

An Electronic Parent-Teacher Association

H.M. Harmain & M.A. Radaideh
 {harmain, radaideh}@uaeu.ac.ae
 UAE University, College of Information Technology
 P.O.Box 17555, Al-Ain, UAE
 Phone: +971-3-7626309 Fax: +971-3-7626309

ABSTRACT

Access to the Internet is spreading very fast global wide. Through the internet, information is no longer constrained by distance, time, or volume. The internet has become an essential media in many aspects of our life. It is being increasingly used in education, research, news, entertainment, business, sport, communications, etc. This paper describes the design and implementation of a web-based Electronic Parent-Teacher Association System. This system facilitates electronic communication channel between teachers and parents. The two can communicate students' issues, progress, assignments, grades, etc. This system is a part of an Electronic School Administration System.

1. INTRODUCTION

Schools worldwide encourage their teachers to interact with the parents of their students. The common name for this type of interaction is Parent-Teacher Association (*i.e. PTA hereinafter*). As educational programs are becoming more sophisticated and complicated, the need for interaction between teachers and parents becomes more essential in the process of education. Similar to other organizations and businesses, educational institutions became more interested in deploying internet technologies towards enhancing their educational programs, their administration systems, and the interaction of their teachers with the parents of their students [1, 2, 3].

This paper is focused on the design and implementation of an electronic Parents-Teacher Association system (*i.e. e-PTA hereinafter*) that would satisfy the overall requirements by public and private schools in the United Arab Emirates. Principals, teachers, and administrative staff from various schools were interviewed and consulted towards formalizing the set of requirements for the e-PTA system. The main objectives of this research are as follows:

1. Identifying the main features required in a e-PTA system that are beneficial to schools and parents. This requires interviewing school principals, teachers, students' parents, and administrative staff.
2. Architecting, designing, and prototyping a web based e-PTA system with the features as indicated in the above.
3. Testing and evaluating the e-PTA system in collaboration with selected schools and parents.
4. Studying the impact of using the e-PTA system on schools and parents.

Given the fact that this is an ongoing project, the authors would like to emphasize on the following:

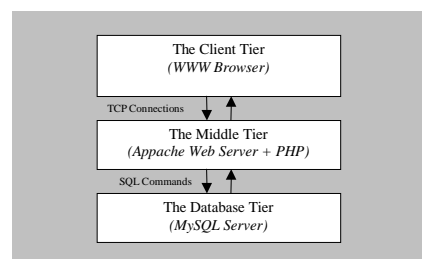
1. Only selected local schools have been considered so far.
2. Discussion in this paper is limited to the first two of the above 4 objectives.

The next two sections illuminate the current implementation of this e-PTA system. Further publications on this project will present performance evaluation, revisions in the implementation, etc.

2. THE E-PTA ARCHITECTURE

The e-PTA system is built around a 3-tier architecture as shown in Figure 1. The client tier is a WWW browser. Web browsers send users' requests to the web server and display the returned results to the end user.

Figure 1: The 3-tier Architecture Used for the e-PTA System



The middle tier consists of a web server and a scripting engine. The scripting engine is needed to handle server side processes. The web server communicates with the client through the standard HTTP protocols, and communicates with the database through the scripting language.

The database tier is built around an SQL Server. Most SQL servers implement the client/server architecture which is important for web enabled applications. We will discuss our choice of the SQL server in the implementation section.

2.1 The Use Case Model

This section describes the "Use-Case-Model" of the e-PTA system. This model describes **WHAT** our system will do at a high-level and with a user focus for the purpose of scoping the project and giving the application some structure. The UML Use Cases [9, 10] are used mainly to capture the high level user-functional requirements of a system. They are not used to capture non-functional requirements. Nor they are used to capture "internal" functional requirements.

Figure 2 shows the main actors of the e-PTA system, which are the school principal, teachers, administrative staff, and students and their parents.

While it is outside the scope of this paper to show a fully fledged use-case model, the following subsections illuminate some of the important use-cases used for this project.

2.1.1 Registration Use-Case

Figure 3 shows the administrator as the only actor for the Registration use-case. The administrator uses the Registration subsystem to add users, remove users, and update users' information.

