Electronic Voting System (E-Voting) of MPPUTP Election

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Dissertation submitted in partial fulfilment of

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CERTIFICATION OF APPROVAL

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A project dissertation submitted to the
Business Information System Programme
Universiti Teknologi PETRONAS
in partial fulfillment of the requirement for the
BACHELOR OF BUSINESS INFORMATION SYSTEM (Hons)
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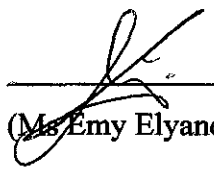
Approved by,



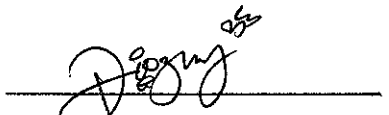
(Ms Emy Elyanee Bt Mustapha)

UNIVERSITI TEKNOLOGI PETRONAS
TRONOH, PERAK
Jan 2006

1) client/server computing
2) SQL server

CERTIFICATION OF ORIGINALITY

This is to certify that I am responsible for the work submitted in this project, that the original work is my own except as specified in the references and acknowledgements, and that the original work contained herein have not been undertaken or done by unspecified sources or persons.



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ABSTRACT

Electronic voting, or e-voting, is an electronic, usually computerized way to facilitate a voting process. In comparison to the traditional paper ballot voting systems, e-voting systems have many advantages such as lower costs, the reduction of manual errors, and increased accessibility for potential voters. The e-voting system need to be implemented in **e-government** in Malaysia but the study focuses more into small community which is election event held by Student Representative Council (MPP) of University Technology of Petronas.. Before this, the election process in any university usually follows the same government election process, which is manually implemented. Therefore, in this paper, it discuss about converting manual voting system into internet-based voting system which is the main objectives of the project. In MPPUTP election before this, students used paper ballot (coupon) and student matric card which are necessary for them to bring along during the election day. The student needs to walk far away from their hostel in the hot sunny day which is difficult for them and perhaps they may not be willing to go out and vote but with e-voting system, the number of student to vote may be increase than manual system. The results of voting will be available to students in a shorter time and the reliability of the process is always available. The innovation applied to the voting process will probably improve the voter turnout statistics. This project will concentrate on the whole e-voting system on how to develop the e-voting system, which the system administrator (SPR) and the voters (student) are target users in this system. The author is developing a website of e-voting system using the PHP language. There are some potential improvements of this system and some important issues regarding e-voting systems are discussed by the end of this document. As for that, the author really appreciates to have this opportunity to do the research regarding this title in order to develop the e-voting system which is beneficial to this university's MPPUTP election and relevant to be implemented in Malaysian government.

ACKNOWLEDGMENTS

First and foremost, I would like to express my gratitude to Almighty Allah s.w.t, without His will, this final year project would not be accomplished. I would also like to take this opportunity to convey my appreciations to all the people who has contributed directly or indirectly in the research and development of this project.

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I would like to give special thanks to my parents, Mr. Amir Bin Ahmad and Mrs. Salmah bt. Mohd. Dris for their moral supports, my friends and others who has supported me in any ways, directly or indirectly throughout this final year project period. I was lucky to be acquainted with them.

Finally, million thanks to PETRONAS for giving me to the opportunity to study in this prestige university.

It has been splendid semesters, an eye-opening experience comparable to none.

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CHAPTER 1:

INTRODUCTION

Electronic voting (also known as e-voting) is a term encompassing several different types of voting. Electronic voting can include kiosks, the Internet, telephones, punch cards, and optical scan ballots. Electronic voting facilitates voting by people who may read different languages and not all is able to read the same paper ballot, and it increases accessibility for the blind. It is generally considered to give more rapid election results, and its advocates claim that it results in cost savings.

Overview

Electronic voting systems have been in use since the 1960s [2] when punch card systems debuted. The newer mark-sense ballots allow a computer to count a voter's mark with an optical sensor. Internet and telephone voting systems have gained popularity for non-governmental purposes since the 1980s but, due to security problems, have so far been applied for government elections and referendums only in some European countries.

Direct recording electronic (DRE) systems, with interfaces much more like an ATM can, depending on design and implementation, provide instant feedback to the voters in case of invalid votes, and they can provide instant counts after polling. With a paper printout of each ballot, verifiable by each voter, they can also offer certain verifiability. By contrast, in a paperless system, voters must have faith in the accuracy, honesty and security of the whole electoral apparatus (people, software and hardware). Vendors of voting equipment tend to prefer proprietary software for business reasons; this alarms some observers. Open source software, based on its established track record related to security design (as opposed to the "security through obscurity" approach by proprietary software), would provide a large degree of transparency for such systems, at the cost of loss of exclusivity to vendors.

1.1 Background of study

The old method of election event

The Student Representative Council (MPP) is very important in every university. It basically acts as student representative on social and academic issues or problems faced by the students. They also act to organize activities towards developing and strengthening students' skills such as social, sports, communication and leadership skills.

Majlis Perwakilan Pelajar (MPPUTP) usually held their election every year. Basically, the process flow is the same with election process in Malaysia. Starting from the dismissal of old MPP, the Jabatan Perkhidmatan dan Sokongan Pelajar (JPSP) will distribute notice about MPP Election information. There will be many benefit information such as election date, naming candidate's date, the candidate's criteria list, all are mention in that notice. Usually the notice should be distributed 1 week before Naming Candidate Day (Hari Penamaan Calon). On the naming candidate day, students involved can submit their name basically if they think they are eligible and interested to join the MPPUTP election. After that, on the next day there will be interview for all candidate conducted by the SPR (Suruhanjaya PilihanRaya). Basically the SPR was in charge by UTP Management which the Chairman of SPR was head program, plus representative program chosen from head program and plus the management which the management mixed with all department. After interview and made confirmation with the selected candidate, there will be a manifesto night (Malam Pengenalan Calon MPP). Right after the manifesto night, there will be campaign duration in a week.

Basically, in the MPP constitutional, there will be a minimum 18 candidate to be selected in MPPUTP which include 5 hi-com (high committee) plus 12 programs (2 candidate for each program – EE, Mechanical, Civil, Chemical engineering, ICT, and BIS) plus 1 representative for international student. In this election, the

UTP student need to vote 5 out of 6 candidate for general constitutional which mean we need to vote the most eligible candidate to be in the 5 hi-com. The campaign to attract votes held in 7 days starting 9 a.m. right after the manifesto night. After campaign, the election started. In this election, there are many location provided for student to making the vote, such as in front of pocket D, at pocket C, and at Lembaran café. Every student has been given a ballot (a ticket with student name, ID and program written on it). This ticket must be brought by student when they go out to vote. At the election place, the student needs to give the ballot to the person in charge the election place. That person will check in student record book and tick upon the student name and after that, the voter was given a paper which in the paper, the voter needs to vote 5 candidates from 6 candidates. They need to vote at the counter allocated and there is the manual guideline on how to vote successfully.

It is important for a voter to follow the rules of voting so that in the election can have a fair and square result for the candidate to be MPPUTP. The voter has to vote by crossing the line fully in the box space given in the election paper. This is because to prevent the votes become damage and invalid. After 5 pm, when the election session closed, all the votes will be calculated. SPR will count the votes witnessed by the candidates and candidate's supporters or candidate's agent. The candidate usually has 2 supporters. If the votes counted gives the same result for 2 or 3 candidates, the SPR are responsible to take action in this situation. The SPR have power to make decision whether to have another election or take another possibilities solution for this MPP election. All about election process, election voting method or technical part was under SPR responsibility. After successfully calculate the votes, the result will be announced at the same place in front of the candidates and their supporters. The next day, the winners which are the MPP now have roles to play in MPP.

The business process

In developing the e-voting system, there would be 2 view of user, one is the voter (UTP students) and the Suruhanjaya Pilihan Raya (SPR UTP) and Administrator for the system.

First of all, in developing the e-voting system of MPPUTP Election, as for the student view, they have to login into the system using the student id and their password provided same as in their e-learning. The database of student information can be taken from the e-learning database. Right after they login, each one of the student have the introduction page, perhaps some information about the MPP candidates, their personal profile, academic and so on like the resume, so that student can know, which one they would vote from the best quality based on personal background of the candidate provided in the website.

To vote, the student needs to go to the next page, which will lead them the vote page. In this case, the student will view the candidate picture, from which constituencies and important information and the student have to choose 5 out of 6 candidates for example from the page. After voting, there will be a confirmation whether he/she really confirms to vote those candidates or if not satisfied with the selection, the voter can hit no button and vote until the voter confirmed with their selection. One student are allowed to vote only one time and there should be considered as absentee voter who didn't log into the system to do their job to vote the candidates. Their ballots would be no longer available and not valid to be vote after the end of the Election Day.

As the SPR or Admin, firstly their job is to make sure that the student gets the information about how to vote, which is the user guideline should be provided. They also should be an announcement about the voting dates, and so on. All the voting process procedures are all managed by the SPR. It is important to make sure the vote is valid or not. Sometimes, like as mention before, to prevent the user traffic of the website, the SPR should manage the time to election in the

election day which perhaps only allowed the first year student to vote first, next the second year, third year until final year, or there will be some other solutions to prevent the traffic on the election day. The Admin also need to manage the calculation but at this time, with the computer based system, the admin or SPR have only to generate the calculation vote system and generate the report, lastly the e-voting system will provide the results for the winning chair of the MPPUTP candidate. On the end of the Election Day, the admin should announce the winners and provide some reports and after that the winning MPPUTP can now starts doing their work, give services among students and UTP management. About the security, it is an important aspects as to make sure the data ballots vote by the students are calculated equally and fairly so that the result would be fair with the number of votes. Another aspect is to prevent any dirty tactics made by candidate's enemies or any potential hackers in order to screw the things up or to grab the chair or the position of the MPPUTP organization.

1.2 Problem Statement

1.2.1 Problem Identification

1) The ballot coupon distribution

There is a small piece of paper which is like coupon, containing student name, student id, and course. For this manual method, it gives some difficulties for students who are in charge to distribute the coupon for each of the block (the hostel where students stay). The process of distribution the paper may not be useful because some students didn't get their coupon (perhaps the block manager or the people's in charge the distribution made mistakes). So, students who didn't have the coupon cannot cast vote and this will decrease the number of voter.

2) The location of election

Students need to go to the voting booth which is far away from hostel and the location for voting is near the lecture's hall and cafeteria but still gives difficulties

for the student for them to walk to the voting booth on the hot day in UTP campus which how many students willing to go out to vote as if in that day there is no class for them. E-voting system makes their life easier because straight away from their room, they can manage to vote without going out in the sunny day.

3) The time of election

Students have to rush to vote before going to class as if they don't have a gap of time at that day. Sometimes students maybe busy for attending the class and lectures, busy for submitting their assignments or reports which make them didn't have time for voting. As for online e-voting, before attending the class, in the morning, they just need to login, enter the password and cast the vote, as simple as that.

4) Need to bring the card metric along when vote

Students cannot vote when they don't have their matric card which sometimes gives the difficulties because if they didn't bring along. If the matric card is lost, they also cannot cast the vote.

5) To prevent the "invisible voter"

There are some old cases which student uses other student's metric card because of cheating reason. They cheat by using other student's matric card who already graduated for the university or the student who no longer studying at UTP. By using different name, they vote the desired candidate and cast the vote 2 times (which 1 vote is from his/her own id and 1 vote is from the "invisible" one). This case gives problems for SPR to track who is the voter and finally the vote become invalid which affected the result for the winner of the election.

6) The MPP candidates and related person keep busy during the election event.

This is including the person who in charge for distributing the coupon, the posters, and also including the followers of the candidate which usually busy with the campaign to influence voter to gain the votes. The candidates are also busy with their commitment for the election campaign which can't concentrate their responsibility as student like absent from class, didn't submit assignments or reports and so on. With e-voting, the advertisement and promotion of the candidate is available in the website which the students can view the video of the manifesto night and students can also follow the current situation and get information about the candidate in campaign week.

1.2.2 Significant of the Project

The voter can vote the MPP candidates with only access to the internet. Online voting can save time and cost because student no need to walk here and there to go out voting. They can vote directly from their room or hostel, and the biggest advantage is in this time, students have no reason for not voting in the MPP election. From the student account, all the students' information is already in the database, so from there the system is easier to handle and the election process can run smoothly. There should be no dirty tactics or fraud in election based in e-voting. To prevent this, there is a need for security mechanisms that will assure privacy of the voters. The admin and the SPR will send the notification for the student (voter) such as a first class letter or postcard containing voting information which can be used to vote online.

1.3 Objectives

Project Objectives

The objectives of the project can be divided into few sections. These objectives help and keep all processes on track following this project title and its requirement. The Objectives are:

- **Design and develop an electronic voting system for MPPUTP Election**

An electronic voting system (e-voting) sites in which the voter logs in through secure means, establishes their identity and votes a ballot during their visit to the web site. This could be accomplished through internet access from the home, hostel, computer lab, office or library. Voting could take place over a several day period ending at 6:00pm on Election Day. This method has the advantage of being similar to most other web transactions. The voter logs in, provides an identifying key through a secure pipeline from their browser, and votes. The transaction occurs in real time. The web site can provide on-line help to the voter as they complete their ballot. The ballot can also be presented in a variety of languages and the voter can take as much time as he or she needs.

- **The studies of security**

The number one concern voiced about e-voting is security. There is computer hackers breaking into computer systems, the prospect of an election tainted by hacking is daunting, but there are many security concerns that are more relevant. Ensuring **the privacy of the voter** is of utmost concern. It must be provable that each ballot has been unexamined and is accurate. Methods must also be devised that provide verifiable privacy.

Another concern is verifying the accuracy of the voting system in collecting and counting the votes. There is the issue of authentication and verification of the voter. Digital signature systems accomplish most of these functions in one

technology. The digital signature authenticates the voter at the same time that it protects privacy and secrecy. Unfortunately, cost remains an issue.

- **The studies about rules and regulations of voting**

Voting system standards: All voting systems and their software are reviewed against the Federal Election Commission (FEC) guidelines for voting systems. E-voting will necessitate the creation of new areas of the standards. There will need to be software review benchmarks, platform review standards, standards for security systems, and standards for logic testing.

1.4 Scope of Study

There are limitations considered in this project which are:-

1) This system only involve between students, the SPR (Suruhan Jaya Pilihan Raya) and the System Admin.

2) Conducted within a smaller scope which is one small community which is the Representative Council (MPPUTP) in university.

3) The election events usually held annually (once a year)

4) The potential weaknesses of this system are its vulnerability to a variety of hacker created problems.

These include "jamming", "man in the middle" hacks and "page jacking". Jams and bottlenecks may also occur due to high volumes of legitimate traffic during the final hours before the polls close. Jamming is caused by a hacker overloading a web site with requests for information thus jamming the lines and preventing legitimate interaction with the site. Man in the middle sites set themselves up to mislead the user into thinking they are on the correct website when in fact they are on the hacker's website. The fake site collects the user's identifying information for later fraudulent use and leaves the user thinking that he/she has properly completed business with the legitimate site. Later the hacker can use the identifying information gathered at the fake site to conduct fraudulent business at the real site. Page jacking consists of leading a user off to an imposter website. [5]

1.4.1 The Relevancy of the Project

The electronic voting system is an intermediate state, before reaching the concept of e-democracy. This means a modernization of the services offered to citizens, without having associated social and political implications:

- The results will be available to students of UTP in a shorter time and the reliability of the process is always available. The innovation applied to the voting process will probably improve the voter turnout statistics.
- The UTP management responsible for electoral processes will benefit from the implementation of electronic voting. Election management will be simplified, the risks of the procedure will be minimized and logistics and personnel involved in the process will be reduced.
- The e-voting system need to be implemented in e-government sector in Malaysia in the first place but have to change into more specific, so choosing a small community which e-voting election held by Student Representative Council (MPP) of University of Technology Petronas.
- The person who playing role as SPR will be the admin for the system. The target user in this project would be the UTP student playing a role as a voter.
- To convert the system from manual into automated system, electronic voting.

1.4.2 Feasibility of the Project within the Scope and Timeframe

This project duration will be implemented in 2 semesters:-
For the first semester, there will be research process for the project while in the next semester, the project will be fully developed and can be executed by the admin and user.
For this semester, the system will be completely developed and by the end of the semester, it is managed to be use by next MPPUTP election event in UTP.

CHAPTER 2:

LITERATURE REVIEW (THEORY)

2.1 Supporting information (e.g. References, etc.)

The World Wide Web was born in Geneva, at the CERN (European Laboratory for Nuclear Research), back in 1990. Thanks to the web's simplicity and user friendliness, internet quickly found its way into our daily lives. The web closes a cycle of the "IT revolution" by introducing full interconnectivity and standardizing computer programming language. It is a powerful democratic and popular tool. [1]

Today two of the concepts most often associated with Internet are eDemocracy and eGovernment. They encompass anything from online tax declaration and payment to online license renewal or direct access to authorities through e-mail or chat sessions and online exercise of political rights. [1]

Geneva began working in the field of online democratic rights in 2000, soon joined by the Swiss Confederation. In March 2001, the Geneva government launched its eVoting project, with the support of the Federal State. Internet voting will not replace the existing ballot forms - the polling station and postal voting - but will be offered as a third way of casting a ballot.[1]

What do people think of it?

Are people ready for such a voting system? A nationwide poll conducted in 2003 has shown that 72% of the Swiss population supported eVoting[1]. In Geneva, 68% of the population was supporting it as early as 2001, when we commissioned the University to conduct a survey. The pilots conducted during official ballots have created a stronger request: some 90% of the voters who used our application during the ballots organized so far want eVoting generalized. More than 80% want the system to be used for elections. For the time being, we have used it in referendums only.[1]

25% to 30% of eVoters don't see any disadvantages to the system. As main advantages, they mark the quick ballot counting, a turnout increase and the possibility of diminishing the ballots' cost. The main perceived drawbacks are the social inequality that eVoting can create and the lesser security compared to other forms of ballots. Actually, these perceptions don not apply to this project, because eVoting will not replace existing voting forms.[1]

Geneva, Switzerland rolled the *cyber-dice* last weekend and took a chance. They tested a new *E-Democracy* project. The centerpiece of the project is Internet voting.

