Requirement model for student monitoring systems

The focus of this study is to get a good requirement model for Student Attendance Monitoring Systems (SAMS) in secondary school. It is aimed at system designer who want to know how to design an efficient SAMS. At the end of this study, a SAMS prototype will be designed based on the requirement model and also analyze user acceptance of this system.

A generation ago, either in principle or in practice, attendance was not optional. Today, often in principle and almost in practice, it is optional (Romer, 1993). According to Lim, Sim and Mansor (2009), most educational institutions' administrators are concerned about student irregular attendance. Shendell et al. (2004) defines it can affect student in overall academic performance. Romer (1993) found that attendance did contribute significantly to the academic performance of students. There are a slightly stronger relationship between attendance and performance. Also, Durden & Ellis (1995) conclude that attendance does matter for academic achievement. Thus, it makes student attendance mandatory in schools (Romer, 1993), (Woltz, 1955).

Yet, almost everyone noticed that attendance in schools is far from perfect (Romer, 1993). There have a lack of school attendance data and a lack of consistency in the definition and measurement of non-attendance (Bourke, Rigby & Burden, 2000). Large schools are more likely to have problems with student attendance than small ones (Epstein & Sheldon, 2002). Everyday, school staffs spends much time to handle student's attendance. There are many problems when recording data manually (Richard, 2005). Sometimes, the attendance's record books were missing. In real situation, it is hard for school staffs to search student's record by looking at attendance's record

books one by one. School staffs usually spend much time to find the student's record especially when there are many classes in the school.

Furthermore, parents may miss to get any information or letter from schools when their children didn't attend to school. According to Epstein & Sheldon (2002), high school staff's communications with parents about attendance can increased student attendance and reduced chronic absenteeism.

Hence, by creating school attendance system is one of the best solutions to address this problem. The system should help school staffs to take attendance for student especially in secondary schools. It must make the process of taking the attendance easier, faster and secure as compared to conventional method. The conventional method of taking attendance by calling names or signing on paper is very time consuming, inefficient, and insecure (Ervasti, Isomursu, & Kinnula, 2009), (Lim, Sim & Mansor, 2009). It is a one way that helps teachers or school staffs reducing the taken time to carry out routine processes and enable them connected with parents by sending real-time information on their children's attendance immediately if students are not-attended to school more than the limit. Thus, teacher have more time for teaching. (Ervasti, Isomursu, & Kinnula, 2009).

Problem Statement

In schools, attendance is important and mandatory. Nowadays, due to enlarge of information technology environment, it is efficient to use School Attendance Monitoring System (SAMS) to manage attendance in secondary schools. In recent years, system designers have expands many ways and characteristics in design a good system. The problem of this study is to

identify important characteristics to design a good SAMS, set up a requirement model, and build a prototype for testing user acceptance. The requirement model must meet the user needs, goals and constraints in order to determine the important feature, relations and design implications. The requirement must be specify clearly about what and how the SAMS should perform.

Objectives

To create a SAMS's requirement model for secondary school.

To design and build a prototype of SAMS.

To help other system developer within related area.

Scope

The study will be conducted within the Kampar district, Perak. All schools chosen for survey will be secondary schools only. Similarly, there are nine secondary schools in Kampar district (sample size). People who manage secondary school organizations are the only respondents of the study. The population is between 15 to 25 or more school staffs. The particular focus areas of the study would include attendance system which is already used in secondary schools.

LITERATURE REVIEW

According to Epstein & Sheldon (2002), reducing the rates of student chronic absenteeism has been and continues to be a goal of many schools and school systems. In 1999, a student tracking system involving a database is being trialed in government and non-government schools Western Australia

(Bourke, Rigby & Burden, 2000). The student tracking system involved a set of processes, procedures and systems which can identify and monitor the location of students.

In the Torres Strait schools, they used a system called Student Information Management System (SIMS). The SIMS provides a good quality data regarding student attendance. This computer-based system collates individual class attendance records on a weekly basis (Bourke, Rigby & Burden, 2000).

The relationship between staffs and parents was seen as vitally important by parents and principals. The student survey results indicated that attendance levels were significantly higher among students when teachers got in touch with their parents to talk about how they were going at school (Bourke, Rigby & Burden, 2000). Therefore, in schools where students have attendance problems, school staffs may need to go beyond the school building to involve parents in reducing absenteeism (Epstein & Sheldon, 2002). Hence, student attendance monitoring system should help school staffs and parents easy to communicate.

There are varieties of opportunities for implementing IT in management education. Technology can be used to facilitate the display of information, to increase access to external explicit information, and to increase the sharing and construction of knowledge (Leidner & Jarvenpaa, 1995) but some of the use of this technology is not yet widespread, efficient and practical for implementation of data management (Wayman, et. al., 2004).

