

EMIS Needs Analysis for C-Student Retrieval Information

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Abstract

The advancement of information technologies provides various means of Educational Management Information System (EMIS) that support in a flexible and personalized manner. However lack of standard and complex system interface design may cause problems to users to interact with the EMIS. This paper highlights issues on the EMIS and also analyzes data that is regularly used in the existing EMIS in schools. Questionnaires on User Interaction Satisfaction (QUIS) are used to test the existing EMIS system and the standard data will then be gathered and examined and then analyzed before being categorized. Results derived from this study hopefully will contribute to the EMIS designer and developer for the betterment of the EMIS in the future.

Keywords: Needs Analysis, Interface Design

1. Introduction

Management Information System (MIS) defines as the development and use of information systems that help an organization to achieve their objectives. [1]. In other words, the process involve in MIS are collecting, storing, retrieving and share important organization resources in an efficient way. Indeed MIS has been widely used in many fields such as in the medical, industrial and educational field.

Recently almost all schools is heading forward to use Information Systems (IS) as a medium to support the administrators and the academia in managing and handling organization operations. From simple functional systems that facilitated the work of a single department, now the systems are designed to integrate the activities in an entire organization process.

Malaysia Ministry of Education (MOE) been a kingpin to develop a world-class education system also, has taken the challenge in using Information Systems as a medium to support the schools in generating glorious generation that fulfill the aspiration of Malaysian nation. For instance, MOE has introduce Information Systems such as Educational Management Information System (EMIS), Students Information System (*Sistem Maklumat Murid-SMM*), Students Discipline System (*Sistem Salahlaku dan Disiplin Murid – (SSDM)*).

Furthermore, these systems are the backbone of data gathering systems in schools [2]. Other MIS supported by MOE are as in Table 1:

Table 1: School Education Management Information Systems.

Management operation
<ul style="list-style-type: none"> School Index Quality Resource Centre (<i>Index Quality Pusat Sumber Sekolah-IQPSS</i>) Year-End Report Database (<i>Database Laporan Awal dan Akhir Tahun-dBlat</i>) Teachers Placement System (<i>e-Pertukaran Guru</i>) Computerised Yearly Preparation System (<i>Sistem Penyediaan Tahunan Secara Berkomputer</i>) Examination Analysis System Information (<i>Sistem Maklumat Analisis Peperiksaan-SMAP</i>)
Students
<ul style="list-style-type: none"> Textbook Loans Management System (<i>Sistem Pinjaman Buku Teks-SIKTEKS</i>) Students Attendance System (<i>e-Kehadiran Murid</i>) Student Reading Record Data (<i>Pengumpulan Data Bacaan Murid-e-Nilam</i>)

However there are several challenges that make the system difficult to use in sharing the data and information within schools [3].

The challenges are:

- Data collection is not standardize
- Lack of integration of technology
- Unclear priorities
- Distrusts of data use

1.1 Data collection is not standardize

Various schools often use different software to collect and organize schools data. For instance schools are allowed to use various systems either built by the school's IT team themselves or the schools will buy the system from the programmer or IT supplier. The positive impact is the system will help the schools management to solve management problems in a short period and on the other hand the negative impact is that, the system in each schools is operating in isolation and would not be able to communicate or shared the information from one system to another.

1.2 Lack of integration in the technology

Many school administrators and academia ignore technology issues and leave the problems to the experts. Moreover, due to the limited information on user's needs highlighted in using the system technology, these may give constraints to the teachers and novice users to use the system. For instance, teachers or IT technician in schools need to key in students' information repeatedly when there is a new system they need to use in order to help them in analyzing certain data. Lack of integration in the system, forced the teachers and IT technician to spent their time to key in students information routine tasks.

1.3 Unclear priorities

Data and information collection is often analyzed in isolation and not clearly related to the organization's objectives. Problems rise up when there is a gap between programmer's conceptual model and user's conceptual model towards the system. Programmers designed the system based on the system functions whereas the users' conceptual model is about knowing how, to use the available functions and interact with the system in an efficient way. In addition, systems suggested by the suppliers to the schools, may lack of user's needs whom are generally teachers and novice users. Indeed, user needs is important in the system development process as this will contribute to increase users' motivation in order to retain them in using the system.