For this test, 16,000 university students registered to vote on-line. The election covered only ballot initiatives, including a question about legalizing abortion. [1]

The Swiss vote four times a year, on average, on issues confronting the country's legislature. [2]

Some of the advantages of "e-voting" are self-evident. Once the system is established it is easy to maintain and efficient to operate. Referenda and more frequent voting on local issues could be efficiently conducted. Vote counting is easier. It would be easier to initiate more frequent referenda and administer vote counts on a proportional representation basis. [3]

"Vote early and vote often" was common parlance at elections in Northern Ireland and clearly security must be such that votes cannot be created in small ward and council elections where a few votes can sway the result. Critical security issues probably lie in protecting the details of the cumulative vote until the polls close. Political parties would dearly like to know the state of play during the day of the vote, especially in marginal constituencies. [3]

The disadvantages lie primarily in the possibility that this form of voting could replace traditional voting methods, on the basis that it is less costly and more efficient to administer. This could disenfranchise older sections of the population,

but to whose Political advantages? It could be a prelude to some form of compulsory voting, as in Australia. Politicians of all parties are increasingly concerned about the growing lack of interest in local and national politics as expressed through electoral turnout. Compulsory voting would be easier to administer through "e-voting". [3]

Advantages of Maryland University's e-Voting System

Accuracy

One way to measure the accuracy of a voting system is to calculate and compare voter error rates. The more accurate the voting system is, the fewer number of voter errors there will be. Voter error rate is the number of voters who voted but did not have a vote counted for a specific contest on the ballot (typically President or Governor). This is calculated by subtracting the total number of votes cast for President or Governor from the total number of voters who voted. [4]

Accessibility

The touch screen voting system used in Maryland University is accessible to most voters with disabilities. Using a headset and keypad, blind voters and voters with visual impairments are able to vote independently and secretly for the first time in the State by listening to the ballot selections and making selections using the keypad. High contrast ballots and magnified or enlarged ballots are also available. For voters who prefer or need to sit while voting, the screen can be adjusted to accommodate this need. Future enhancements include a "sip and puff" device to allow voters with disabilities that prevent arm movement to vote independently and secretly. [4]

Voter Intent

With paper-based voting systems, election officials sometimes have to make determinations as to the candidate or ballot question response for which the voter intended to vote. If a voter erases a selection and makes another one or

improperly marks the ballot, the scanning unit may not accurately read the ballot. In this case, election officials must review the voter's ballot and try to determine for what candidate or ballot question response the voter intended to vote. [4]

Easy to Use

Voting on a touch screen voting system is easy to do. Voters just touch the screen next to the candidate or ballot question response and move through the ballot. Changing votes is easy -- voters just de-select one candidate or question response and select another. Voters of all ages and levels of computer experience report positive experiences after voting on Maryland's voting system. [4]

Internet voting, i.e., voting on one's personal computer and sending the ballot electronically to the election office, has great potential for making elections more convenient and accessible, but concerns regarding verifiability and security are greatly magnified in the Internet environment, and there is consensus that Internet voting is at present too risky for general implementation. However, with continuing advances in encryption and other security measures, Internet voting is likely to become more prevalent, and Defense Department experiments and pilot projects are leading the way. In the interest of improving voting opportunities of overseas military personnel, the Defense Department conducted a pilot in the 2000 election called the Voting Over the Internet (VOI) Pilot Project, and planned a larger pilot for the 2004 election called the Secure Electronic Registration and Voting Experiment (SERVE). Unresolved security concerns led officials to cancel the SERVE pilot in early 2004 before it was implemented. [6]

In sum, views about electronic voting fall into two basic camps. On one side are those who put a premium on accessibility and improving political participation. They welcome electronic voting on the ground that its advantages outweigh security and reliability concerns--which in their view will always plague voting systems to some extent. On the other side are those who put a premium on security and reliability, and the need to maintain voter confidence in the electoral

process. In their view, unless electronic voting is backed up with a verifiable record of some kind, the risks are too great--the potential for mishap and mischief looms too large.[6]

An author from of the University of Maryland C.D. Mote, Jr. said,

"E-voting requires a much greater level of security than e-commerce. It's not like buying a book over the Internet. Remote Internet voting technology will not be able to meet this standard for years to come."[4]

An author from West Virginia University - Student Government Association, Melanie J. Cook, Ed. D, Assistant Dean of Students said,

"Our technology staff on campus was involved and crucial to our making a successful change. They said the eBallot system was better than anything they could do on our campus (and more cost-effective), so it became an easy sell from the beginning."[1]

CHAPTER 3:

METHODOLOGY

Systems Development Life Cycle (SDLC) (Waterfall)

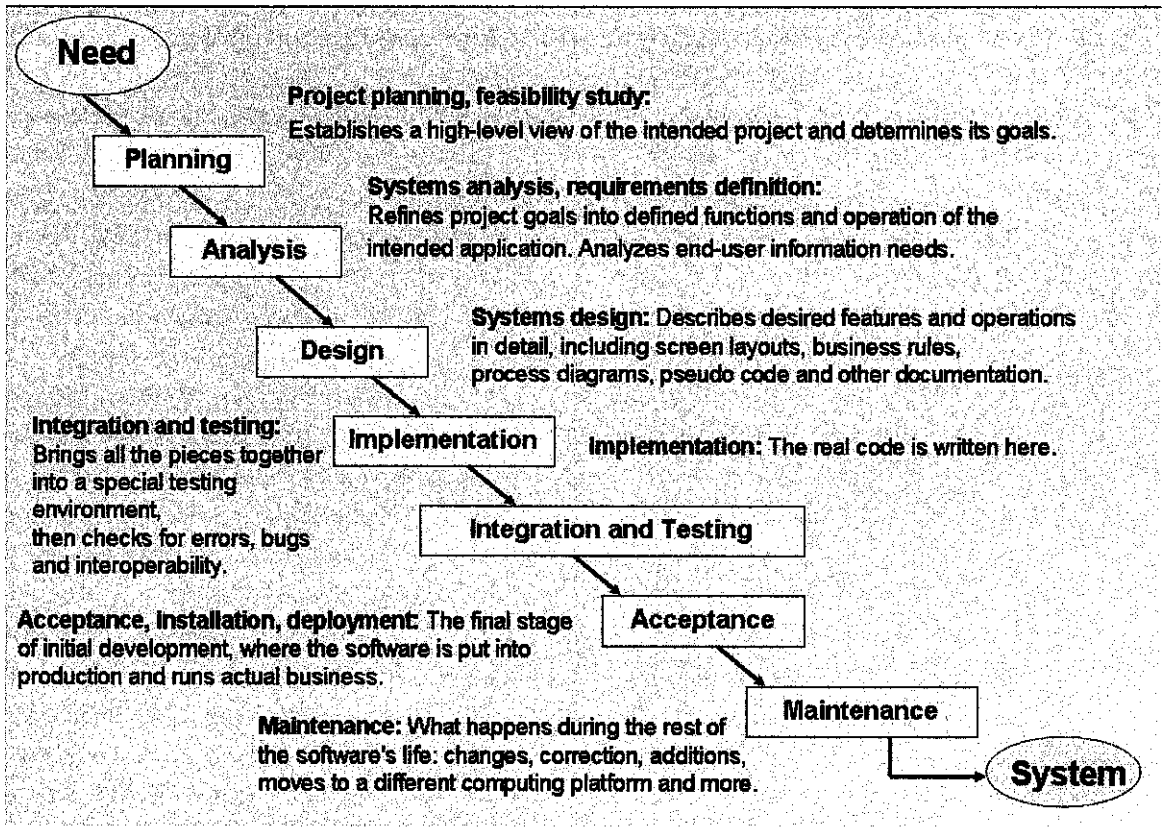


Figure 3.1: SDLC Waterfall Diagram

This figure indicate the system development life cycle waterfall diagram which basically indicate the stage of the project have been done so far. For this final draft, the project has reach the integration and testing process, where the system is nearly finish and complete but need to have checking and testing process. Some modification of the system need to be done to ensure that the vote calculation is correct and tally.

At the planning phase:

For the project, the author determined the objectives and the scope which is relevant with the project requirements. The objective is to develop the e-voting

system until it achieve its goal and finally the system can be use in the real world, as for the university's MPPUTP election use which held once a year.

At the analysis phase:

An interview was conducted by the author involving JPSP and MPPUTP. From the interview, the author can see that in the election event, the JPSP have role to play as the SPR and the MPP candidate which have to campaign and promote them to gain votes from students. The survey was conducted as the interview with one of the ex-MPP, Mohd. Hairi Razak and the SPR, Mr. Mohd Tajul who was in charged in managing the election event.

There is also a small survey conducted which the author distribute the questionnaires to the MPPUTP new members and 20 students in order to know how many of them prefer the electronic voting services or manual voting system. Basically the questionnaires are divided into 4 sections:-

Section A - contains the respondent's awareness and readiness of e-voting system

Section B - covers the services that are available online or electronically.

Section C - identifies the advantages or benefits of implementing e-voting in MPPUTP Election event as according to the respondent's perceptions.

From the results of the questionnaires, majority of the respondents are agreeing in implementing and introducing the e-voting system in our campus life.

In this stage, the author also did some research by preparing the literature review regarding the project throughout the internet and referring the books. The author manages to define the system requirements and determines the project functions and operations.

At the design phase:

The author starts to describe the desired features and operations by designing the screen layout, describing the business process, system architecture and use-case diagram.

At the implementation phase:

The author implements the code for the website using PHP language. This is the stage where all the difficulties happens here in order to put the upload function, add, edit, delete functions and the function of calculating the votes, the candidate and their position which gives a lot of attention and need to put a lot of effort here to run the system.

As for the integration and testing phase which the author have testing the system into the computer followed by acceptance and the maintenance phase, the author plans that the system is going to be used in the next year's MPPUTP election.

For the admin or Suruhanjaya Pilihan Raya (SPR) point of view:-
To develop the e-voting system for MPPUTP election, there are some aspects to be take note on how

- To upload candidate pictures, details and information
- To monitor Election Day
- To monitor the vote of each voter
- To electronically read the ballot papers
- To issue a voting confirmation to each voter
- To stores, count and transmit the provisional results
- To issue electoral reports.

In the user or voter point of view:-

- Log into the website
- Vote the suitable candidate
- View the results
- Some comments about the new MPPUTP student

3.2 Tool (e.g. equipment, hardware, etc.) required.

- Microsoft Dreamweaver MX 2004
- Adobe Photoshop or other graphic design software
- PHP Language
- Apache webserver
- PHP4 with session support compiled in
- Mysql server

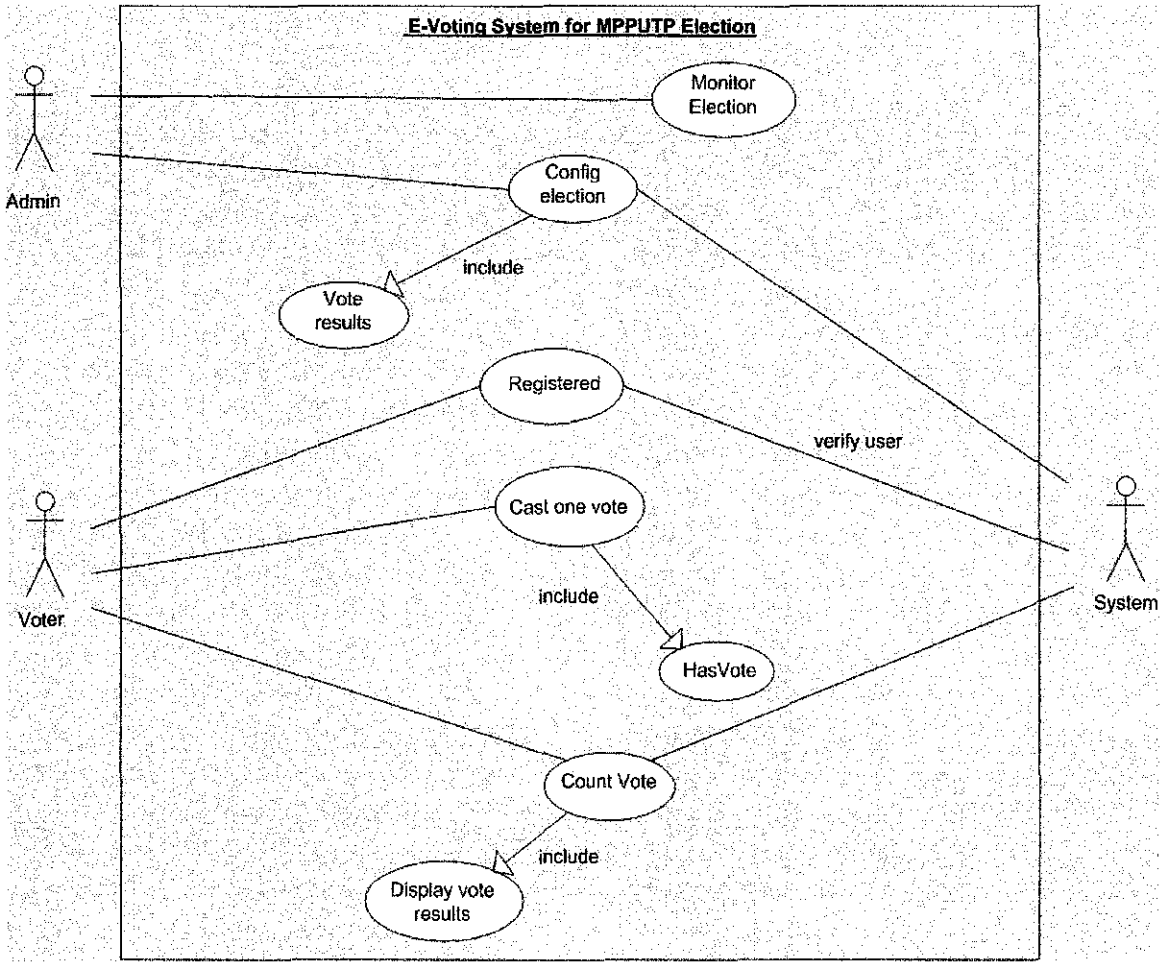


Figure 3.2.1 : Use case of the e-voting system

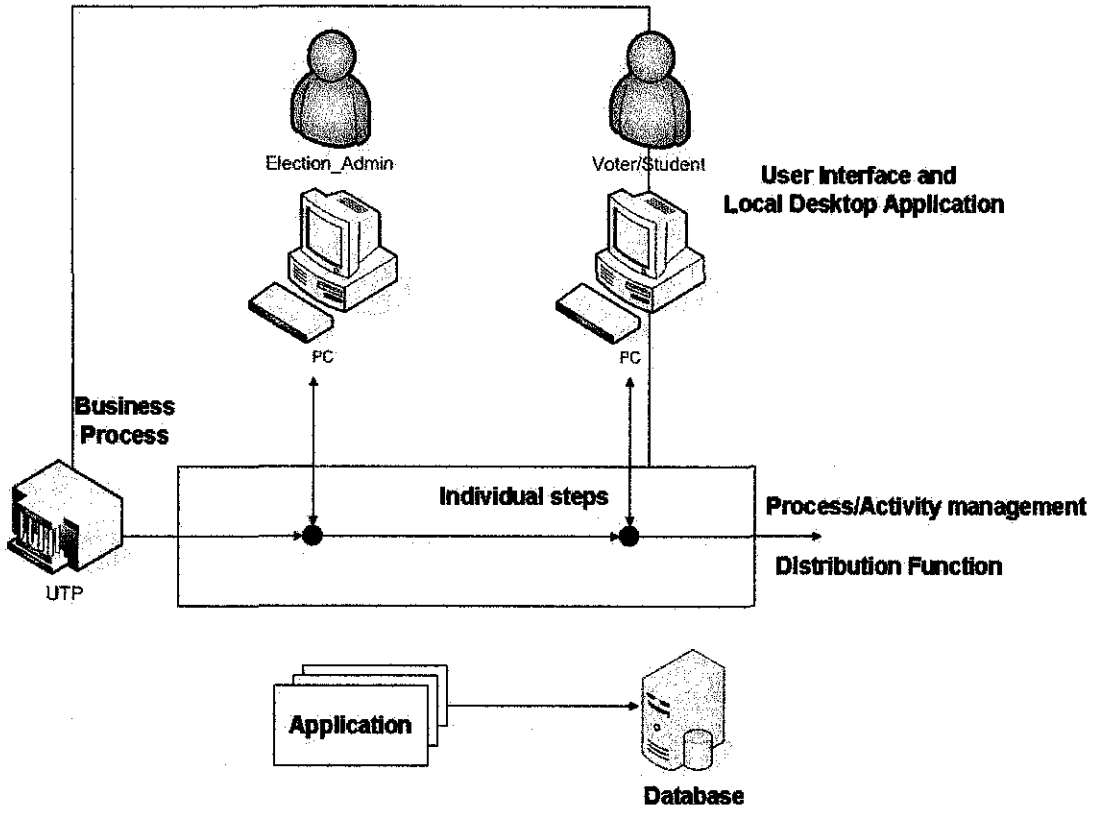


Figure 3.2.2 : System Architecture

CHAPTER 4:

RESULTS AND DISCUSSIONS

4.1 For the students/voters

The e-voting system from both student and admin views are in the following process. The screen shot has been made and same examples used in the final year project presentation.