Implementation of an application system can present many unforeseen challenges. The first step toward implementing a student data analysis system should be to thoroughly assess the data, needs, and resources available to a school or district. The successful implementation is important for the long-term development of a data based decision-making climate (Wayman, et. al, 2004).

Fig. 1 shows the model for integrated functional requirement which has been explained by Malet et al. (2007)

Figure 1: Model for Integrated Functional Requirement

In Fig. 1, functions can be linked with specific processes. The technical realization of functions takes place in these processes. Functions can also be related to specific positions in the product structure. As a result of linking the requirements with functions, functions to processes and the product structure, an indirect relation between requirements, processes and the product structure has been established (Malet et al., 2007).

There are many views of software's development or development process though that has evolved over the years. What follows is a brief discussion of the theories of the software development process that recently used today. The first formal description of the software development process model is published in 1970 by Winston W. Royce.

Below is one of the software development process's model:

Figure 2: Conceptual model of software development process

According to Royce (1970), firstly, developer must analyze user requirements. After that, make requirement specifications by clearly set out necessary features of system based on user requirement. Then, developer can design a suitable solution and do implementation by develop the proposed solution. In addition, developer must test the system to ensure that the solution solves the original problem and works in context. Lastly, developer must maintain the system.

METHODOLOGY

Fig. 3 shows the requirement modeling process which has been explained by Malet et al. (2007)

Figure 3: Requirement modeling process

The first step is elicitation of requirements. The requirements will be based on collected data. The sites are the secondary school managing departments. The sampling frame will be based on the list of the secondary schools within area of Kampar district, Perak. The sample size will be nine secondary schools. The population is between 15 to 25 or more employees including principal, clerks, and teachers. The method of data collection is by questionnaire and interview. According to Creswell (1994), measurement instrument can helps in get a quantifiable data. A questionnaire will be given to each employee within the sampling to get employee's personal details, personal experiences of using any school attendance system, problem with existing attendance system and an opinion or suggestion for the future system's developer. The purpose of the study and how to answer the questionnaire will be explained to the employees under study. During

interview session, the informants will be selected individuals within the sample employees who had an experience of using any school attendance system.

The second step is analyzing the requirements. All user requirements will be investigated. The data will be analyzed and displayed using SPSS 16. 00. The percentage, the mean and statistic formula (ANOVA) will be used when describing the data. It will be interpreted and translated into a form that suitable for other developer (sequence diagram, activity diagram, class diagram & etc.). A requirement specifications model will be defined by clearly set out necessary features of SAMS.

The third step is managing the requirements. In this step, a prototype of SAMS will be design and built based on user requirement model by using several types of tool such as Dreamweaver CS4, Photoshop CS4 and etc. The programming language that will be used for building the system is PHP. During this system development lifecycle, requirements might be change and evolve. These changes need to be tracked and traced (Malet et al., 2007).

Lastly, the fulfillment of requirements needs to be validated with virtual or physical tests. A product is deemed successful (by means of satisfying the customer) if all requirements are fulfilled (Malet et al., 2007). SAMS will be tested to ensure that the solution solves the original problem and integrate the system to make sure that the solution will working in circumstance. The user acceptance testing will be done by choosing user randomly within the sample.

Requirement's modeling takes place in all phases of product development. More emphasis needs to be put on later development phases such as usage, recycling and maintenance. The knowledge gained in these phases, once included in the development process, can accelerate the development of new products (Malet et al., 2007).

EXPECTED FINDINGS

At the end of this study, the requirement model can help any system designers to design good SAMS for secondary schools. They will know how to design useful, usable and desirable SAMS such as in the system should contain the right functions, secure and must be user friendly. SAMS should contain all these basic needs of attendance system.

Below shows the flow of Students Attendance Monitoring Systems (SAMS):

1

Record

attendance

2

Check

attendance

3

Process

data

4

Save

data

5

Send

email

Figure 4: The flow of Students Attendance Monitoring Systems (SAMS).

SAMS should helps school staffs records student's attendance, checks either student is present or absent, process the attendance data, save it and send an email to the parents if student was absent more than three days.

SIGNIFICANCE

The aimed of requirement model for Student Attendance Monitoring System (SAMS) is to help system designer in designing a good attendance system

and also conduct them to develop the attendance system in the future.
Attendance system are important because can gives many benefit to schools
such as security on attendance, reduce work time on taking attendance and
create connection between school staffs and parents.

CONCLUSION

There is no comprehensive and generally accepted manual on how to design
good human factors into computer systems (Shackel, 1984) but there are a
lot of guideline on how to design a system. However, this requirement model
can guide any system designers who want straightly focus to design Student
Attendance Monitoring System (SAMS). Creativity and innovation are
required to make a great SAMS. The system should be usable. Usability
consists of many pieces such as system performance, system functions, user
interfaces organization and so on.

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