1.4 Distrusts of data use

Administrators and academia that have accessed and manipulated to the data are wary of the process that their work is subject to institutional responsibility. This happens when teachers or IT technicians accidentally key in the wrong students information data into the system. Wrong data and typo error may lead to the failure of the data retrieval process. As a results because of the mismatched data, the data will not be able to analyzed correctly and this may give problems to the teachers and IT technician to further analyzed students information which is basically link to almost all of the system in schools.

Therefore, this study is to investigate user needs of EMIS in schools and at the same time to investigate common Students Information Retrieval Data as an input to improve and enhance EMIS design and development in Schools.

2. Needs Analysis

Problems can arise when the EMIS is introduced without a full understanding of all the people who will be affected by it. The most important user populations are those people who will be the regular users of the system. In this context the user for the EMIS in schools are teachers or IT technicians.

In relation to this, mismatch between the person's goals and intentions, and the inputs that the computer recognizes contribute to the gap between the computer's output and the person's conceptual model of the task that needs to be taken while handling the system.

In fact, this scenario is also known as the gulfs of execution and evaluation of the task that will be handled by the users in using the system (refer figure 1).

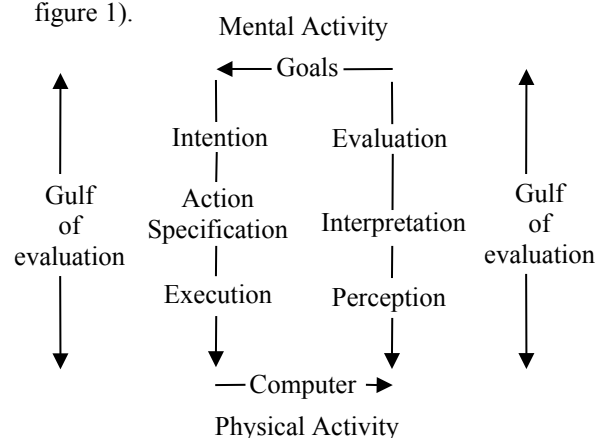


Figure 1: The gulfs of execution and evaluation [4].

Consequently, in bridging the gap between user and the system, this study will investigate problems and the needs analysis needed in existing EMIS in schools. Investigation will also covers the identification on common Students Information data used in the existing EMIS in schools. Eventually, results from this study will be used as an input to enhance student's retrieval information data in schools in a user friendly way.

This study adapted Questionnaire for User Interaction Satisfaction (QUIS) which was develop by Shneiderman and refined by Chin, Diel and Norman [5]. The questionnaire covered the following user needs attributes:

- Affect
- Efficiency
- Helpfulness
- Control
- Learnability

2.1 Affect

Affect represents the user's general reaction to the system. Several affect attributes asked to the participants are

- Sometimes I don't know what to do next with this e-system
- This e-system is awkward when I want to do something, which is not standard
- Sometimes this e-system give me headache
- There are too many steps required to get something to work
- Sometimes this e-system behaves in a way that I don't understand

2.2 Efficiency

Efficiency refers to the way a system supports users in carrying out their tasks. The system should be efficient to use, so that once the user has learned the system, a high level of productivity is achieved. Efficiency attributes discussed in this usability testing are

- I enjoy my sessions with this e-system
- I would recommend this e-system to my friends
- Working with this e-system is mentally stimulating
- The e-system has helped me to overcome any problems I have had in using it
- The e-system is attractively presented

2.3 Helpfulness

Helpfulness represents the degree to which the software is self-explanatory. Participants are asked the following questions for Helpfulness attributes

- The instructions and prompts are helpful
- The way that information is presented is clear and understandable
- The e-system instructions are very informative
- There is enough information on the screen when it is needed
- I can understand and act based on the information provided by this e-system

2.4 Control

Control is the extent to which the user feels in control. The system should be pleasant to use, so that users will feel control when using it. Sets of controls attributes discussed are