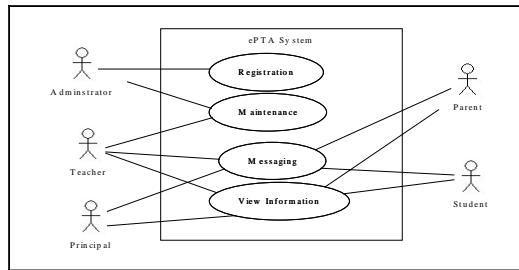
2.1.2 Maintenance Use-Case

Figure 4 shows the Maintenance use-case involving the administrator. In this use case, the administrator login to the administration area, the system displays the maintenance menu. This allows the administrator to backup and restore the database.

2.1.3 Messaging Use-Case

Figure 5 shows the Messaging use-case that involves all of the system users. The user logs into the messaging area, the system displays

Figure 2: Actors of the e-PTA system



the messaging menu. This menu allows system users to send, read, delete, and reply to messages.

2.2 Database Design

Several database tables have been created as the base infrastructure for the e-PTA system. All data is stored in and retrieved from these tables. The current e-PTA implementation uses the following database tables.

Figure 3: The Registration Use-Case

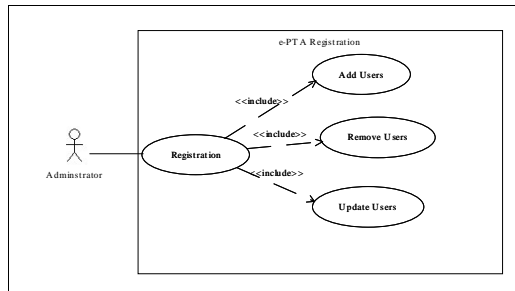


Figure 4: Maintenance use-case

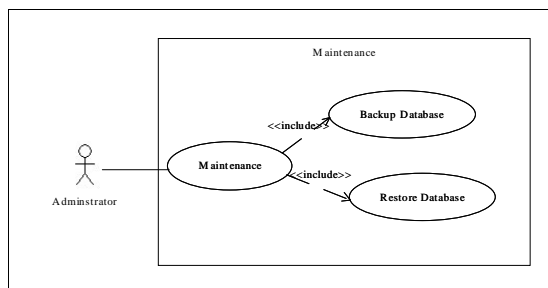


Figure 5: The Messaging use-case.

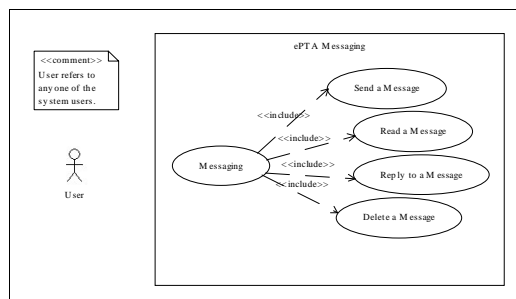


Table 1: Admin Table's Fields				Table 2: Course Table's Fields			
Field	Type	Null	Default	Field	Type	Null	Default
adID	varchar(30)	No		csID	varchar(8)	No	0
adPassword	varchar(15)	No		csName	varchar(15)	No	
adFName	varchar(15)	No		csSection	tinyint(4)	No	0
adSName	varchar(15)	No		csTeacherID	tinyint(4)	No	0
adLName	varchar(15)	No		csLevel	tinyint(4)	No	0
adPhone	varchar(15)	No		csRoom	tinyint(4)	No	0
adMobile	varchar(15)	No		cs1	tinyint(4)	No	0
adEmail	varchar(30)	No		cs2	tinyint(4)	No	0
adStatus	varchar(8)	No	Enabled	cs3	tinyint(4)	No	0
				cs4	tinyint(4)	No	0

Table 3: Gradebook Table			Table 4: Message Table's Fields			
stID	tinyint(4)	No 0	msID	int(11)	No	
csID	tinyint(4)	No 0	msFrom	varchar(8)	No	
stSection	varchar(5)	No 0	msTo	varchar(8)	No	
test1	tinyint(3)	No 0	msSubject	varchar(40)	No	
test2	tinyint(3)	No 0	msDate	Date	No	0000-00-00
test3	tinyint(3)	No 0	msTime	Time	No	00:00:00
test4	tinyint(3)	No 0	msContent	Text	No	
			msStatus	varchar(4)	No	New