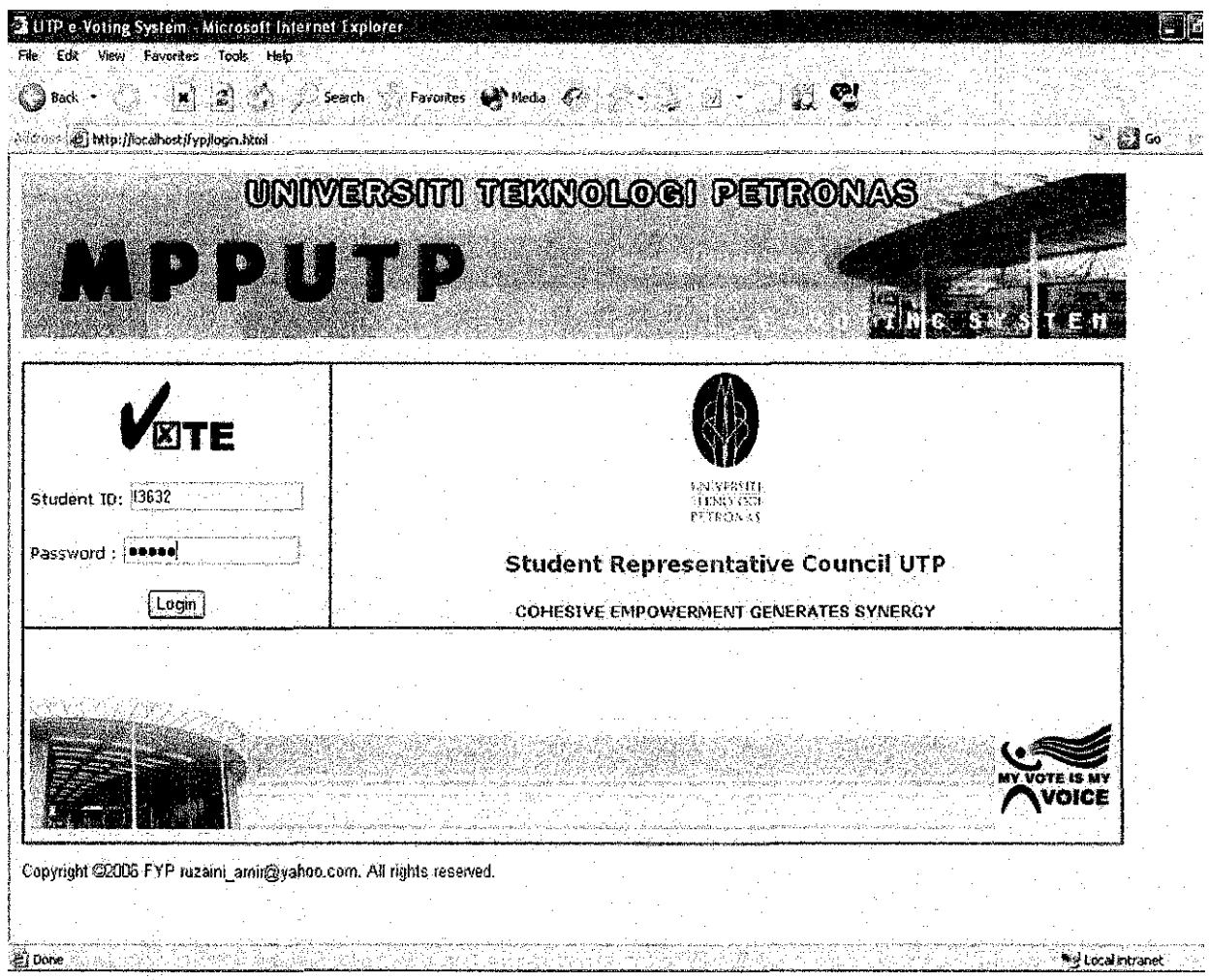


Figure 4.1.1: The Login page for student to enter the system

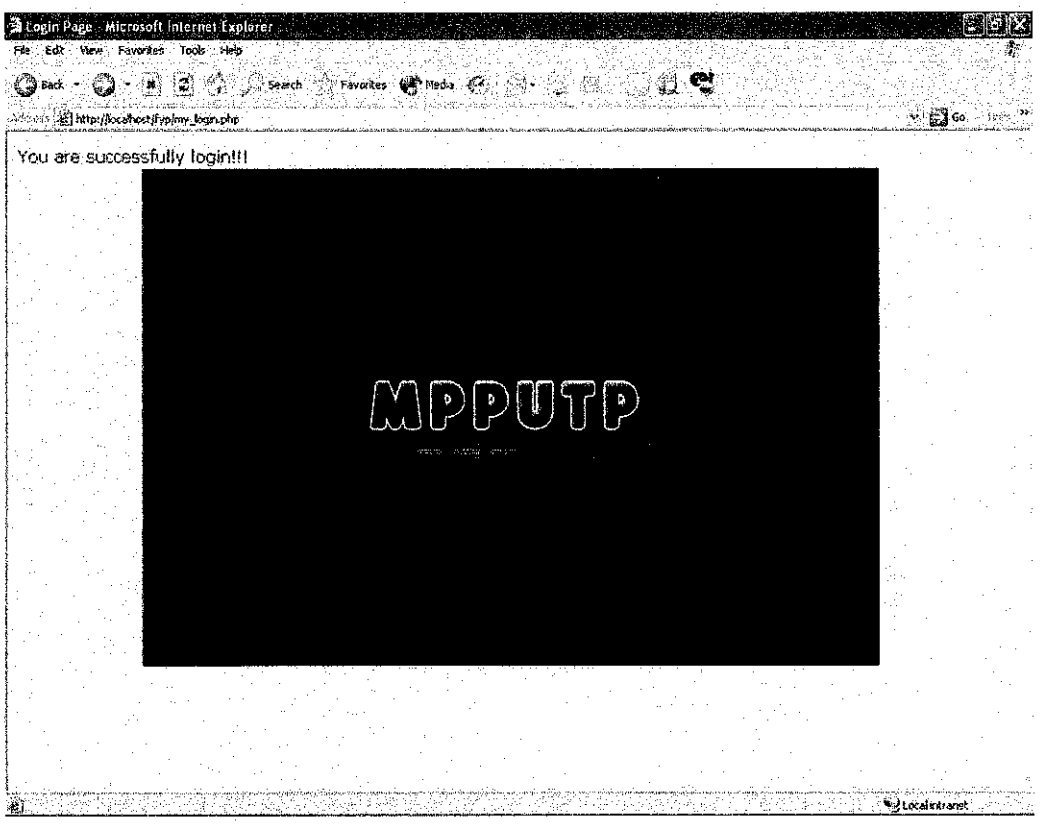


Figure 4.1.2: The loading page after successful login

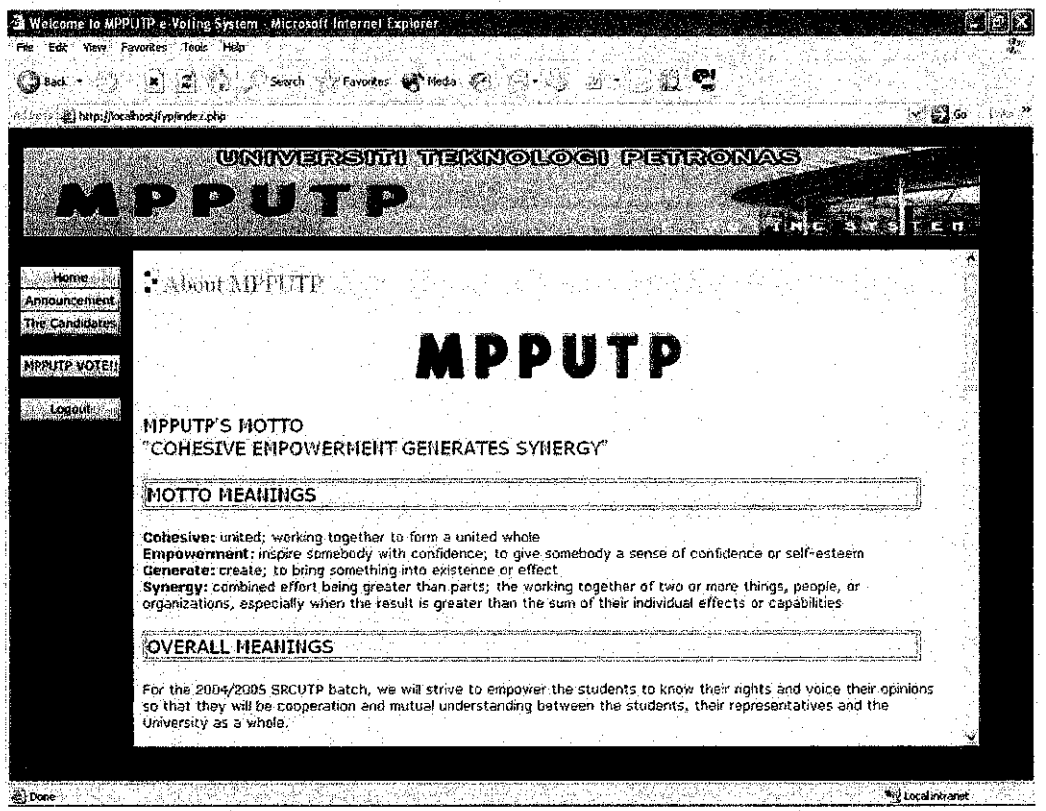


Figure 4.1.3: The main page of the system provides the student (the voter) information about the election.

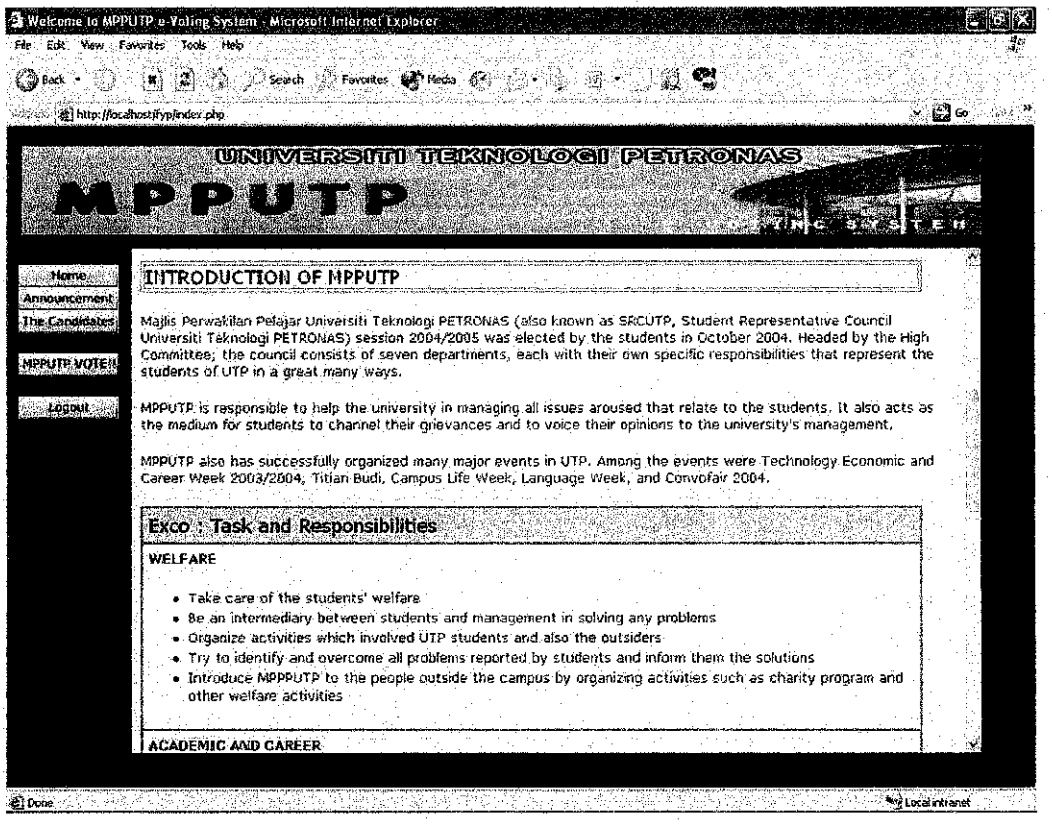


Figure 4.1.4: The continues scroll of home page

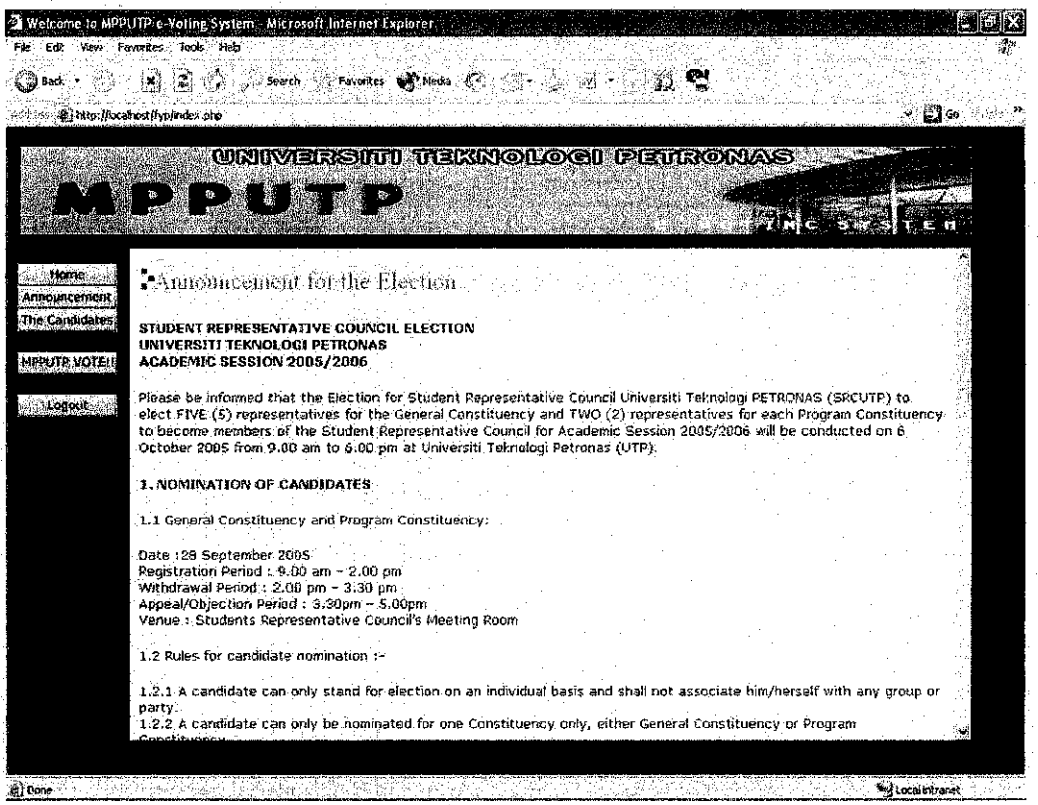


Figure 4.1.5: The announcement made by the SPR admin.

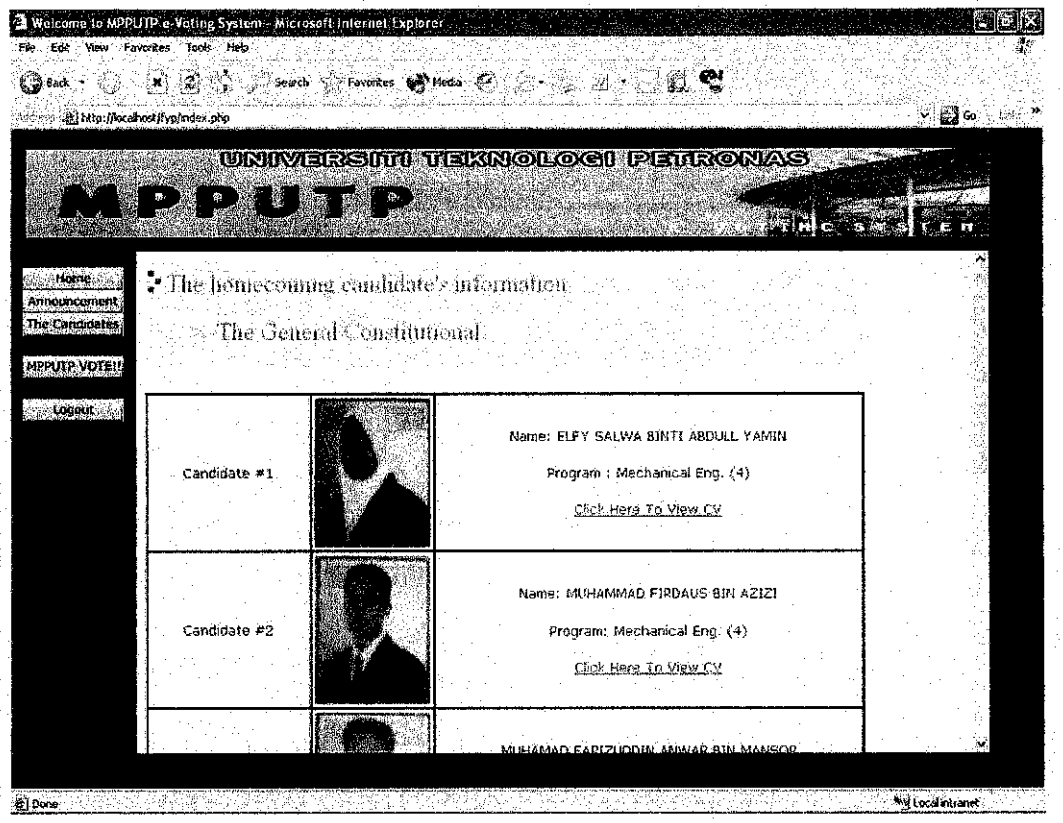


Figure 4.1.6: The candidate for the general constitutional provided to student so that they will know who they want to vote.

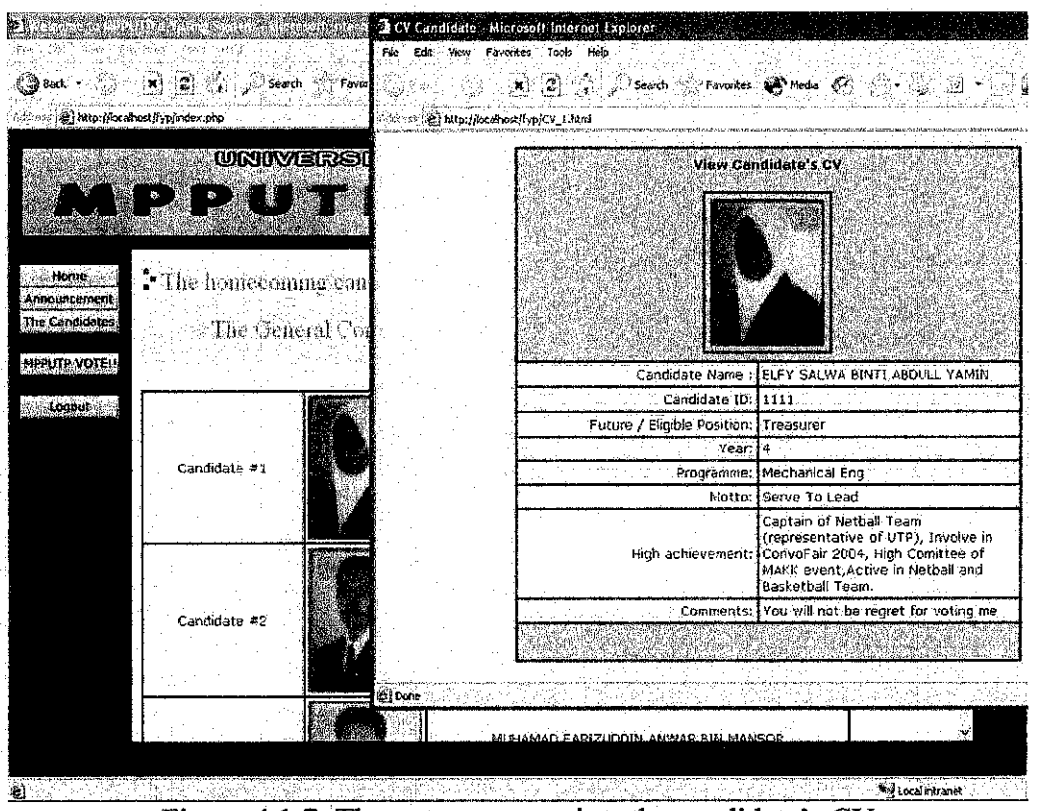
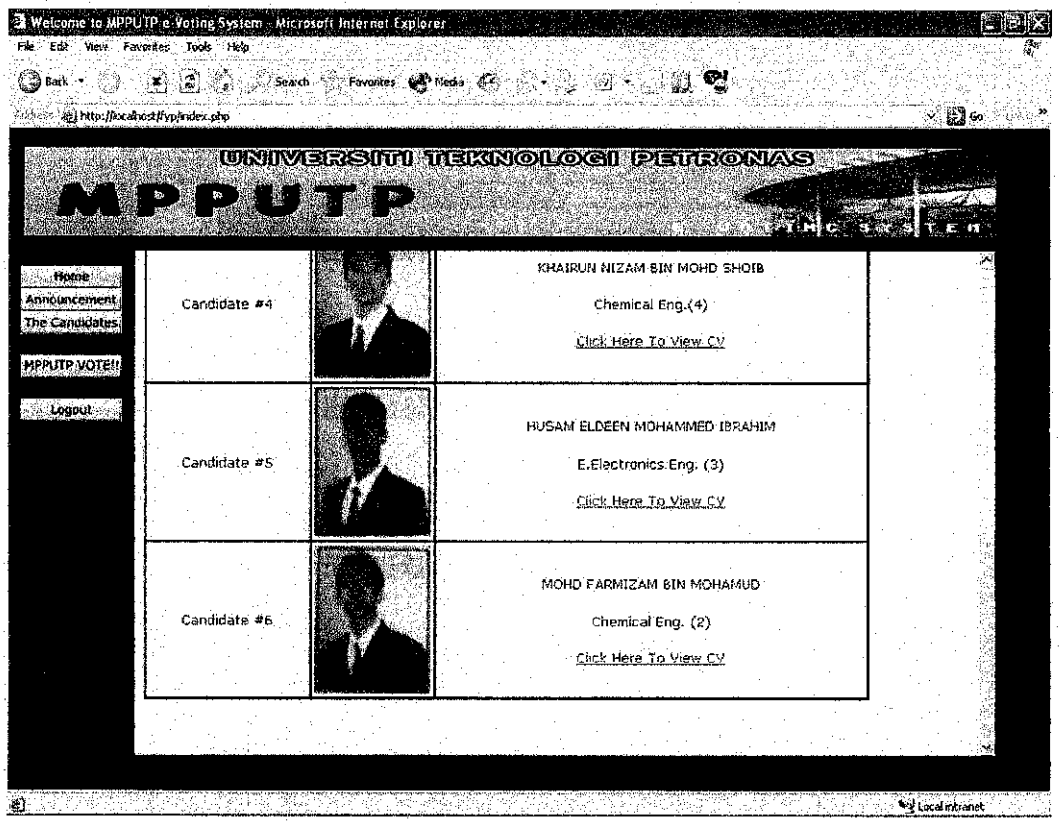


