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ENHANCING STUDENT MARK MANAGEMENT THROUGH WEB BASED SYSTEM

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ABSTRACT

In search of technological modernization, the Internet is the main medium of delivery. Education today is seen as leading to the development of the information age. Hence the approach to education is also in line with the latest technology. The use of Information and Communication Technologies (ICT) in teaching and learning has become an important method to increase the efficiency and effectiveness of the education management process. On the other hand, the ICT is also used in education to manage student information. Management of student information especially students' marks is a burdensome task, requiring lecturers to devote more time to complete the task within the stipulated time. Besides, the lecturers who teach more than one class and have more than one marking category such as quizzes, assignments and lab exercises find this task very complicated. The use of software such as Microsoft Excel can be helpful but cannot solve all mark management requirements due to limitation of its function. Therefore, an online students' mark management system was developed to facilitate the process of mark calculation for the lecturers in the Faculty of Information Science and Technology. By using this system, lecturers can record each student's marks and the system will automatically compute and issue the student's grade. In addition, analysis will be conducted in which the system will generate reports and graphs for each subject. The system was developed using the ASP.NET web application development tool, programming language C# and JavaScript as the language support, whereas the Microsoft SQL Server is used as the database tool and ASP.NET Development Server as the web server.

Key-Words: Web-based system, Students Mark Management System, Information System.

INTRODUCTION

In the era of modern technology, the world has been dominated by the availability of digital systems and information technology. Human life is no longer separated from the technology. The importance of information technology in daily life is without a doubt, hence the government of Malaysia developed the Multimedia Super Corridor (MSC) to revolutionize the industry of developing an Information and Communication Technologies (ICT)-based economy. The rapid growth of computing and networking as well as infrastructure offers not only an increase in available technologies for learning, but also a change in its potential use in education [1]. Most universities currently rely on a variety of web-based systems for management of important data such as students' registration, registration of courses, and teaching and learning management systems. By using web-based systems, education management can be made faster and more systematic. Another area where web-based system technology can be used in education is in management of students' marks as well as using the data to analyze students' performance. Mark analysis reports can be instantly generated with very minimum entries ascribed to the task, providing stress-free solutions to lecturers and administration staff [2]. Thus, an online Students Mark Management System (SPP) was developed to help the lecturers to manage students' marks and analyze students' achievements. The system was built for internal use in the Faculty of Information Science and Technology (FTSM) in Universiti Kebangsaan Malaysia (UKM). As a big faculty with a large number of students and subjects offered, the system is very helpful in accelerating the process of mark calculation and analysis.

ANALYSIS AND REVIEW

In planning the development of SPP, a number of issues related to mark management had been studied. The first issue was the unavailability of a complete information system for management of students' mark that fulfils all the mark management needs in FTSM. The second issue was related to the data management. Spreadsheets could be used for calculation, submission and management of student grades but were not significant in providing a solution towards organizing those data [3]. With the absence of a database management system for the mark data, mark files in the form of spreadsheet files were cluttered in the hard drive of lecturers' personal computers. This resulted in inefficiency in searching for a particular record especially when the mark spreadsheet files involved different sets of subjects, students, and semesters. As for the third issue, the spreadsheet programs were also inefficient in helping the lecturers to quickly specify the different weightages for mark components for different subjects.

Apart of studying these issues, three existing mark management systems were studied and compared. The features of the systems are compared in Table 1. Although all the systems were web-based database systems, they have limitations and thus did not fulfill all the criteria for mark management needed by FTSM. Besides, these free internet-based systems were not suitable for use in a university environment where mark data are supposed to be private and confidential.