- This e-system responds too slow to inputs
- I think this e-system is inconsistent
- The speed of this e-system is appropriate
- It is relatively easy to move from one part of a task to another
- It is relatively easy to move from one part of a task to another
- I can see at a glance what are the options at each stage

2.5 Learnability

Learnability refers to the speed with which the user has been able to master the system. The system should be easy to learn so that the user can rapidly start getting some work done with the system. Possible attributes for learnability attributes are

- It is hard to use new functions
- The help information given by this e-system is very useful
- I'm sure in choosing the right command to use
- It is easy to make the e-system do exactly what I want
- Learning to operate this e-system is full of problems initially

We adopted five point of Likert scale on the QUIS attributes as we do not want to force the subjects to choose one specific choice or another, negating the possibility of seeing how strongly the subjects is committed to one choice or the other.

The five Likert scale have the following values; 1=Strongly disagree, 2=Disagree, 3=Neutral, 4=Agree and 5=Strongly agree.

In the last section of the questionnaires we also listed out some common students data input for the respondents. In this section, the respondents need to tick on the required students data input lists which may be useful and important for further reference about students' information. Empty spaces in the questionnaires is also provided for the respondents to fill in, if there are any other students information other than listed by the researcher in the students information data lists.

3. Methodology

Generally, we have distributed around 40 questionnaires to the targeted schools around southern areas of Peninsular Malaysia. The targeted schools included schools in the state of Johor, Melaka and Negeri Sembilan.

In this study, we have identified two categories of respondents whom are regular users of the EMIS in schools. Most of the targeted respondents are teachers or IT technicians in schools and IT officers that actually monitored and use the EMIS to help them to manage daily schools operations. By and large, most of the respondents involved in this study have more than 3 to 5 years experience in using the EMIS system in schools.

Once all the questionnaires is completed and handed in to the researcher, the data analysis process for Affect, Efficiency, Helpfulness, Control and Learnability begins.

4. Results and Discussion

Earlier on we have generated a pilot study in order to test the reliability of the questionnaires that we want to use for the needs analysis for centralized-students information data. Overall, the reliability statistics of the pilot usability testing for this questionnaire is achieved where the Cronbach's Alpha is 0.726.

Out of 40 questionnaires distributed to the targeted respondents in schools and IT organizations around southern areas of Peninsular Malaysia, we have received about 30 questionnaires feedback. Generally teachers, IT technicians and IT officers who involved in this study, give full and go co-operation to the researcher in completing this study.

4.1 Finding on Affect

From the needs analysis results, the Affect attributes are 3.59 mean values. Most of the respondents who used the EMIS systems in schools know what are the next tasks need to be taken when using the EMIS system and the respondents feel satisfied with the EMIS systems in schools in helping them to manage daily schools operations. Nevertheless the results also shows that, the respondents sometimes felt stress and gave headache to them because sometimes the EMIS system gave confused information, and some of the respondents having difficulties to understand the EMIS system as a whole. In fact a good system should provide meaningful output so that it will help the respondents to interpret some of the information from the EMIS easily [5].

4.2 Finding on Efficiency

The mean values for the Efficiency attributes are 3.63 mean values. In general, the respondents feel that the EMIS used in schools is efficient and the respondents also feel relief because the systems help them to manage their task in a short period of time. Indeed, an efficient system is much depends on the design of information on the interface of the system as it reflects on the functions or characteristics of the system that the users use [6]. In designing an interface for a system, it is better to design an interface that maps the user's needs in using the EMIS. In fact, it is possible to classify displays along at least three different dimensions; first is user's physical characteristics, second is the tasks the system are design to support and finally is the perceptions of users that dictate the best mapping between display and task [7].

4.3 Finding on Helpfulness

Findings from the Helpfulness attributes shows that information inside EMIS is very useful in order to help them to understand more about the EMIS system functions. For this finding on helpfulness, the mean value results are around 3.34 mean values. Perhaps, the respondents believe that the help information available in the system is actually helping them in using the system. Easy to understand and simple help instructions will motivate the respondents to use the help function in the EMIS. Furthermore, by structuring icons and instructions and grouped these elements into relevant categories of information will also help users to make the EMIS interface information meaningful. Indeed, rich EMIS interface information consists of buttons, menus, graphics that enable people to recognize what needs to be done and then do it through intuitive actions [8].