Figure 4.1.7: The voter can preview the candidate's CV



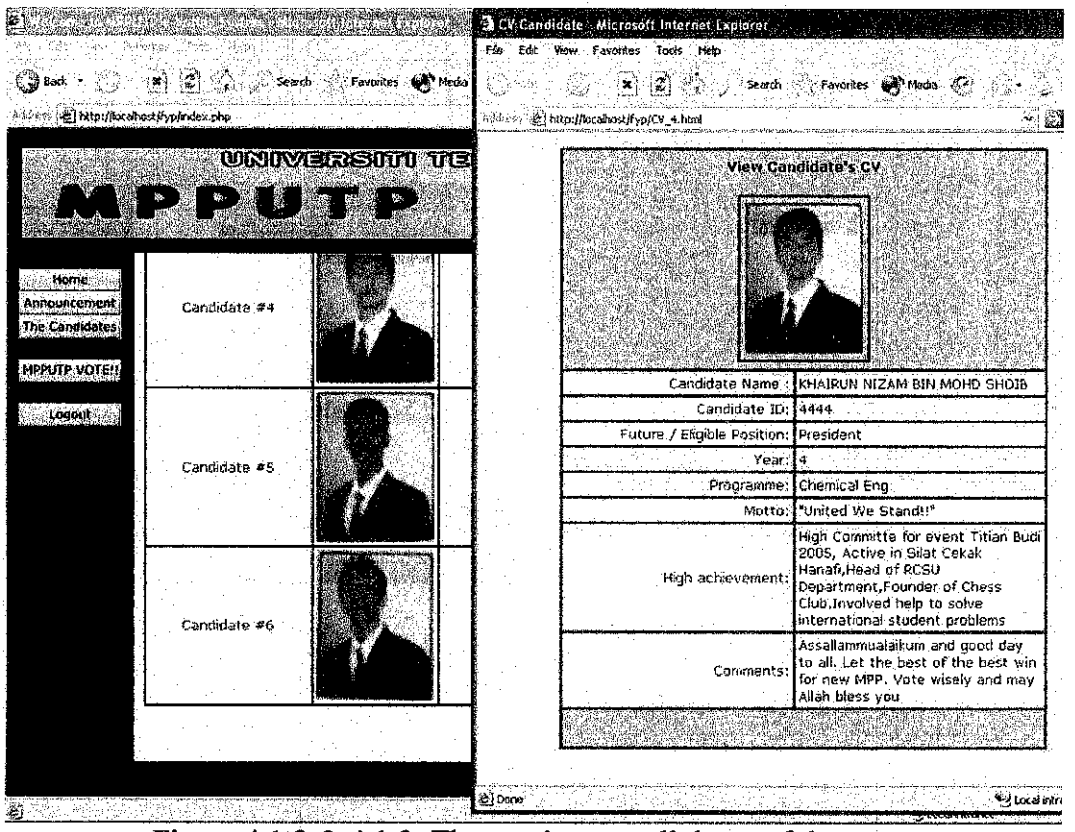


Figure 4.1.8 & 4.1.9: The continue scroll down of the page.

Once when the admin are ready to submit the e-ballot form (for the student to click at the MPPUTP vote button), the student should be ready to vote their favorite candidates in the Election Day. Time is also important for the election process.

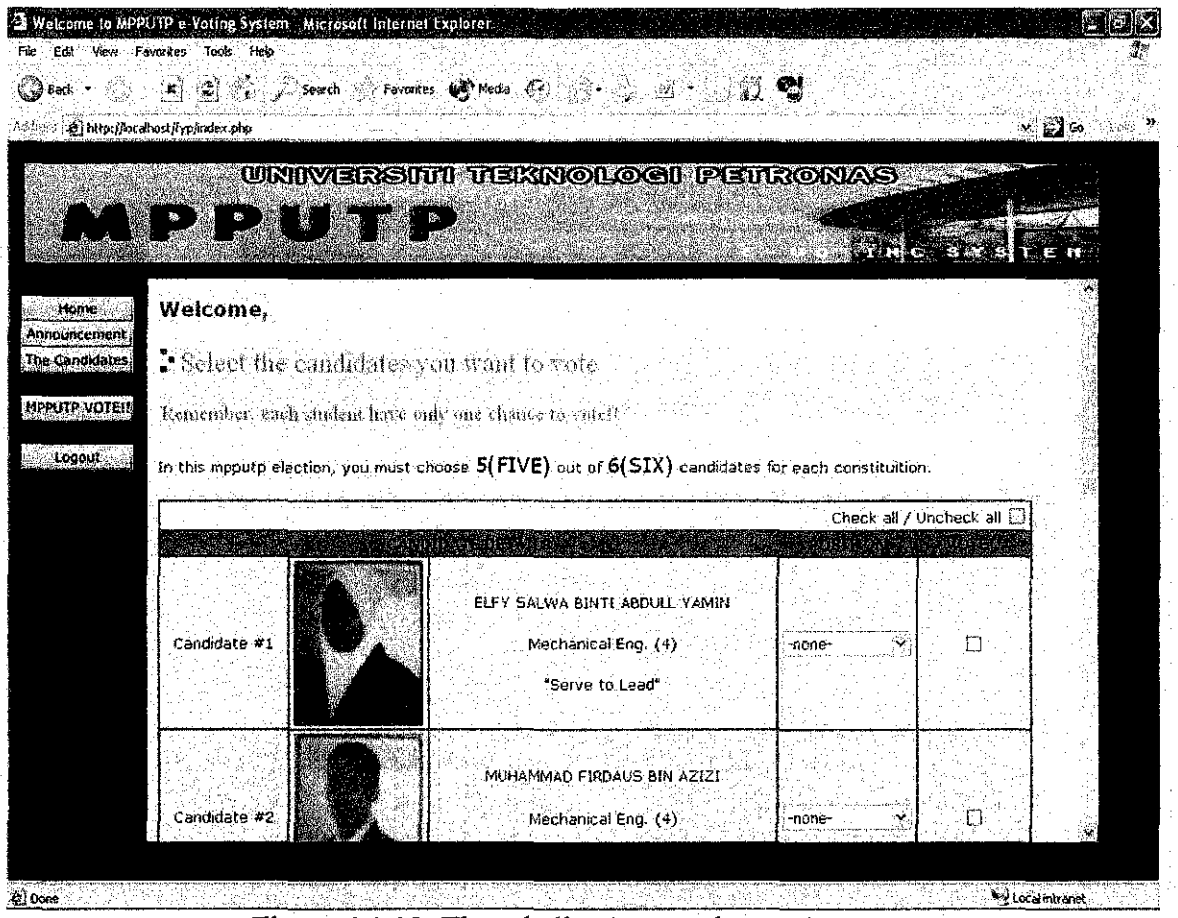
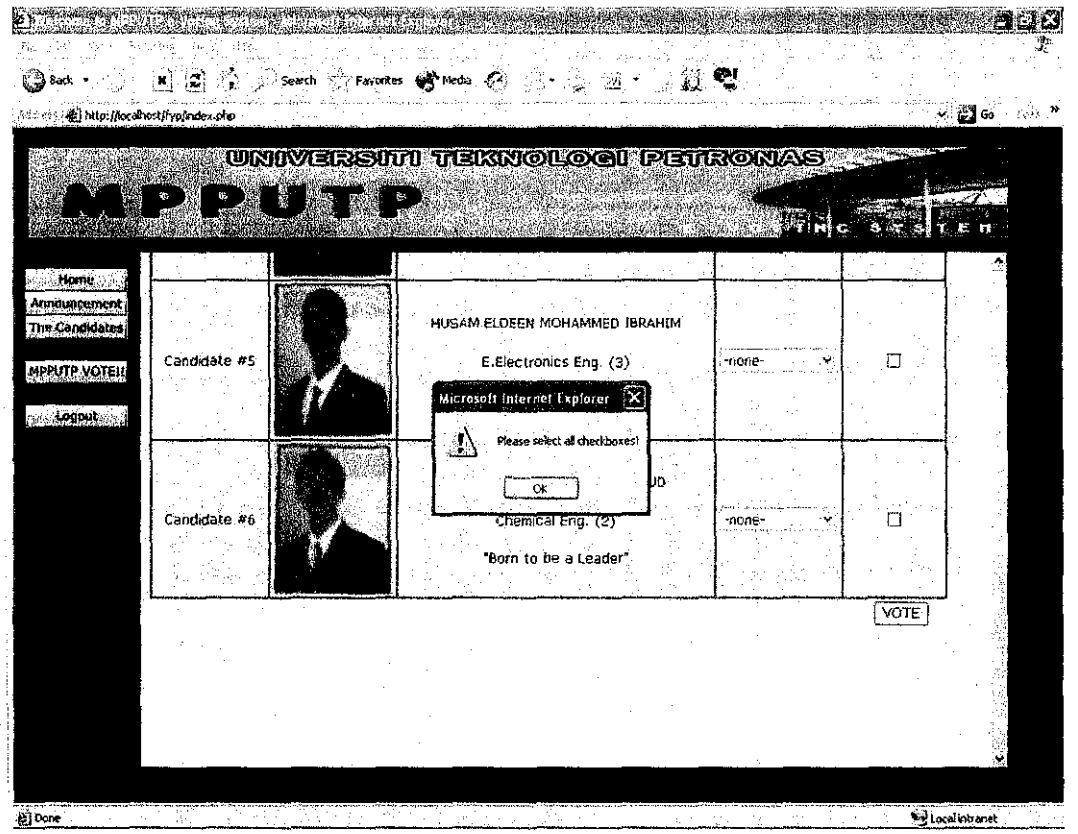


Figure 4.1.10: The e-ballot (to cast the vote)

After click casting the vote, it will be a popup message telling the voter about the confirmation of who they voting. The candidate's name and id will finally retrieving from the database. In this election, there are 6 candidates to be nominated into 5 chairs. So, the voter needs to vote those candidates with suitable positions and put none for the one candidate to be out from the nomination.


UNIVERSITI TEKNOLOGI PETRONAS
MPPUTP
Home
Announcement
The Candidates
MPPUTP VOTE!!
Logout
Candidate #5
HUSAM ELDEEN MOHAMMED IBRAHIM
E.Electronics Eng. (3)
-none-
Microsoft Internet Explorer
Please select all checkboxes!
OK
Candidate #6
Chemical Eng. (2)
"Born to be a Leader"
-none-
VOTE

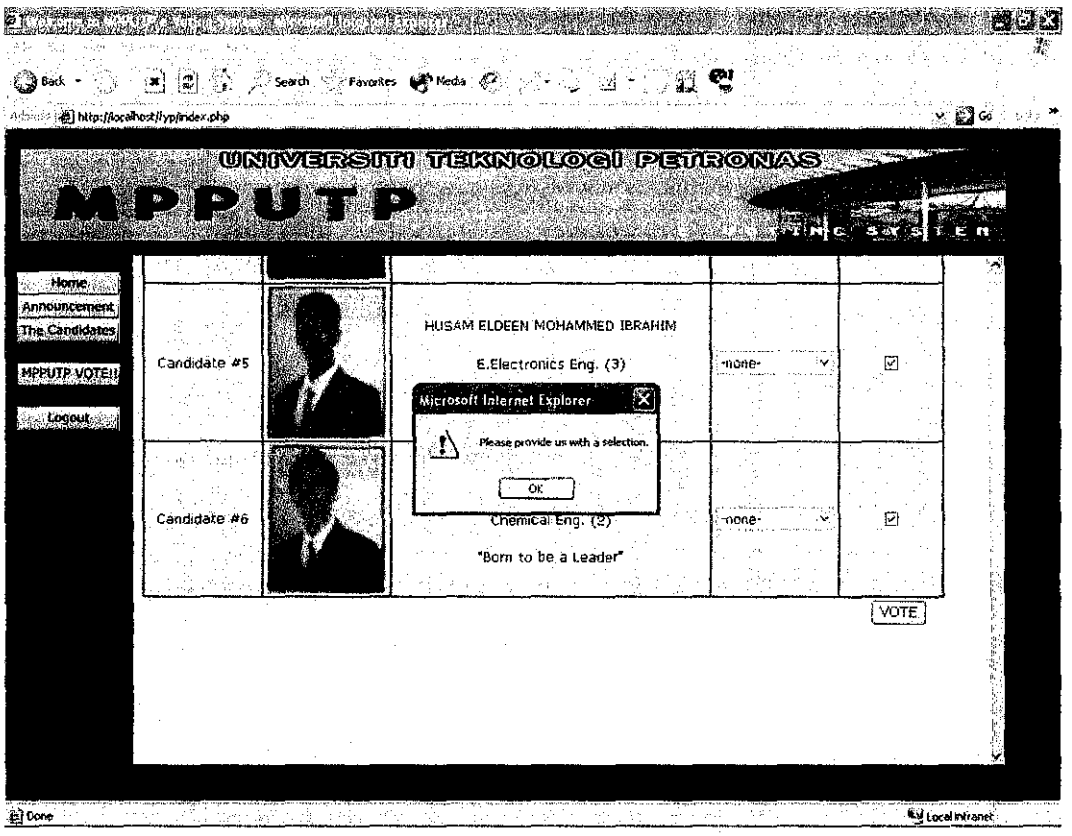
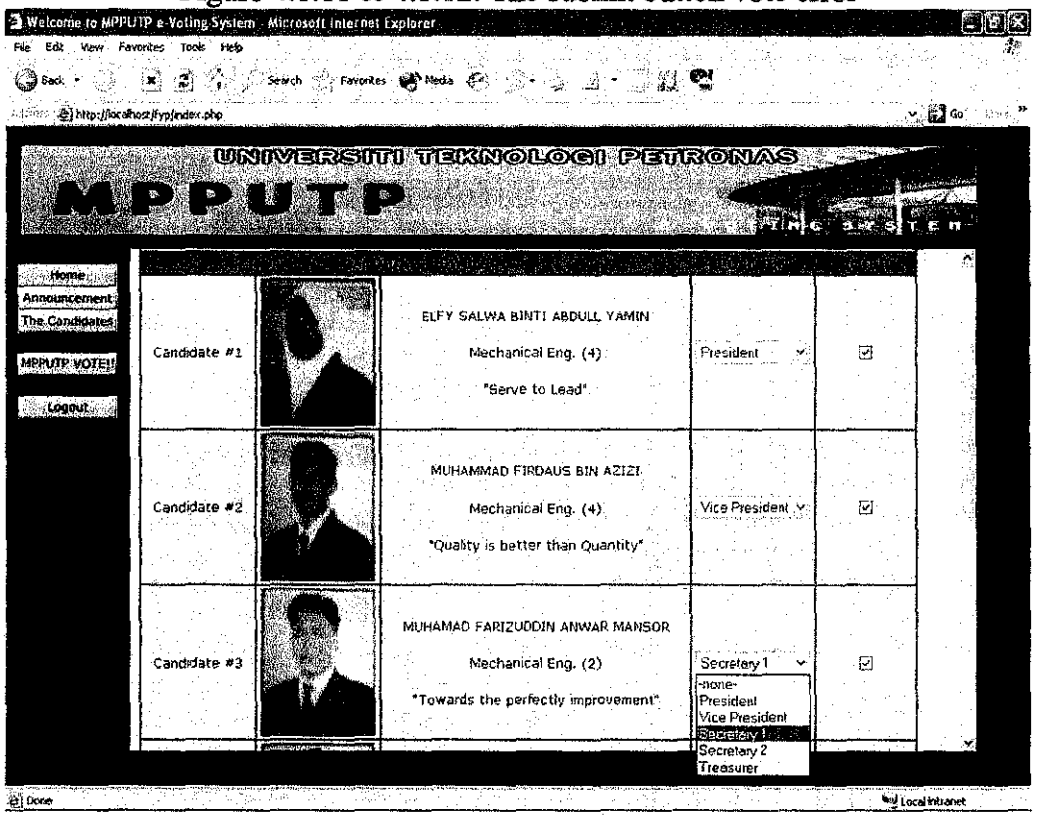

UNIVERSITI TEKNOLOGI PETRONAS
MPPUTP
Home
Announcement
The Candidates
MPPUTP VOTE!!
Logout
Candidate #5
HUSAM ELDEEN MOHAMMED IBRAHIM
E.Electronics Eng. (3)
-none-
Microsoft Internet Explorer
Please provide us with a selection.
OK
Candidate #6
Chemical Eng. (2)
"Born to be a Leader"
-none-
VOTE

Figure 4.1.11 & 4.1.12: The submit button vote error



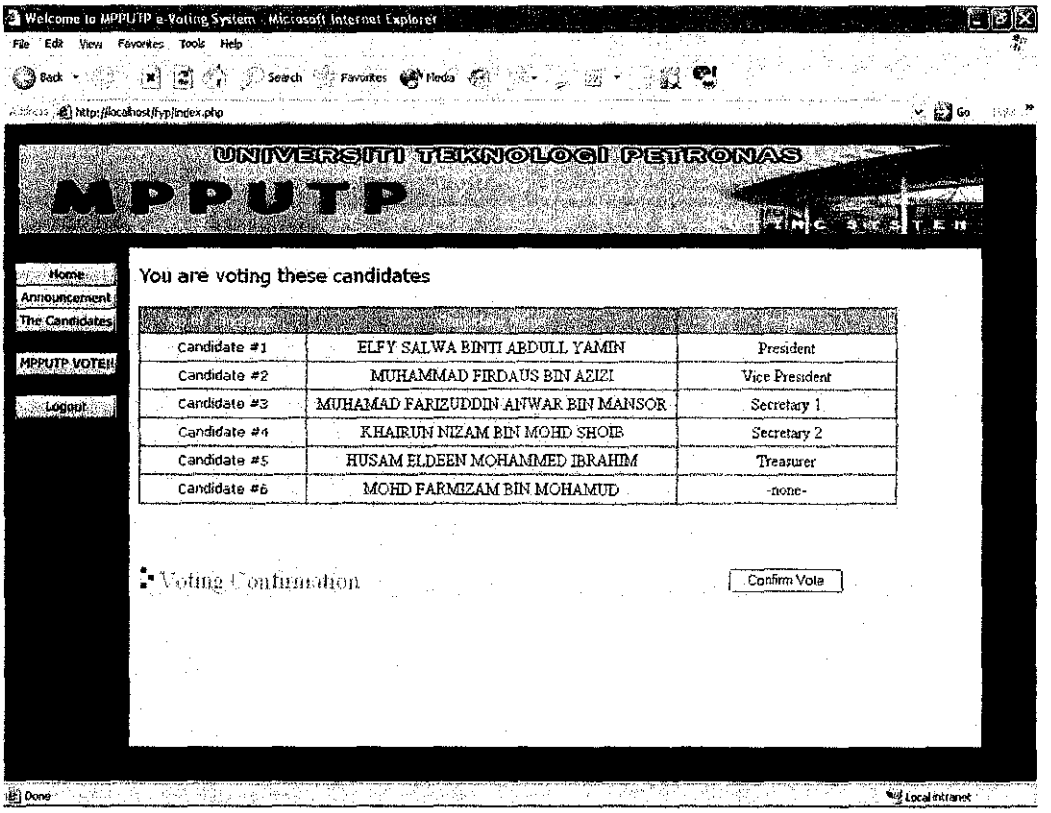


Figure 4.1.13 & 4.1.14: The candidate selection

From the previous page, after the student click "cast vote" button, the next page (post method) will show the selection from the voter and lastly, they need to confirm their votes and the votes are stored in the database.