Table 1: Comparison of features between existing systems

Features / Application	<i>Engrade</i>	<i>School Circuit</i>	<i>Learn Boost</i>
System Type	Web Based	Web Based	Web Based
Login and logout function	Yes	Yes	Yes
Marking scale	Yes with limited option	No	Yes with limited option
Ability to calculate marks based on marking scale	Yes (Manual)	Yes	Yes
Generation of graphs and charts	No	No	Yes
Generation of Reports	Yes	Yes	Yes

Each of these systems could provide functionalities to meet specific requirements; however a number of limitations were come across when attempting to implement the systems in the FTSM environment [4]. For example, one existing system that was studied could generate graphs and charts, but had a limited option for its marking scale. After the analysis is done as shown in Table 1, SPP was developed to ensure that it could fulfill the needs of every user, including tracking and analyzing the students' performance. A web-based system was chosen because a database system based on web technology does not have issues that happen with spreadsheets as mentioned before. On the other hand, the use of any of the existing online systems which are freely available pose security risks as the data is stored in remote servers connected via the public Internet. So a specific system, such as SPP was developed solely for use by lecturers in FTSM. All the needed criteria such as login and logout functions, extended marking scale options, the ability to calculate marks based on marking scales, the function of generating graphs and charts, and the function of generating reports are available in the system.

RESEARCH OBJECTIVES

Based on the analysis and review that have been done, the objectives of SPP have been identified. The first objective of this system is the retention of students' marks and analysis result in the database-based system. The system provides a database to record the marks and student information. This will simplify the process hence making the process easier and faster to complete. The second objective is to assist lecturers in the task of determination of weighted marks for each course and sub-tasks. This system allows lecturers to include weighted marks for each course and sub-tasks before it automatically compute the marks and grade of each student. The calculation of the total marks for the sub-tasks and the overall marks can be done with the weights determined in the sub-task assignments and weights. Another important objective is to ensure that the process of mark calculation is more effective as it needs to take into account all the components required. This system can specify components as needed by the lecturer, such as tutorials, labs, quizzes, and others while managing the marks. A marking template will be generated by the components specified by the lecturer. The calculation of marks and grades is automatically generated by the system. Based on records entered by the lecturers, the system will calculate the scores and assign a grade at the same time. With this method, the mark management process will become easier and more effective. Finally this system is able to generate reports and charts for analysis. Lecturers can generate reports and charts in various formats according to marks of students admitted to analyze the students' achievement.

MATERIALS AND METHOD

The FTSM Online Students Mark Management System (SPP) was developed using the waterfall model approach. This approach was chosen because the waterfall model shows the system development process clearly and is well suited to this system. In addition this model also suggests a systematic and sequential approach to software development that begins with the requirements of specifications, through a process of planning, modeling, and requirements analysis, system modeling design, coding and testing.

The system was developed using programming languages C # and JavaScript. The software suite that needs to be installed before running the system is Microsoft Visual Studio 2010 (VS2010). VS2010 contains a variety of built-in programs that have been built into a package. One of these is the ASP.NET Development Server that enables personal computers to act as a server (localhost). By using the web server which is provided, there is no need to install separate web server software. In addition, VS2010 also provides tools to build a database of SQL Server. The SQL Server is a product developed by Microsoft for managing storage of information. In terms of technique, the SQL Server is a "relational database management system" (RDMS). RDMS means two things; firstly, data stored in the SQL server will be placed in a "relational database". Secondly, the SQL Server is an overall "management system" which is not just a database. SQL is an abbreviation for Structured Query Language. This is the language used to manage and administer the database server. The system was developed by using the ASP.NET web application framework. ASP.NET provides Web Form; these files typically contain the static HTML markup, a markup that defines the network server controls and user controls. Besides, the file with the format aspx.cs can also be used to write codes behind the model. Figure 1 shows the entity relationship diagram for this system:

In general, there are two major entities in the system, lecturers and administrators. The role of an administrator is to fill the information and the student's data into SPP, while for the lecturers, they must register prior to filling personal information before using this system. After that, the lecturer can login using an ID and a password as available. The main function of this system is to assist lecturers in managing the marks and students' work. Therefore, lecturers will have the function of filling in the details of courses, student details, and details of grades, marks and weights to produce a specific scheme based on their specific requirement. Then, the system will produce a template for the marking table which allows lecturers to fill in student marks. The system will compute the marks and grades are automatically generated. In addition, the system can also generate reports and charts to be printed out. Figure 2 shows the main interface of the system:

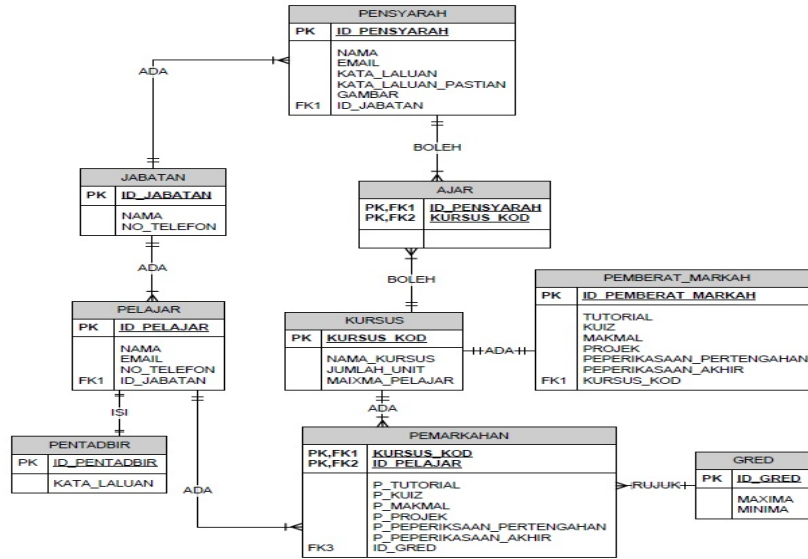


Figure 1: Entity Relationship Diagram

Figure 2 shows the interface that allows users such as administrators and lecturers to log into the system. When the username and password entered are valid, the user will be brought to the respective level of access and their displays. The main interface also consists of a calendar, information about the academic schedule and links to other related websites in the university.

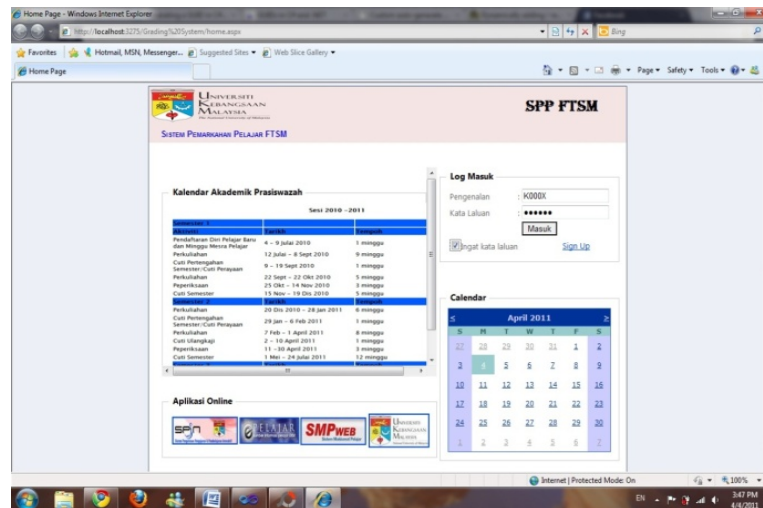


Figure 2: Main Page

RESULT AND DISCUSSION

The main objectives of the SPP system have been achieved with the following list of objectives; the system is developed based on the web technology, retention of students' marks in the database, efficient calculation of

marks and grades, and enablement of analysis by generating reports and charts. Several advantages of the system include safe and systematic storage of data such as marks of students in a database, and multiple formats of the reports that are generated i.e. they can be saved in pdf format and can also be exported to support Microsoft Word and Microsoft Excel format.

Besides, several areas where future enhancement can be made have been identified. Firstly is to make use of the web-based nature by expanding the scope to include students as users. Thus, students can check their results online and print out their results. Secondly, the function to reset the password must be provided so that lecturers can obtain a new password if forgotten. Other than that, the system should enable the lecturers to determine categories of sub-tasks needed and perform complex calculations if needed. Figure 3 and 4 are the interfaces that show students' grades as calculated by the system.

