
2. Provides accurate, up-to - date and complete information about patients	4.50	Strongly Agree
3. Supports staff do their work more effectively	4.50	Strongly Agree
Grand Mean	4.55	Strongly Agree

Numerical Rating Scale	*Adjective Rating*
4.50 – 5.0	Strongly Agree
3.50 – 4.49	Highly Agree
2.50 – 3.49	Agree
1.50 – 2.49	Disagree
1.0 – 1.49	Strongly Disagree

In summary, the result of the data analysis in terms of Functionality gathered a 4.55 grand mean. Thus, the assessment of the respondents in terms of Functionality is Strongly Agree. In criteria one (1), the a 4.66 mean was obtained which states that the records of the patient can be access quickly. In criteria two (2), the data gathered a 4.50 mean which states that the system provides accurate, up-to-date and complete information of the patients. Lastly, the third criteria gathered 4.50 which means that the system helped to support the staff in doing their work more effectively.

Table 2 Assessment of the Respondents in terms of Usability

Criteria	Mean	Analysis
1. The system is easy to use	4.40	Highly Agree
2. The information provided in the system is clear	4.50	Strongly Agree
3. The system has all the functions and capabilities needed	4.50	Strongly Agree
Grand Mean	4.47	Highly Agree

In summary, the result of the data analysis in terms of Usability gathered a 4.47 grand mean. Thus, the Assessment of the Respondents in terms of Usability is Highly Agree. In criteria one (1), the 4.40 mean states that the system is easy to use with a rate of Highly Agree. In criteria two (2), the data gathered a 4.50 which means that the information provided in the system is clear. Lastly, the third criteria generated a 4.50 mean which states that the system has all the functions and capabilities needed.

Table 3 Assessment of the Respondents in terms of Reliability

Criteria	Mean	Analysis
1. The system has storage for preservation of records	4.40	Highly Agree
2. It reduces the chances of data duplication as there is only one modifiable file.	4.80	Strongly Agree
3. It provides privacy and security of the patients' records	4.60	Strongly Agree
Grand Mean	4.60	Strongly Agree

In summary, the result of the data analysis in terms of Reliability is Strongly Agree. In criteria one (1), the data gathered a 4.40 mean which states that the system has storage for preservation of records. In criteria two (2), the mean is 4.80 which means that the system helps

reduce the chances of data duplication as there is only one modifiable file. Lastly, the criteria three (3) gathered 4.60 mean which states that the system provides privacy and security of the patient records.

Table 4 Assessment of the Respondents in terms of Performance

Criteria	Mean	Analysis
1. The system is free from downtime errors	4.60	Strongly Agree
2. The system increases productivity	4.50	Strongly Agree
3. The system provides reports that are needed from time to time	4.60	Strongly Agree
Grand Mean	4.57	Strongly Agree

In summary, the result of the data analysis in terms of Performance is Strongly Agree. In criteria one (1), the data gathered a 4.60 mean which states that the system is free from downtime errors. In criteria two (2), the mean is 4.50 which means that using the system increases productivity. Lastly, the criteria three (3) gathered 4.60 mean which states that the system provides reports that are needed from time to time. The grand mean is 4.57.

Table 5 Assessment of the Respondents in terms of Supportability

Criteria	Mean	Analysis
1. The system can be modified easily	4.50	Strongly Agree
2. The system can run in any operating system	4.50	Strongly Agree
3. The system can be installed easily	4.40	Highly Agree
Grand Mean	4.47	Highly Agree

In summary, the result of the data analysis in terms of Supportability gathered a 4.55 grand mean. Thus,

the assessment of the respondents in terms of Functionality is Strongly Agree. In criteria one (1), the data gathered a 4.50 mean which states that the system can be modified easily. In criteria two (2), the mean is 4.50 which tells that the system can run in any operating system. Lastly, the third criteria has a 4.40 mean which means that the system can be installed easily.

Table 6 Summary of FURPS

Criteria	Mean	Analysis
Functionality	4.55	Strongly Agree
Usability	4.47	Highly Agree
Reliability	4.60	Strongly Agree
Performance	4.57	Strongly Agree
Supportability	4.47	Highly Agree
Grand Mean	4.53	Strongly Agree

The table 4.6 summarizes the mean of each category. Functionality accumulated a mean of 4.55 which means that the system provides and accomplished the necessary functions efficiently. For Usability, it gathered a 4.47 mean which states that the system is user-friendly and the all information provided were clear. Reliability gathered a mean of 4.60, this means that the system is consistently good in terms of its quality. For the Performance, it has a 4.57 mean which indicates that the system helps to increase the productivity of the users. Lastly, Supportability has a mean of 4.47 which indicates that the system is enable to function or support the over-all process of the operation. The Grand Mean of 4.53 means that the system is strongly recommended to use.

Summary of Findings

The patients' record of every Health Service Provider is very important. Everything should be well-organized and stored properly. The proponents identified

the current situation of the beneficiary in terms of organizing and storing their records. With the use of an appropriate method to evaluate the problems of the beneficiary, the proponents developed a system called the Design and Development of Dental and Medical System.

The researchers conducted a survey in Barangay Molino, Bacoor, Cavite. The residents of the said Barangay are the main beneficiaries of the system. The summary of the data gathered from the respondents came up with a precise evaluation of the system. The results of the data collected from the respondents in each category were summarized as follows:

- Functionality. The system provides and accomplished the necessary functions efficiently.
- Usability. The system is user-friendly and the all information provided was clear.
- Reliability. It system is consistently good in terms of its quality.
- Performance. The system helps to increase the productivity of the users.
- Supportability. It is enabling to function or support the over-all process of the operation.

Conclusion

The system will help in organizing and keeping the patients' record of the Health Service Department. Thus, the system will make the user more productive. It will also help reduce (if not able to avoid) the chances of data duplication. The system will provide accurate, up-to-date, and complete information about the patient. Over-all, the system received a Strongly Agree output in terms of Functionality, Usability, Reliability, Performance and Supportability. Thus, the result shows that major

concerns presented in the statement of the problem were answered and provided an appropriate resolution.

Recommendation

The proponent strongly recommends the implementation of the Design and Development of Dental and Medical System in the Health Services Department of Barangay Molino Bacoor in the province of Cavite. The Health Service Administrator should act as the administrator of the system which will be responsible managing the system.

It is essential to use a computer with standard or high specification and large capacity of hard-disk for the storage of the patients' information.

References

[1] George Palma, MD, Medical Director, Simpler Consulting | October 14, 2013
Electronic Health Records: The Good, the Bad and the Ugly
http://www.beckershospitalreview.com/healthcare-information technology/electronic- health-records-the-good-the-bad-and-the-ugly.html
[2] Albert Boonstra and Manda Broekhuis (2010)
Barriers to the acceptance of electronic medical records by physicians from systematic review to taxonomy and interventions
http://www.biomedcentral.com/1472-6963/10/231
[3] 1998-2014 Mayo Foundation for Medical Education and Research
The electronic medical record at Mayo Clinic
http://www.mayoclinic.org/about-mayo-clinic/electronic-medical-record