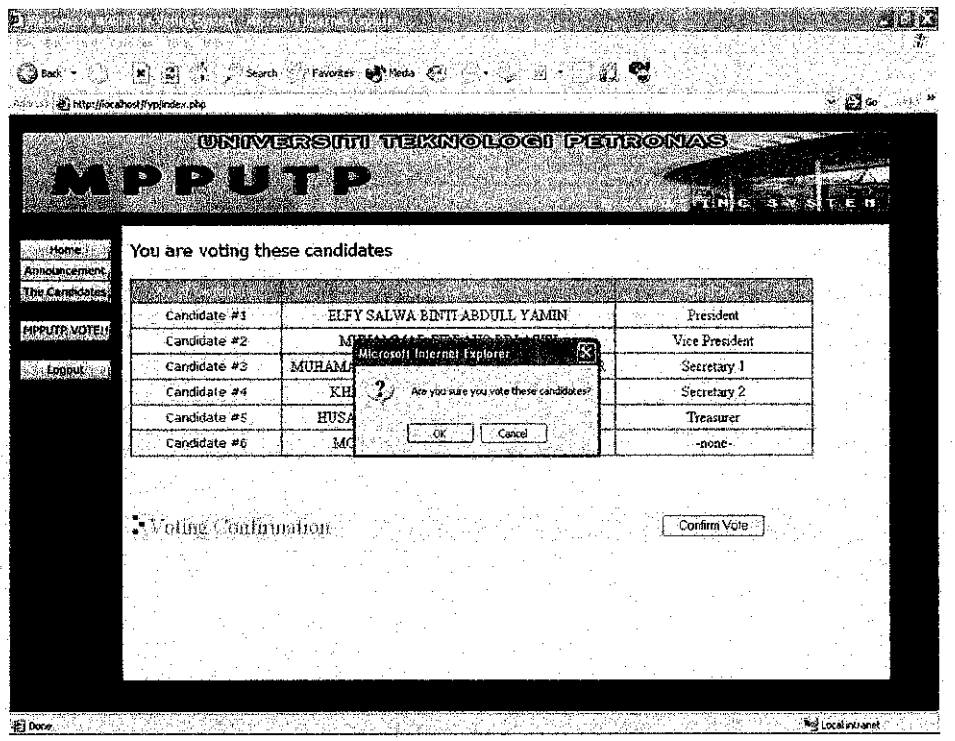


Figure 4.1.15: The confirmed vote and each student only can vote once.

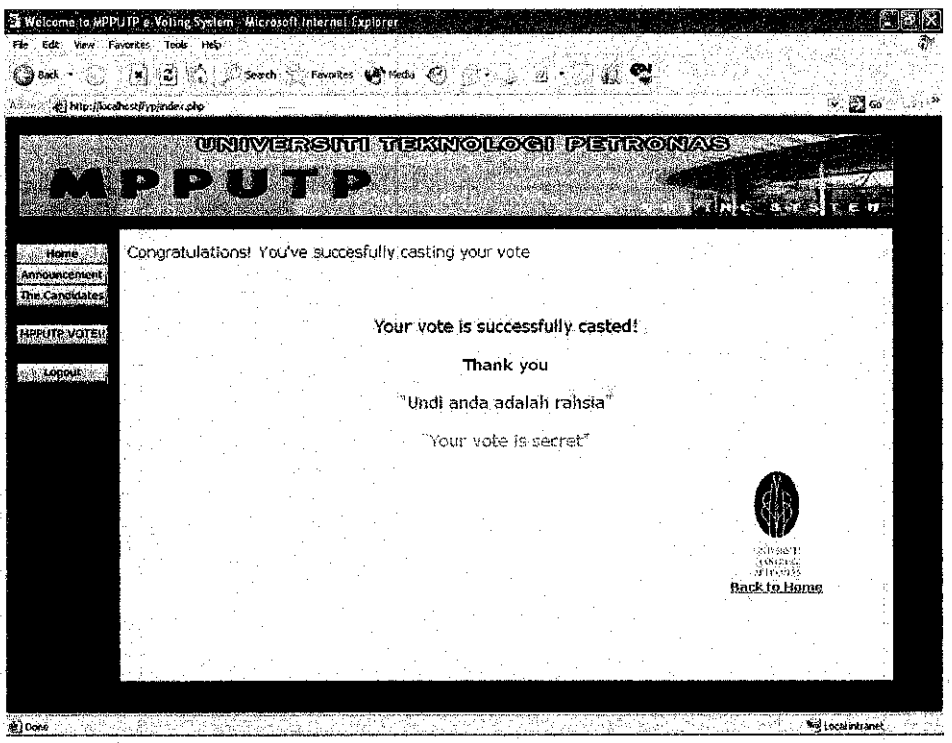


Figure 4.1.16: The vote has stored into database

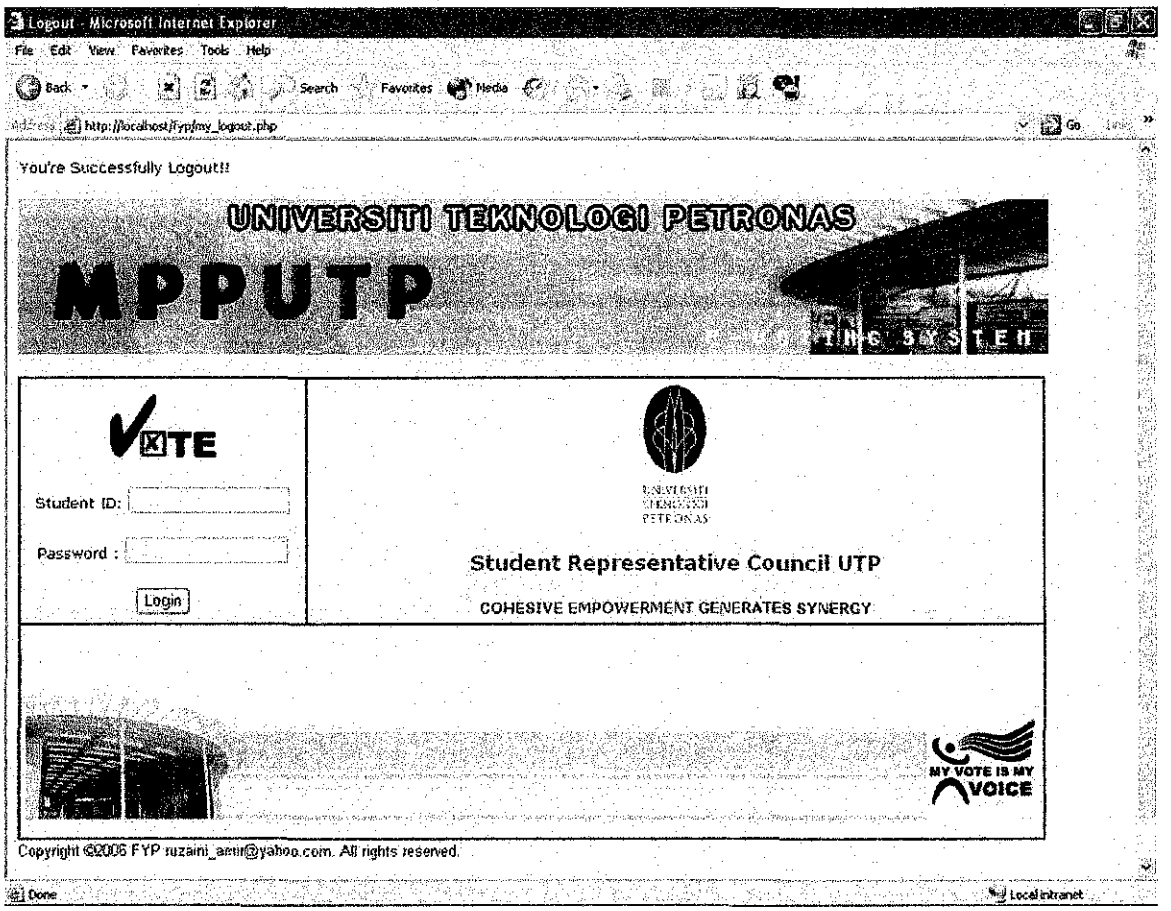


Figure 4.1.17: The logout page

Finally, after log out, the student/voter usually have done voting for the Election Day. If they want to log-in and vote again, the ballot page in previous does not appear as which the session of the page would be time out. This would prevent the student/voter to vote twice again in the same login id.

4.2 For election admin

In the process, since the students' view has now can vote through the website, I also have to concern about calculating the vote. In the admin views, there are several things need to be develop. The UTP-SPR and the administrator of the website need to update all the information and provide the results and display it fair and squarely.

Basically, there were 2 respective SPR from the UTP Management and 1 administrator need to monitor the website. As for the calculating process and displaying the results are in the next process different with student's or voters' view.

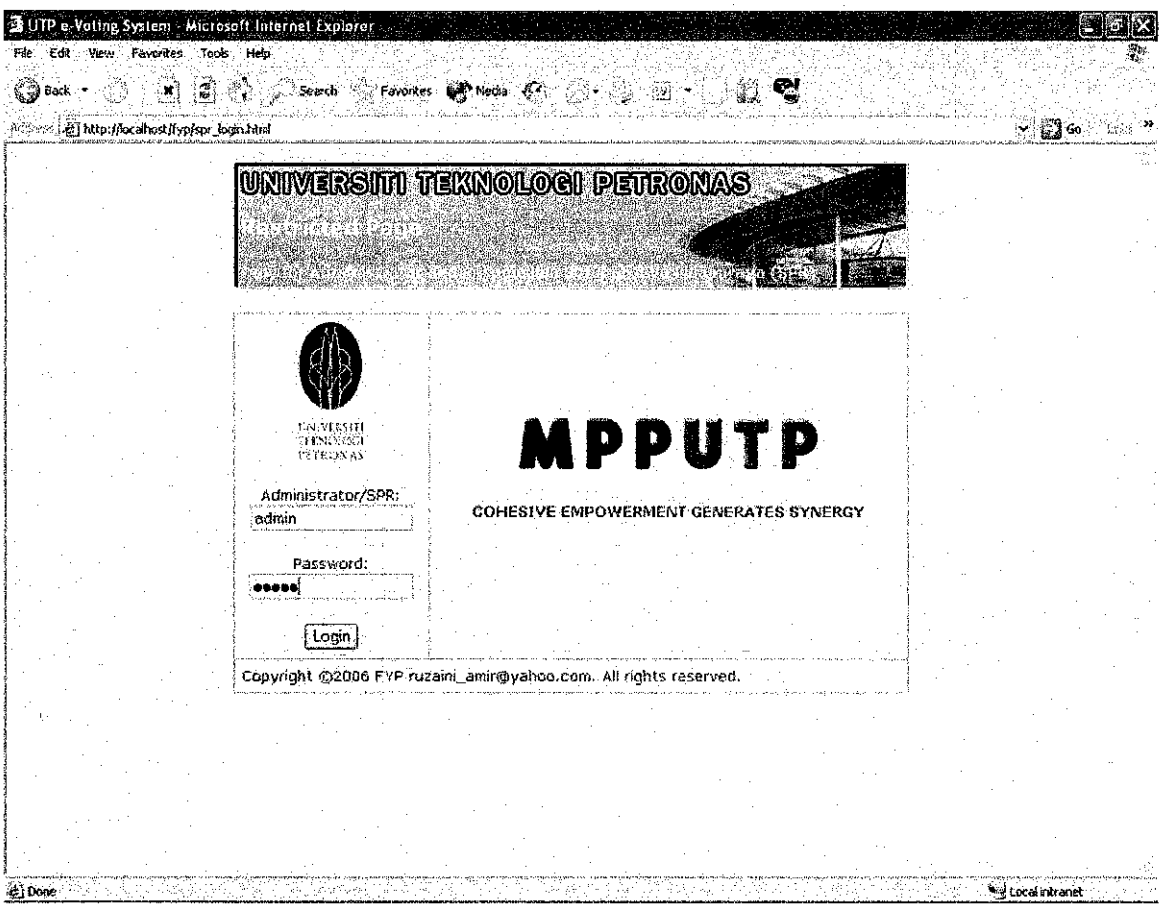


Figure 4.2.1: The login page for the admin (SPR) from UTP Management for them to login into the system.