4.4 Finding on Control

In the aim of keeping users in control and use EMIS in schools, it is important to make sure that the respondents will always feel satisfied and enjoyable in using EMIS. Finding on control results shows that the mean values are about 3.72 mean values. By filtering less important items on the design interface may also help EMIS users to have better control on the EMIS system. Too much information on the displays also might increase user's mental workload. Therefore, a good user interface design should map an object visibility on the EMIS interface with the user's needs [9].

Moreover, if users are able to control the system it also may reduce the chances of users to make an error in handling the system. Several points to avoid users from making an error in a system are [10] :

- Reducing the risk of wrong keys/ buttons being mistakenly activated
- Providing users with various means of recovery if users make mistakes
- Include undo facilities
- Provide confirmatory dialog boxes that give users another chance to consider their intentions

4.5 Finding on Learnability

Finally, for mean values for learnability attributes is around 3.71 mean values. In this learnability testing, the respondents were able to understand the available information in the EMIS system. Generally, the respondents would not take too long to understand in using the system. In fact, The underlying design goal to improve an instruction on a system is to create easily recognizable signals, signs or cues that may help users to perceive an information and response in terms of action in the system [7]. Indeed with the help of rich EMIS interface design will improve the communication between users and the system. Normally, users know what are the actions need to be taken in order to perform the desired tasks. Besides, an interface is considered effective when the user is able to focus on instructional content rather than focusing on how to access the instructional content [6].

4.6 C-Students Information Data

For the Centralized Students Information Data, almost all of the respondents agree upon the suggested centralized Students Information data in the questionnaire checklists (refer Table 2).

Additional information suggested by the respondents are as in Table 3.

Table 2: Proposed Centralized Students Information Data

Student's Personal Information
<ul style="list-style-type: none"> • Name • Identification Card No • Date of Birth • Home Address • Postage Address • House Phone No • Hand phone No • Academic Achievement <ul style="list-style-type: none"> ○ UPSR ○ PMR ○ SPM • School's Details • Co-curriculum Activity • Disability • Allergy • Sickness
Parent's Information
<ul style="list-style-type: none"> • Father <ul style="list-style-type: none"> ○ Identification Card No ○ Job ○ Employer's Address ○ Office Phone No ○ Salary • Mother <ul style="list-style-type: none"> ○ Identification Card No ○ Job ○ Employer's Address ○ Office Phone No ○ Salary • Parent's Marital Status • Children's Guardian Status • Guardian <ul style="list-style-type: none"> ○ Identification Card No ○ Job ○ Employer's Address ○ Office Phone No ○ Salary

Table 3: Additional Information proposed by the respondents

Student's Personal Information
<ul style="list-style-type: none"> • Hobby • Academic achievement • Interest in Computer • URL
Parent's Information

-
- Academic Qualification
 - Other Contact Number for emergency
 - Language used at home
 - Internet facilities at home
-

5. Conclusion

In conclusion, the needs analysis results for Centralized Students Retrieval Information will help to enhance EMIS design in schools. Incorporating user's needs in design will help will adversely affect the performance of motivated users, even when the users are capable of dealing with less usable information because they prefer more usable materials [10]. In relation to this, more than 90 per cent of users were not willing to read system documentation in a not user friendly environment [12].

In consequence of incorporating user needs discussed, we hope that we can always improve EMIS system in schools. A good system is a system that is usable to use by users, they will feel effective and efficient in performing work tasks and feel satisfy in using the system.

Also, hopefully the Centralized Students Information in EMIS system will help to reduce data redundancy within EMIS data processing. At the same time helping the teachers and IT technicians from doing repeated tasks for example key in the same data, over and over again especially related to the existing EMIS that operates in isolation within schools.

By highlighting as well as identifying common Centralized Students Information in EMIS system, will help system designers and developers to further enhance schools EMIS design in the future.

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