Table 5: Parent Table's Fields			Table 6: Principal Table's Fields			
ptID	varchar(8)	No	prID	varchar(8)	No	
ptPhone	varchar(10)	No	prFName	varchar(10)	No	
ptMobile	varchar(10)	No	prSName	varchar(10)	No	
ptFName	varchar(20)	No	prLName	varchar(10)	No	
ptSName	varchar(20)	No	prPhone	smallint(6)	No 0	
ptLName	varchar(20)	No 0	prMobile	smallint(6)	No 0	
ptEmail	varchar(30)	No	prPassword	varchar(8)	No	
ptPassword	varchar(8)	No	prEmail	varchar(30)	No	
ptStatus	varchar(8)	No	prStatus	varchar(8)	No	

Table 7: Student Table's Fields			Table 8: Teacher Table's Fields			
stID	varchar(8)	No	trID	varchar(8)	No	
stPassword	varchar(8)	No	trFName	varchar(20)	No	
stFName	varchar(15)	No	trSName	varchar(20)	No	
stBirthDate	Date	'0000-00-00'	trLName	varchar(20)	No	
stBirthPlace	varchar(30)	NULL	trGender	char(1)	No	
stGender	char(1)	NULL	trNationality	varchar(20)	No	
stNationality	varchar(20)	NULL	trQualification	varchar(20)	No	
stLevel	Char(2)	0	trReligion	varchar(10)	No	
stSection	varchar(5)	0	trBirthDate	date	No	'0000-00-00'
stRegDate	date	'0000-00-00'	trAddress	varchar(20)	No	
stFinishDate	date	'0000-00-00'	trPhone	varchar(15)	No 03	
stReligion	varchar(10)	NULL	trMobile	varchar(15)	No	
stAddress	varchar(30)	NULL	trBirthPlace	varchar(20)	No	
ptID	varchar(8)	No 0	trStartDate	date	No	'0000-00-00'
stFees	float	No 0	trFinishDate	date		NULL
stPaid	float	No 0	trInternalPhone	varchar(10)	No	
stPhoto	Blob	No	trCoord	varchar(5)		NULL
stEmail	varchar(8)	No	trSections	varchar(15)	No 0	
stStatus	varchar(8)	No	trPassword	varchar(8)	No	

Table 9: User Ids Table's Field		
parent	int(11)	No 0
teacher	int(11)	No 0
student	int(11)	No 0
admin	int(11)	No 0
principal	int(11)	No 0

3. IMPLEMENTATION

The e-PTA system consists of several components, running on both server and client machines. This section explains the purpose of each component as given in the system architecture.

The Client: the client is a Java and JavaScript enabled WWW browser. The main advantages of using a web browser as an interface to the system are (i) web browsers are available on almost any modern computer; and (ii) the hassle of software installation on the client side is eliminated.

The Web Server: the server is part of the middle tier. We used the Apache web server for system development [4]. The main reason for

using Apache is its availability. However, any web server can be used provided that it supports PHP (e.g. Personal Home Page) [5, 6].

The Scripting Engine: we used the PHP Engine [5, 6]. PHP is a server-side, cross-platform, HTML-embedded scripting language. There main reasons for choosing PHP are:

1. PHP is a scripting language that is widely used for creating dynamic Web pages.
2. PHP can produce files with many MIME types (e.g. HTML, GIF, PNG, JPEG). With the suitable configuration, this allows PHP scripts to send various kinds of data through the HTTP protocols.
3. PHP has strong support for most of the common database servers including MySQL, which is used for this project.
4. PHP is platform independent. Use of PHP increases the independency of the project on server side. Nevertheless, the best performance can be seen under Unix where PHP runs as an Apache module.

The PHP Scripts: most of the e-PTA system information exchange is handled by PHP scripts. Given the fact that PHP is a server side scripting language, users neither need to configure their browsers nor they need to install any plug-ins to use the system.

The Database Server: **we used MySQL [7, 8] for the following reasons:**

- MySQL is well supported in the PHP scripting language.
- MySQL is a widely used and popular database engine.
- Most of the e-PTA system operations are read-only, updates are very restricted, so we can sacrifice transaction processing for the speed of the select statement.

4. CONCLUSION

The e-PTA system described in this paper, focuses on linking parents and teachers together at a given school. The system is being evalu-

ated at this time by the system's developers and few selected local schools. Further evaluations will take place at several more schools during the next phase of this project. The system has been architected based on the many aspects, features, and feedback collected from parents, teachers, and principals of selected local schools. The architecture will remain subject to enhancement as this is an ongoing research project.

ACKNOWLEDGMENT

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