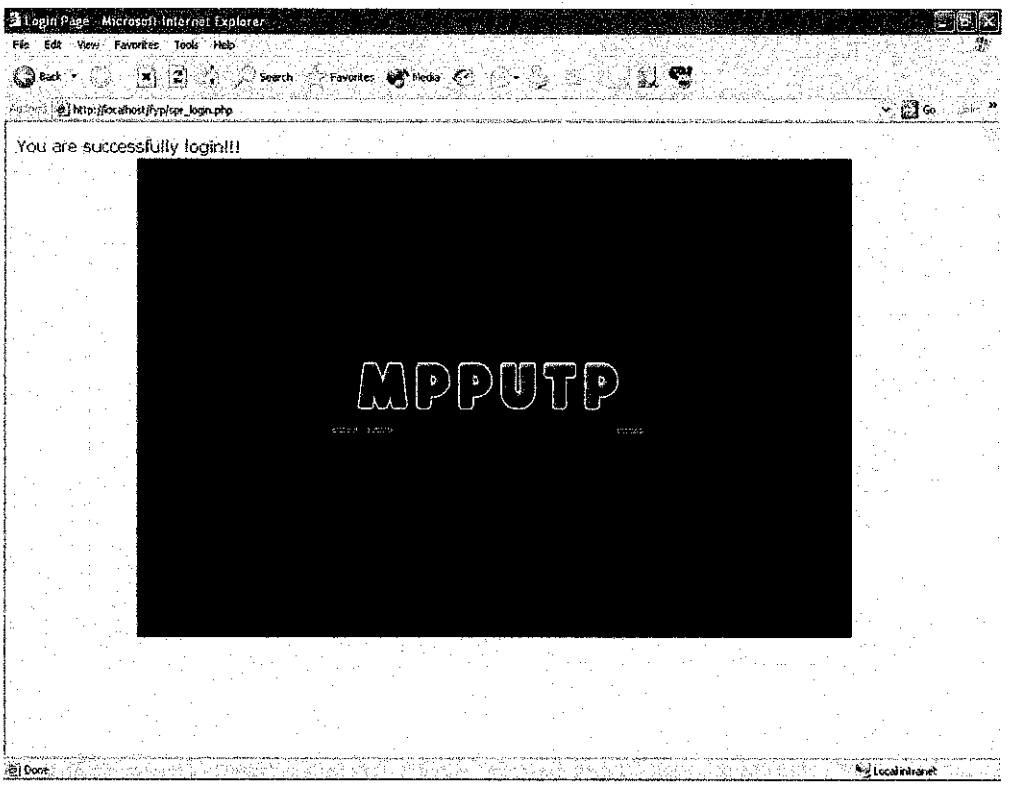


Figure 4.2.2: The loading page after successful login

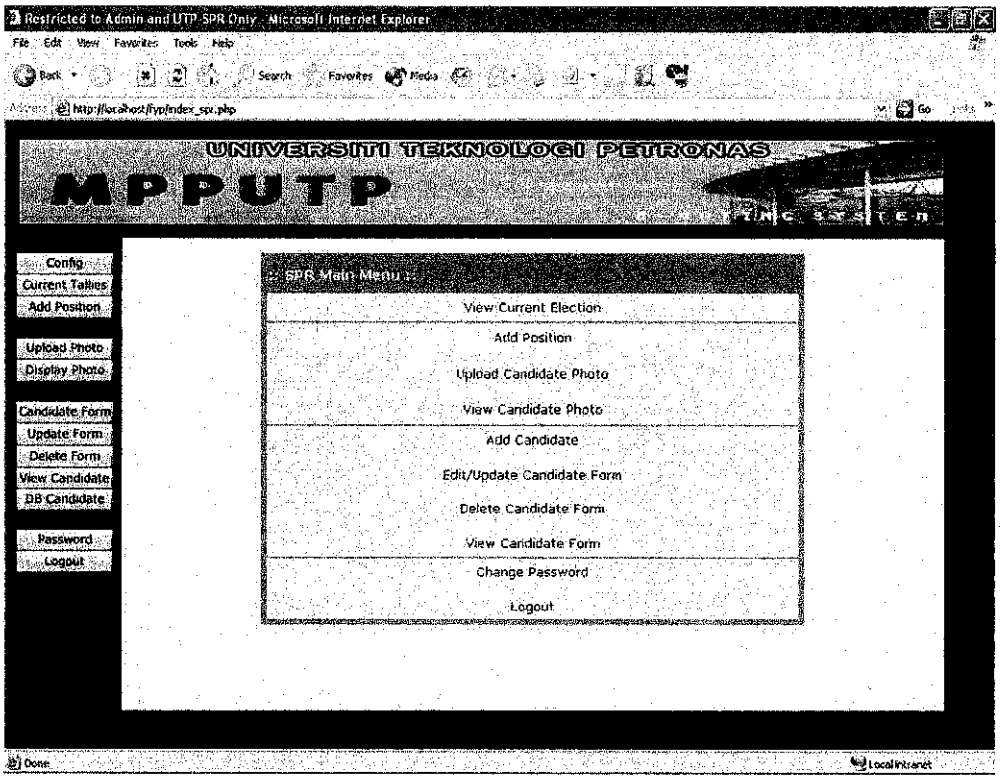
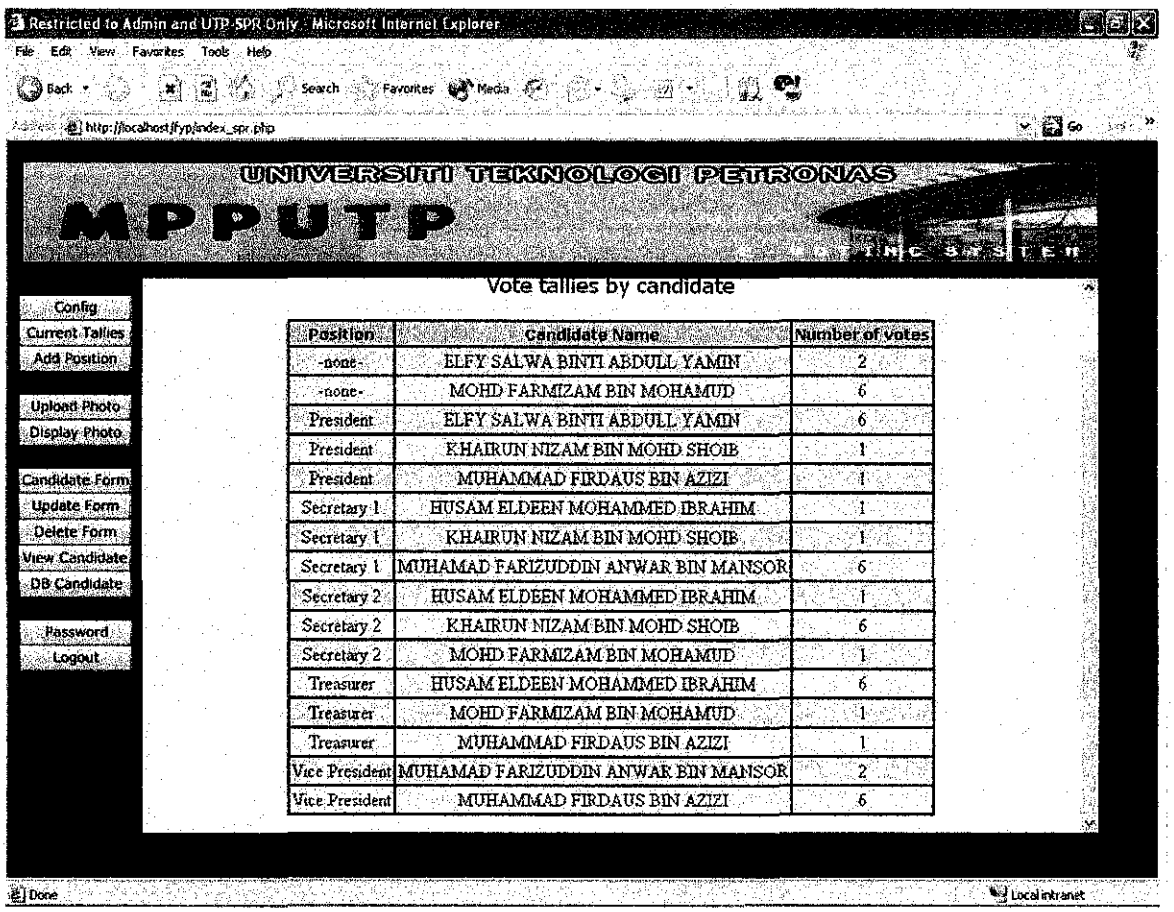


Figure 4.2.3: The main page for the administrator's use providing menus for each buttons.

For this page, usually for the SPR (Suruhanjaya Pilihanraya) manage to check the election process and finally to calculate the votes based on the results table of the votes tallies.



Position	Candidate Name	Number of votes
-none-	ELFY SALWA BINTI ABDULL YAMIN	2
-none-	MOHD FARMIZAM BIN MOHAMUD	6
President	ELFY SALWA BINTI ABDULL YAMIN	6
President	KHAIRUN NIZAM BIN MOHD SHOIB	1
President	MUHAMMAD FIRDAUS BIN AZIZI	1
Secretary 1	HUSAM ELDEEN MOHAMMED IBRAHIM	1
Secretary 1	KHAIRUN NIZAM BIN MOHD SHOIB	1
Secretary 1	MUHAMAD FARIZUDDIN ANWAR BIN MANSOR	6
Secretary 2	HUSAM ELDEEN MOHAMMED IBRAHIM	1
Secretary 2	KHAIRUN NIZAM BIN MOHD SHOIB	6
Secretary 2	MOHD FARMIZAM BIN MOHAMUD	1
Treasurer	HUSAM ELDEEN MOHAMMED IBRAHIM	6
Treasurer	MOHD FARMIZAM BIN MOHAMUD	1
Treasurer	MUHAMMAD FIRDAUS BIN AZIZI	1
Vice President	MUHAMAD FARIZUDDIN ANWAR BIN MANSOR	2
Vice President	MUHAMMAD FIRDAUS BIN AZIZI	6

Figure 4.2.4: The result page is finally sorts the candidate's name and their positions with counted votes.

From the results, there are 48 votes been casted which means 8 voters have vote 6 candidates with 5 current chairs (positions) in this election. The results are sorted with number of positions and the number of candidates. The table should be in 6 positions X 6 candidates. This results table is important for admin to be informed whose candidate is leading and whose not. The number of votes will increase depending on the number of students of UTP who vote in the election.

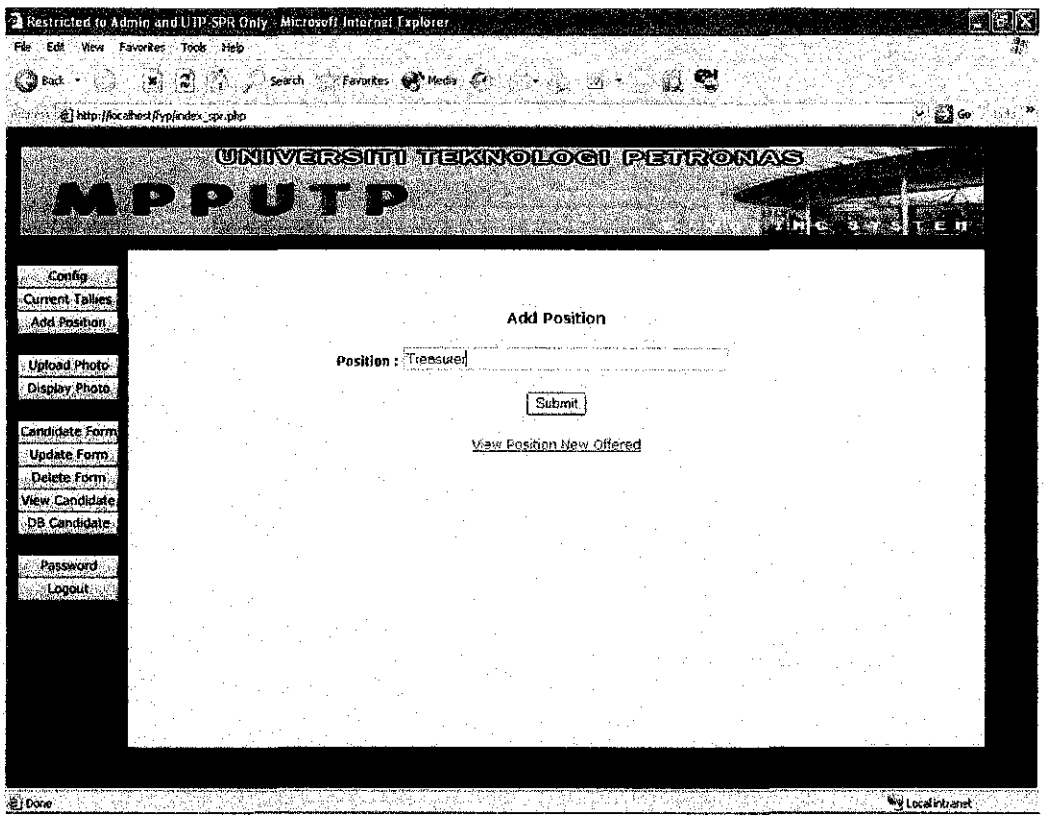


Figure 4.2.5: Another function is to add the position to be offered in the election.