ID Pelajar	Nama Pelajar	Tutorial (5%)	Kuis (5%)	Peperiksaan Pertengahan (20%)	Lab (10%)
A11888	Lim Wey Sang	5.00	3.00	20.00	8.00
A12209	Abdul Hameed Bin Moham	5.00	5.00	14.00	6.00
A12233	Albi	3.00	4.00	12.00	4.00
A12343	Toh Ai Lee	3.00	3.00	13.00	5.00
A12345	Alhamd	4.00	4.00	11.00	4.00
A12354	Teo Ann Sin	4.00	5.00	14.00	5.00
A12398	Siti	5.00	4.00	14.00	6.00
A12453	Boo Kan Ann	2.00	3.00	16.00	7.00
A12543	Mahmud	3.00	2.00	14.00	9.00
A12865	Fadri Rizuan	4.00	3.00	11.00	7.00
A12893	Abdul Alhamd	5.00	5.00	12.00	6.00

Figure 3: Mark calculation

ID Pelajar	Nama Pelajar	Grade	Total
A12233	Albi	B	79.00
A12343	Toh Ai Lee	B	79.00
A12345	Alhamd	C+	67.00
A12354	Teo Ann Sin	B	79.00
A12398	Siti	B	75.00
A12453	Boo Kan Ann	C+	66.00
A12543	Mahmud	C+	69.00
A12865	Fadri Rizuan	B	76.00
A12893	Abdul Alhamd	C+	69.00
A12934	Mahamad Syarif	B	79.00
A13634	Teo Ann Koh	B+	82.00
A13888	Lim Wey Sang	A-	85.00
		Practical	73.892307692307692307692
		Maximum	85.00
		Minimum	66.00
		SDDev	6.0882044830333

Figure 4: Report generation interface

Figure 3 shows the screen that allows lecturers to insert students' marks into the mark template generated by the system. The system can automatically calculate and generate grades by pressing the "Calculate" button to enable the calculation and generation of students' grades. The lecturer can generate reports as shown in Figure 4.

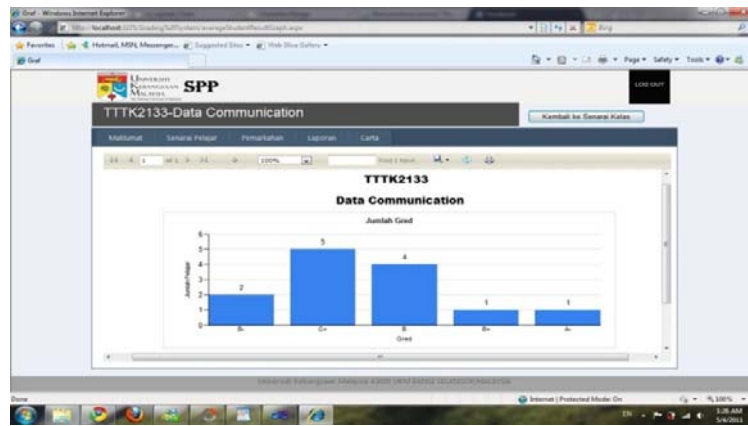


Figure 5: Graph interface

Finally, graphs can be generated as shown in Figure 5, an example of graphs that display the overall statistics for one of the subjects taught at FTSM.

CONCLUSION

Currently, FTSM does not have a specific system to assist it in managing students' marks. Lecturers are limited to using complicated software such as Microsoft Excel to manage marks. Thus, SPP was developed to facilitate and accelerate the mark management tasks for lecturers at FTSM.

As a conclusion, it is widely accepted that use of a web-based system can improve the efficiency and the effectiveness of managing students' data. SPP was developed with the aim of facilitating lecturers in managing the students' marks. This system allows lecturers to insert scores of students and determine the range of marks for grades. Next, the system will display the actual scores of students and generate a grade based on the weighting set by the lecturer. In addition, the system will also generate reports and graphs based on the achievement of students with scores of students. Thus, the lecturer can manage the scores of students more effectively and quickly.

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