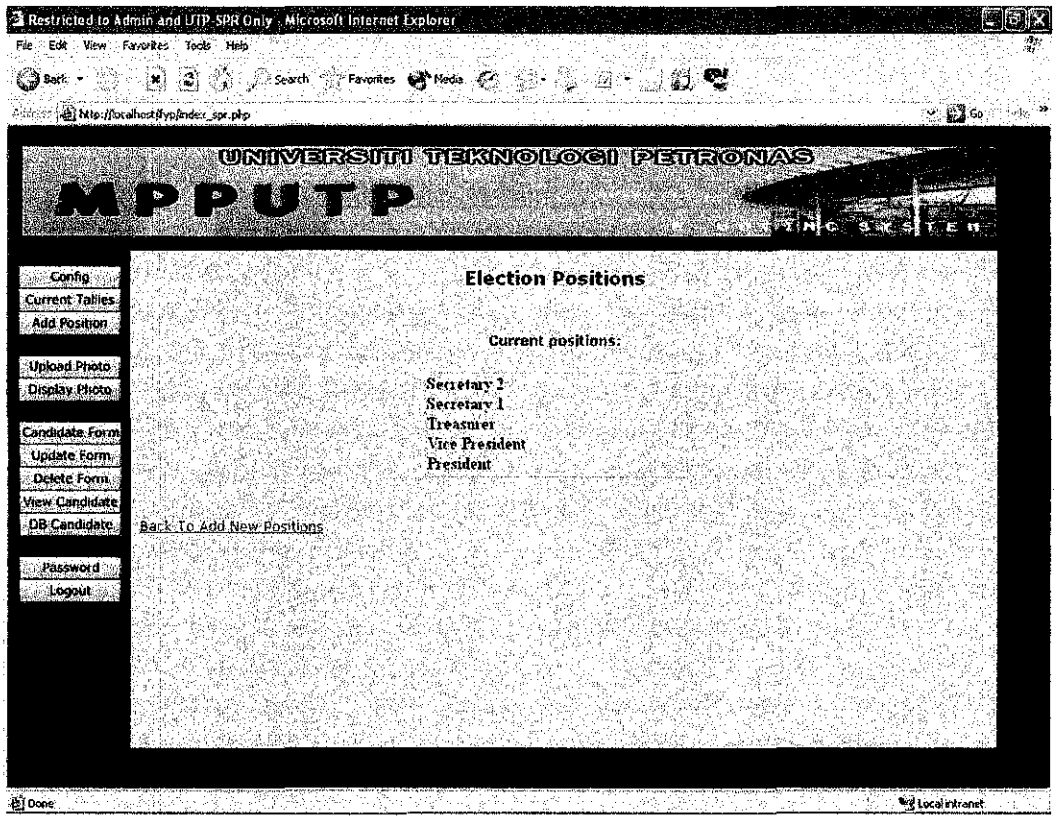


Figure 4.2.6: View added position in the database

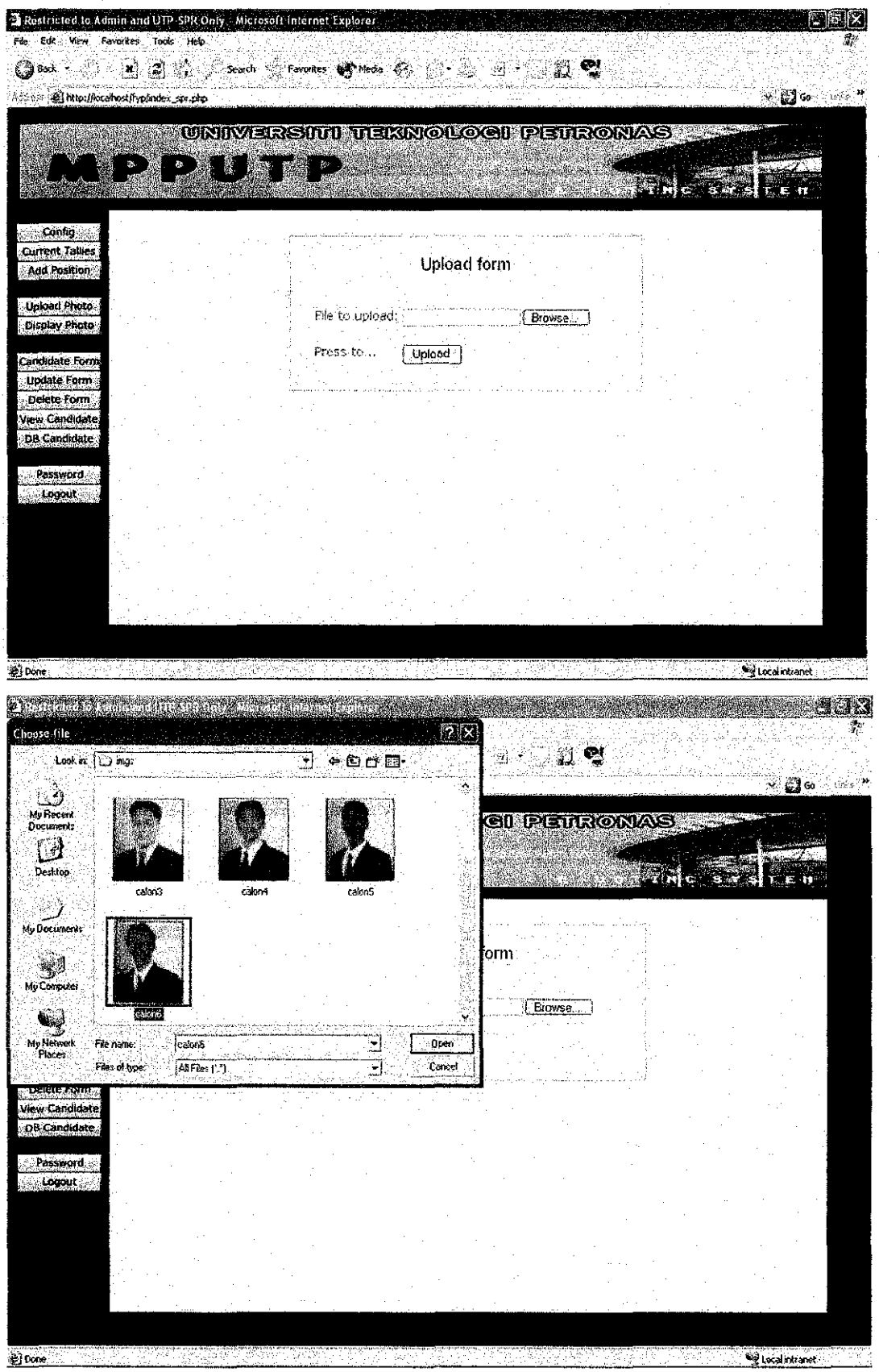


Figure 4.2.7 & 4.2.8: Uploading the candidate's picture into the system

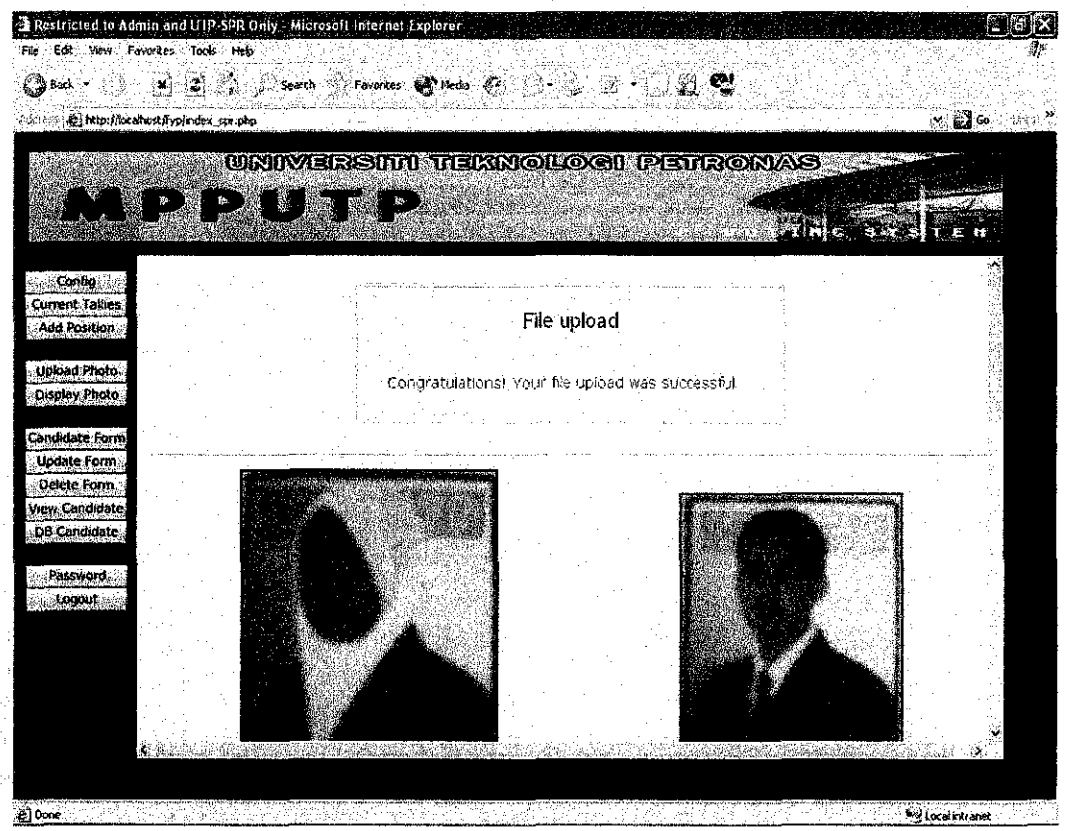


Figure 4.2.9: Once after the upload picture is successful

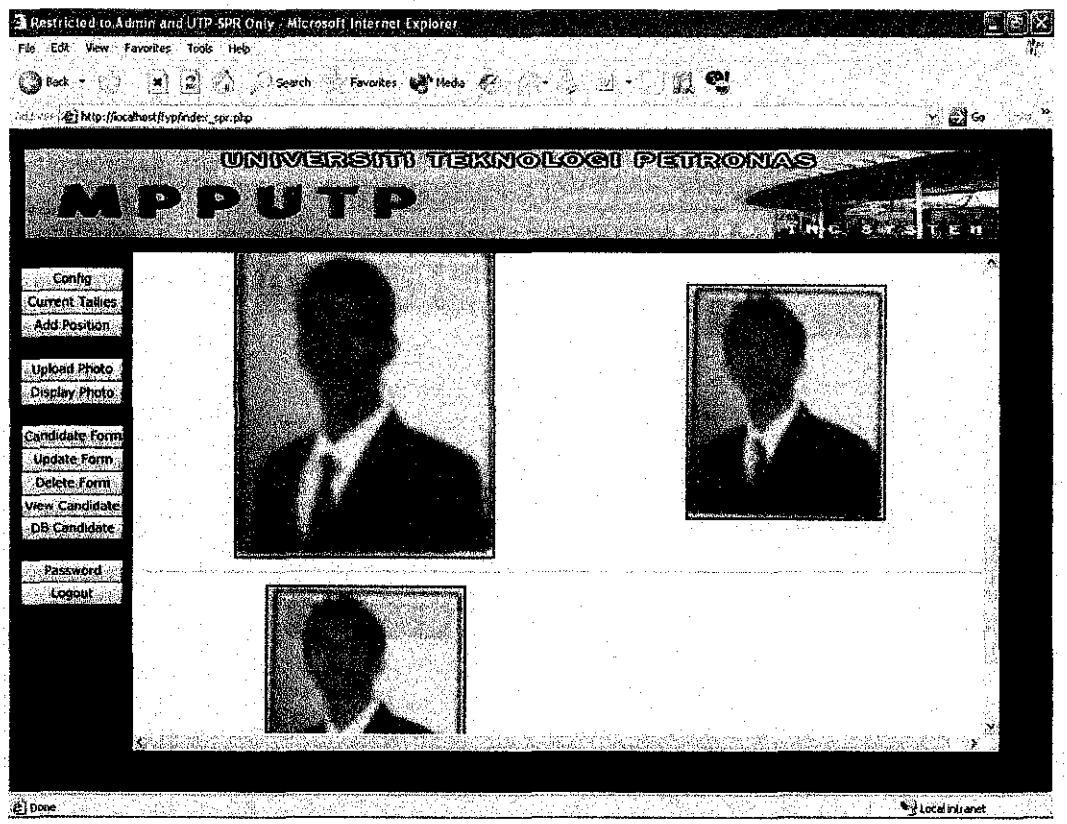


Figure 4.2.10: Displaying the pictures from uploaded folder

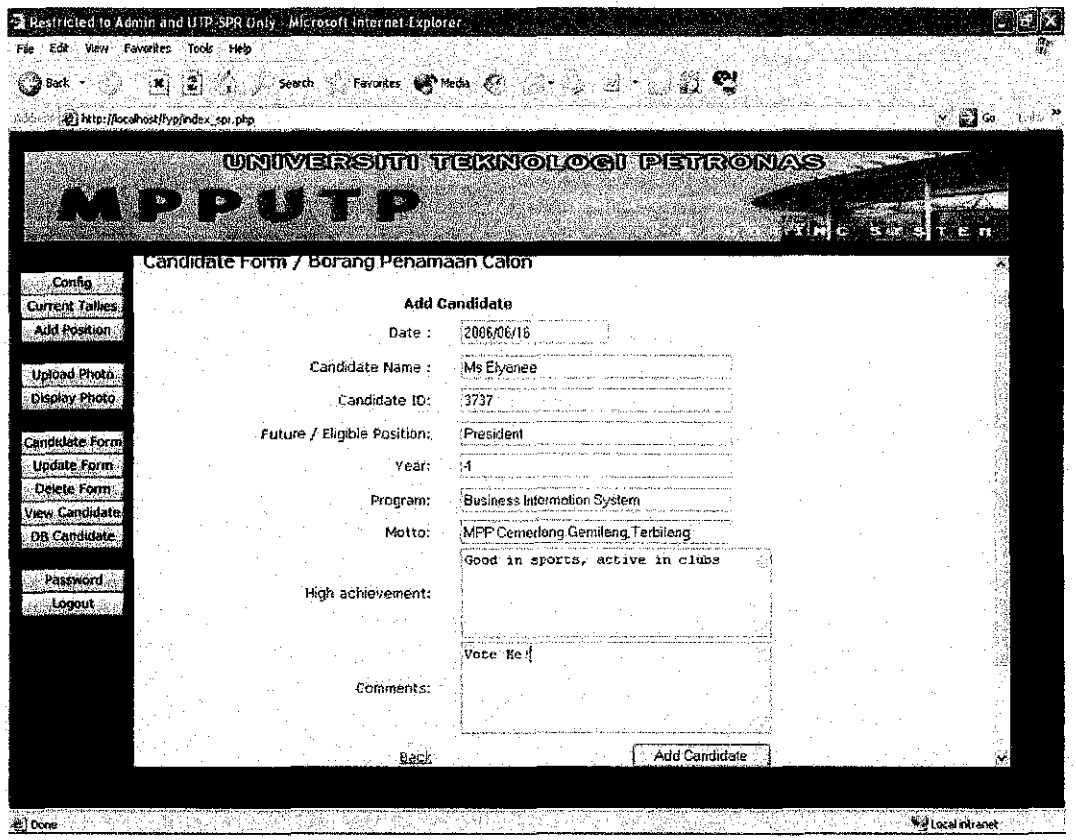


Figure 4.2.11: The candidate form which the admin need to key-in the data to provide information about the candidates.

In this e-voting system, from figure 4.2.7 until figure 4.2.10, there is an upload image function where the admin need to upload the candidate's photo into the website, so that the students (voters) can easily know their election candidate and know who they want to vote. As for figure 4.2.11 & 4.2.12, all candidate's details like candidate's name, candidate's id number, candidate's year of studies, candidate's program, their motto (which also known as self-believer in order to attract votes from student; usually to show different from others) , their high achievements in life, and some comments from the candidates for the students.

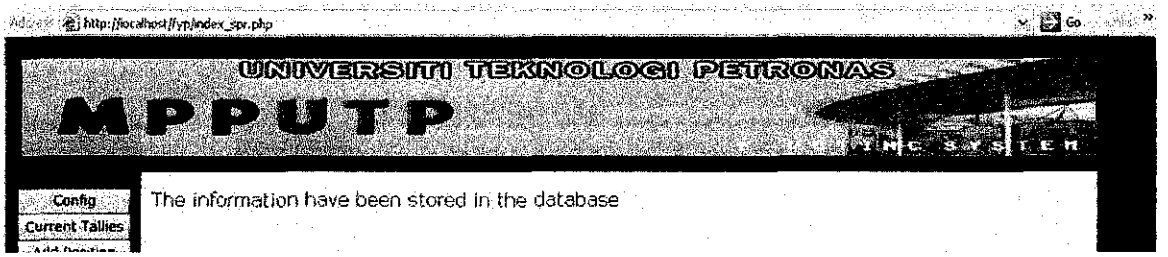


Figure 4.2.12: The candidate form successfully saved

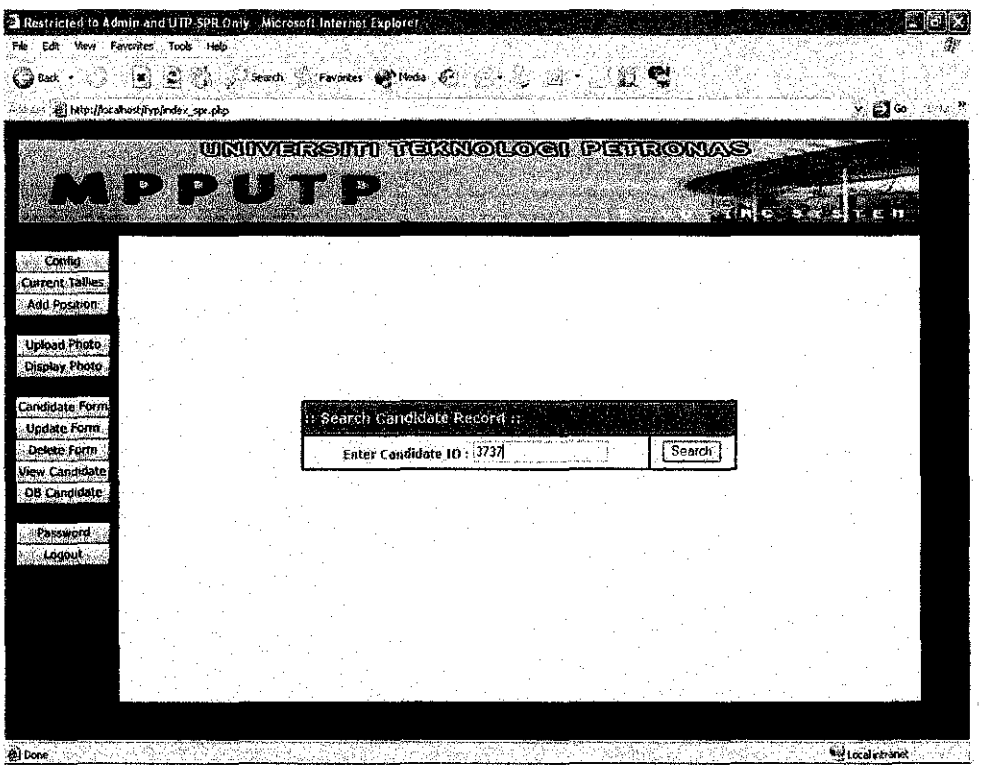


Figure 4.2.13: In the update form, admin should put the candidate's id to search the form.

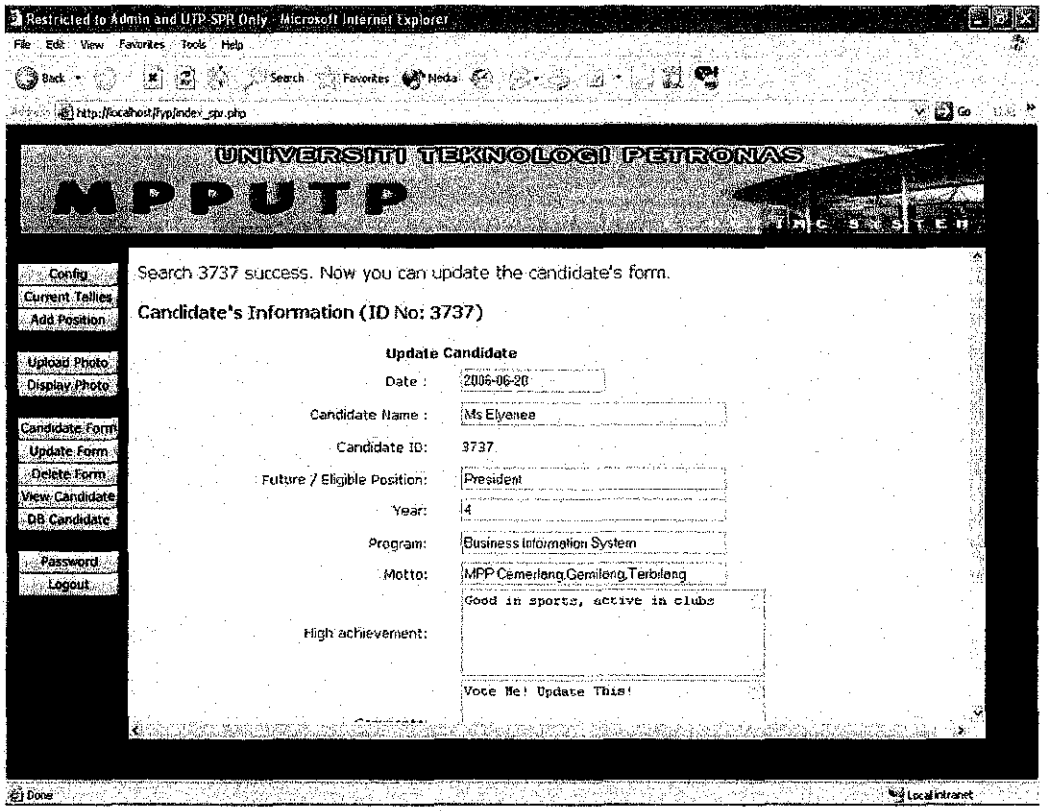


Figure 4.2.14: From the search, the candidate's data can be retrieve from database.

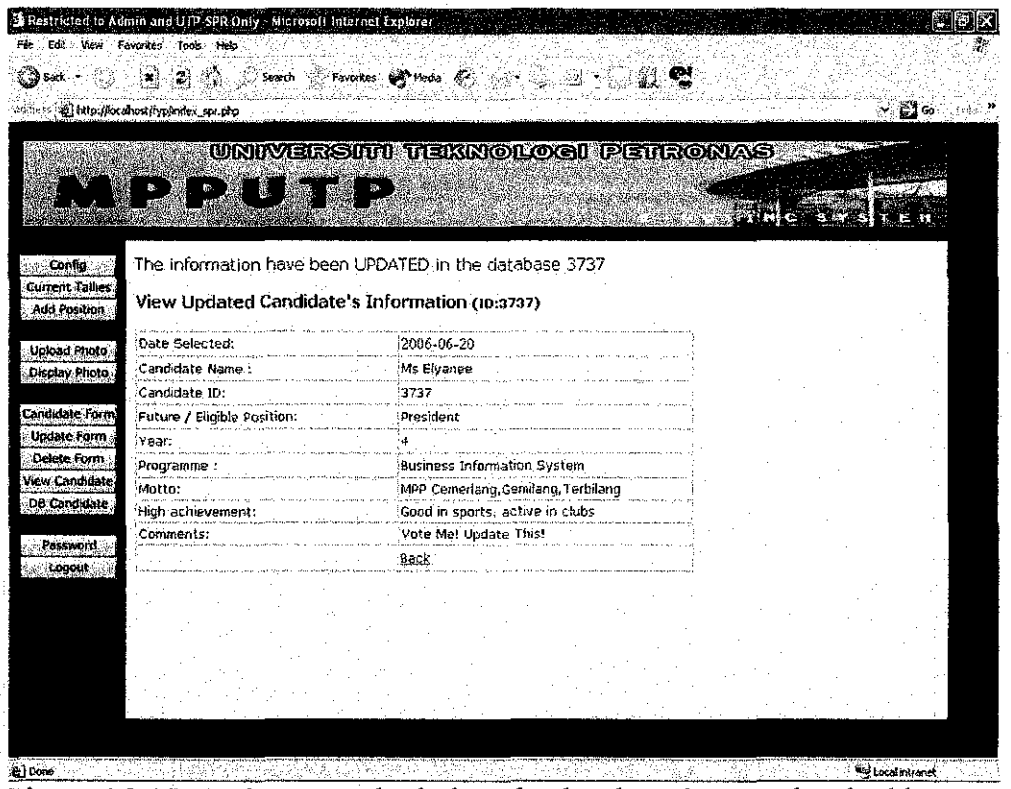


Figure 4.2.15: At the next submission, the data have been update in this page.

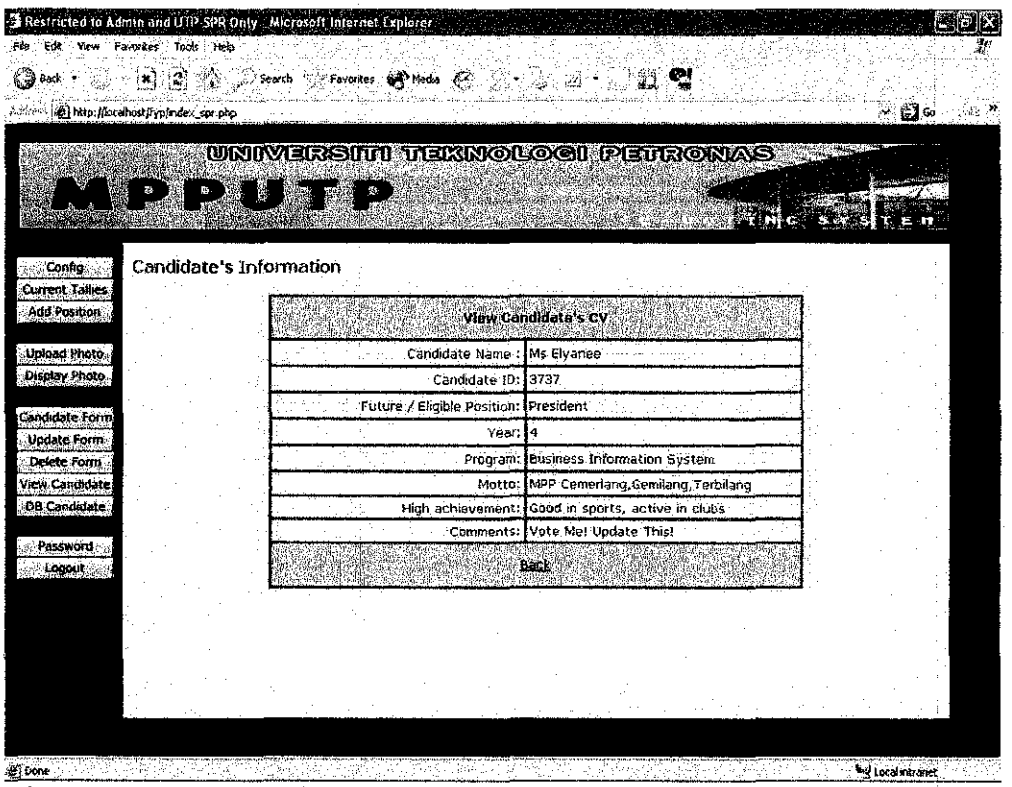


Figure 4.2.16: To check whether data been update or not, the admin can view candidate (button) and the data is retrieved from database.

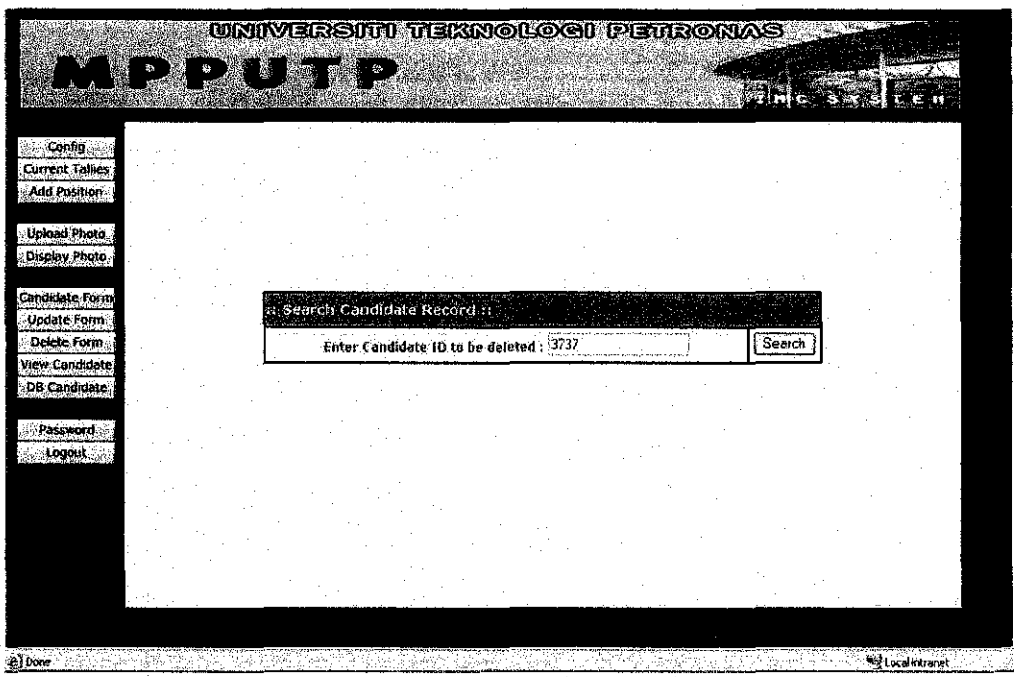


Figure 4.2.17: To delete the candidate, admin need to key-in the candidate's id to be deleted.

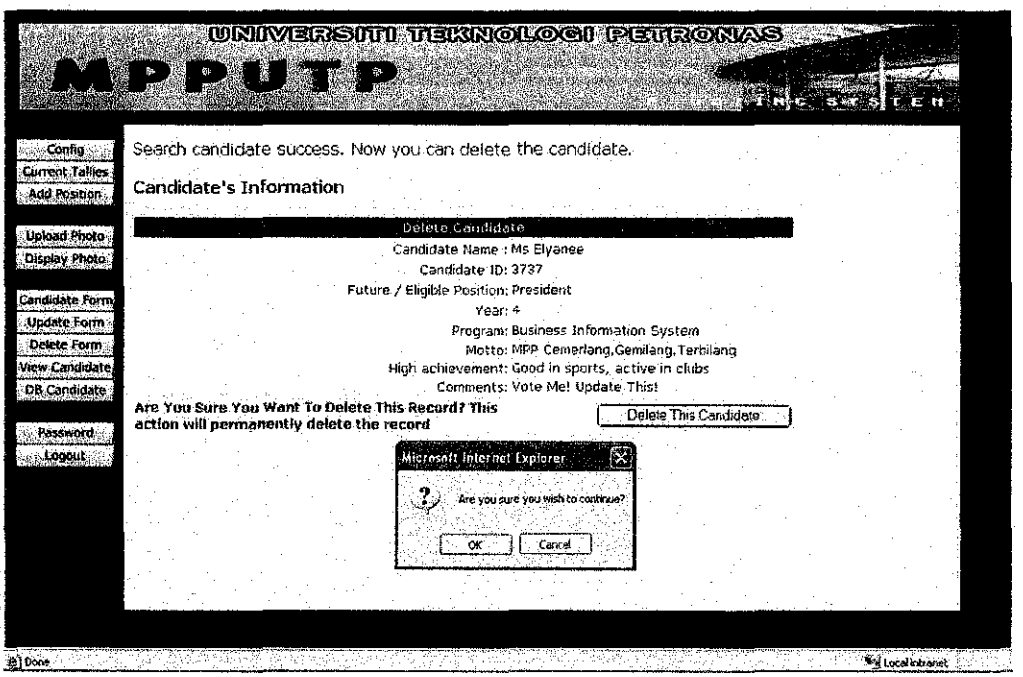


Figure 4.2.18: To confirm the delete action.

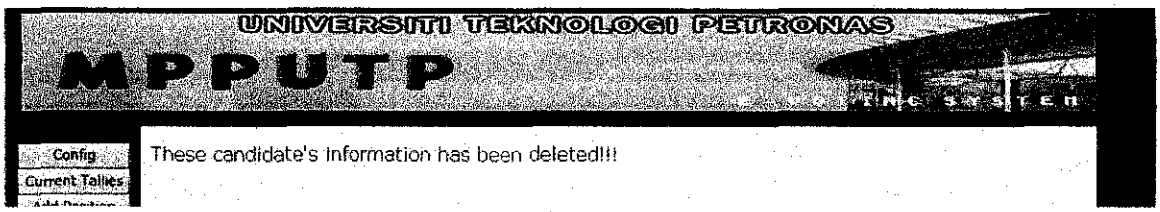


Figure 4.2.19: The successfully delete candidate action.

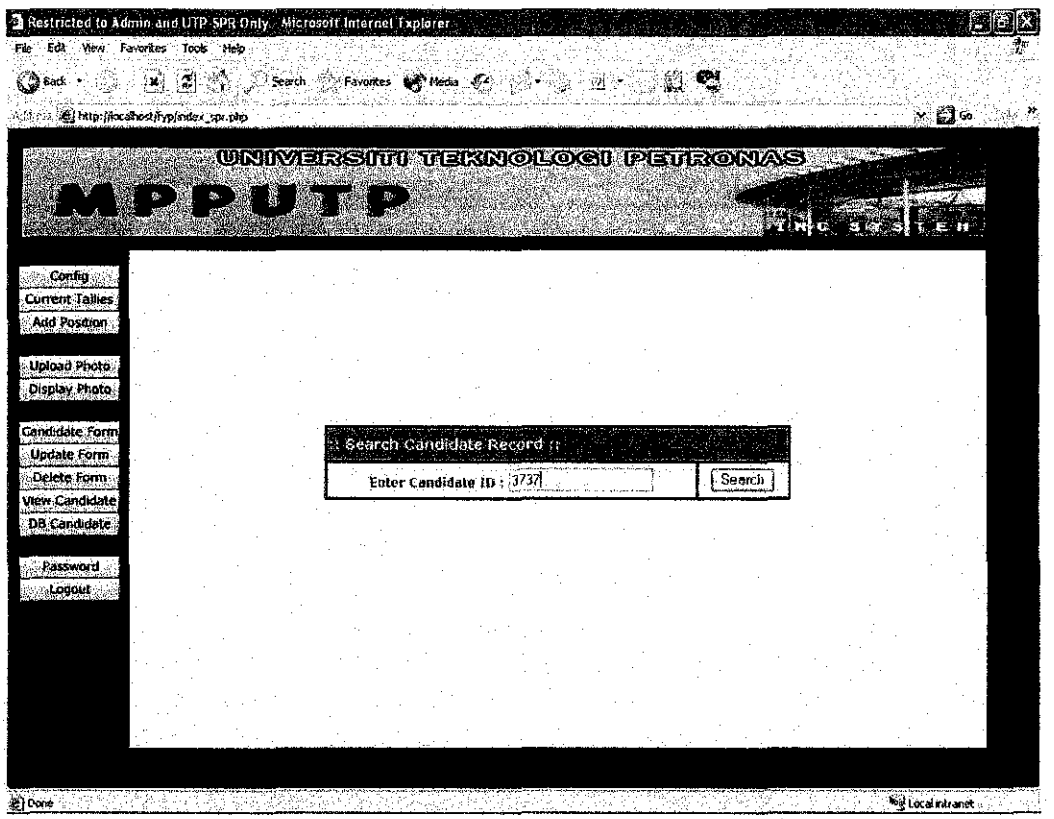


Figure 4.2.20: The search action for the candidate.

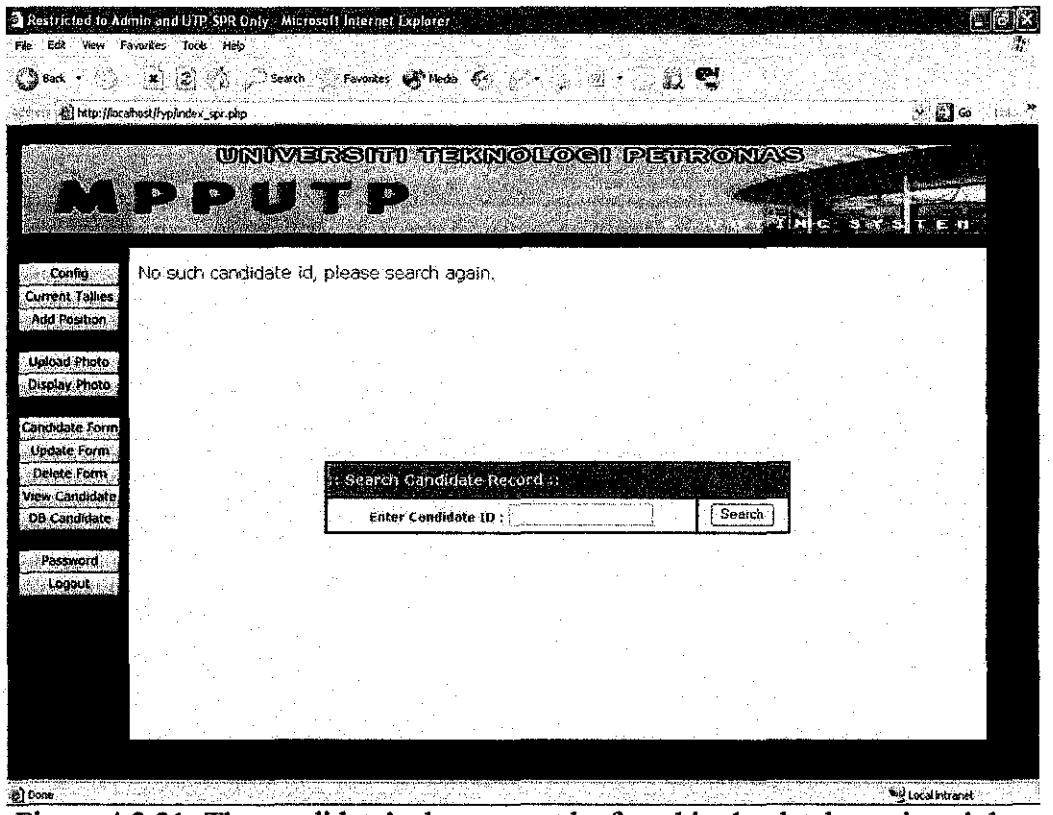


Figure 4.2.21: The candidate's data cannot be found in the database since it has been deleted before.

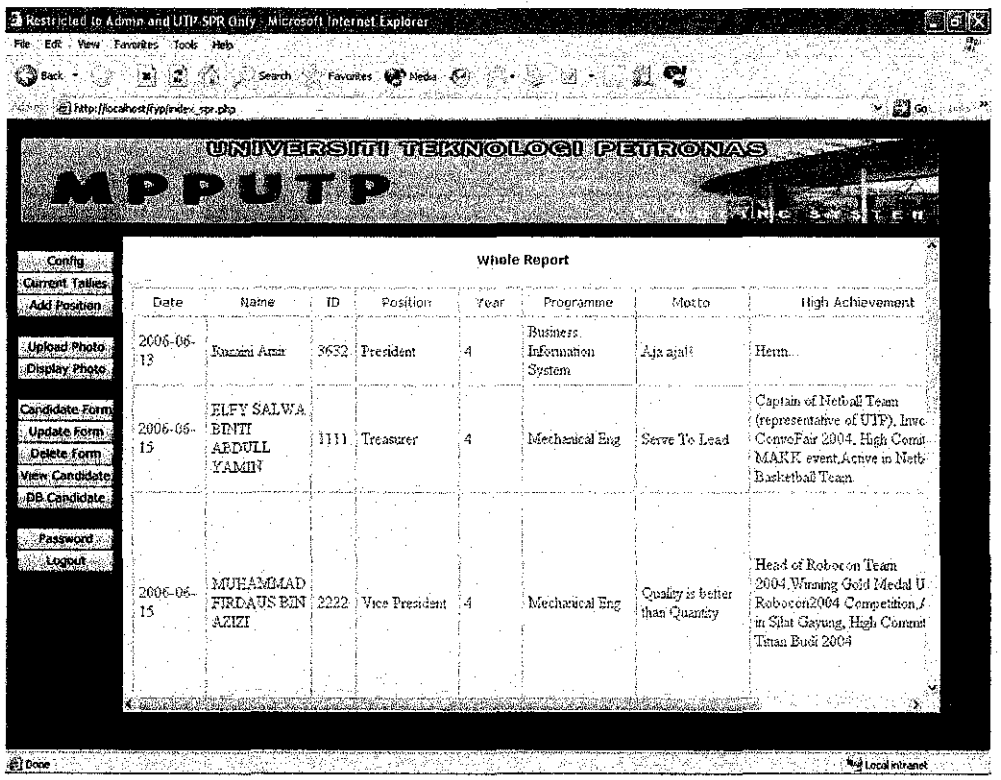


Figure 4.2.22: The candidate's whole data from database

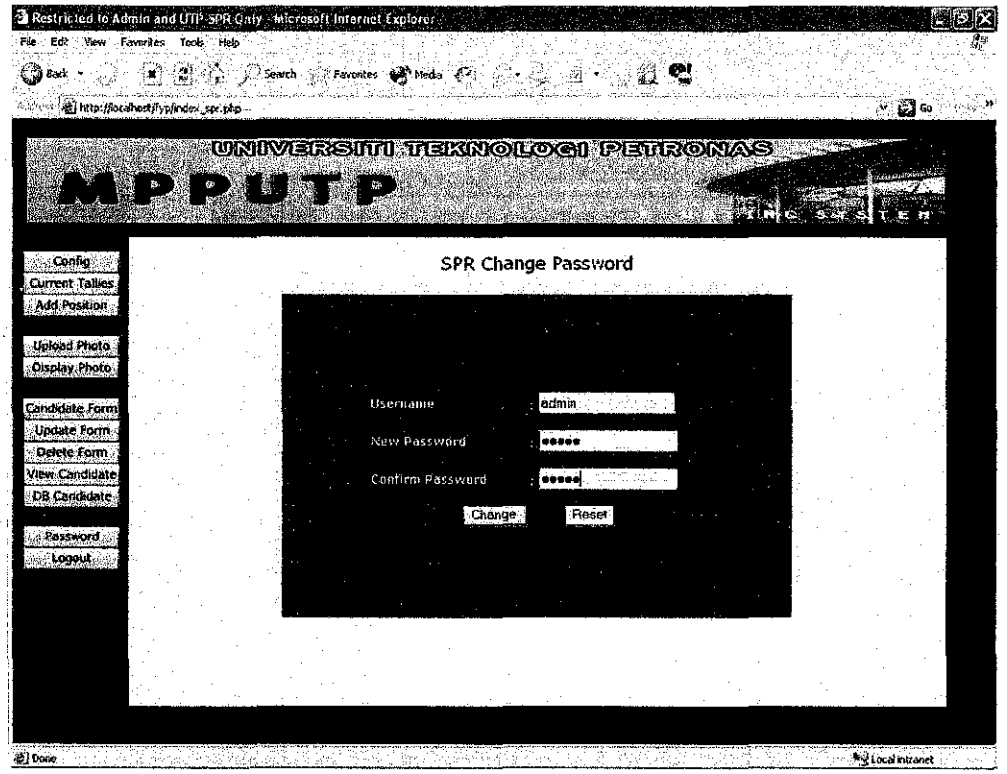


Figure 4.2.23: The admin's change password form.

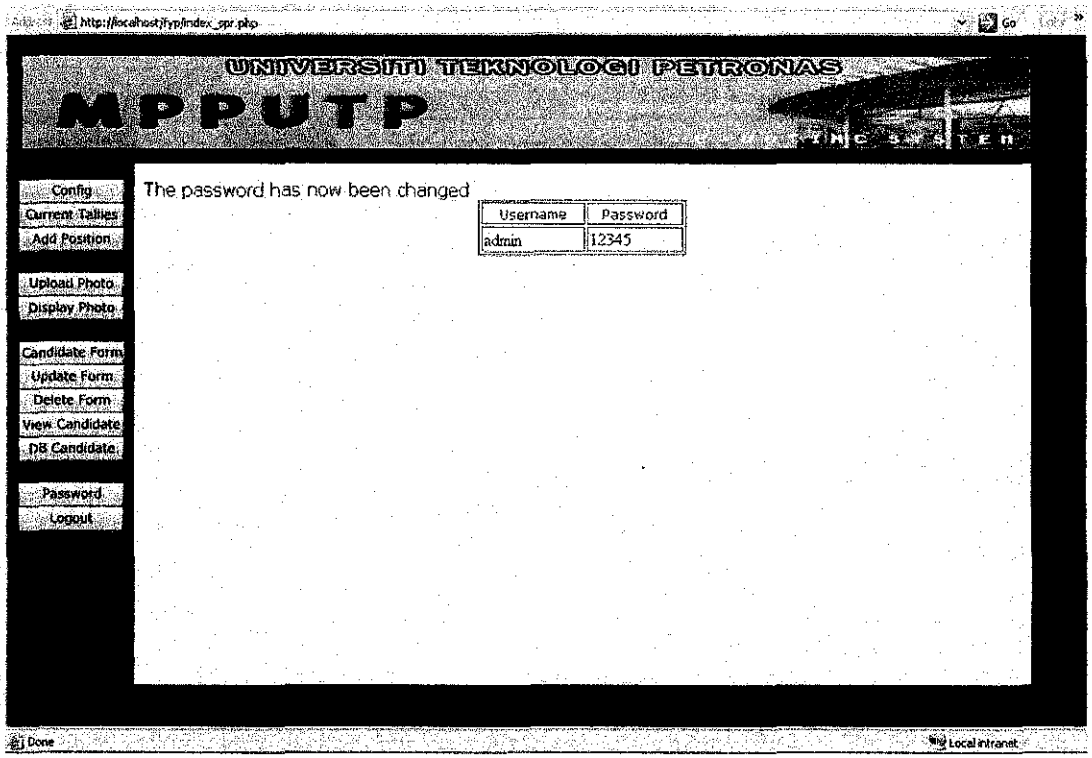


Figure 4.2.24: The successfully change password page

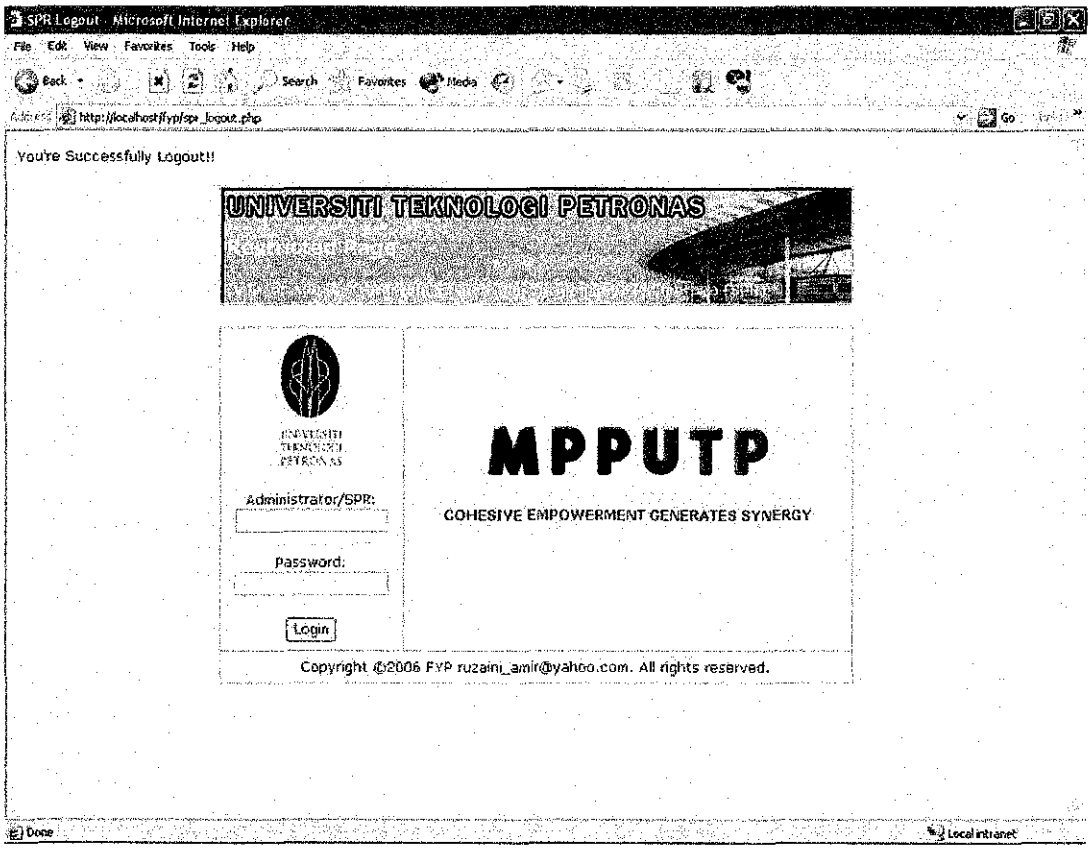


Figure 4.2.25: The logout page

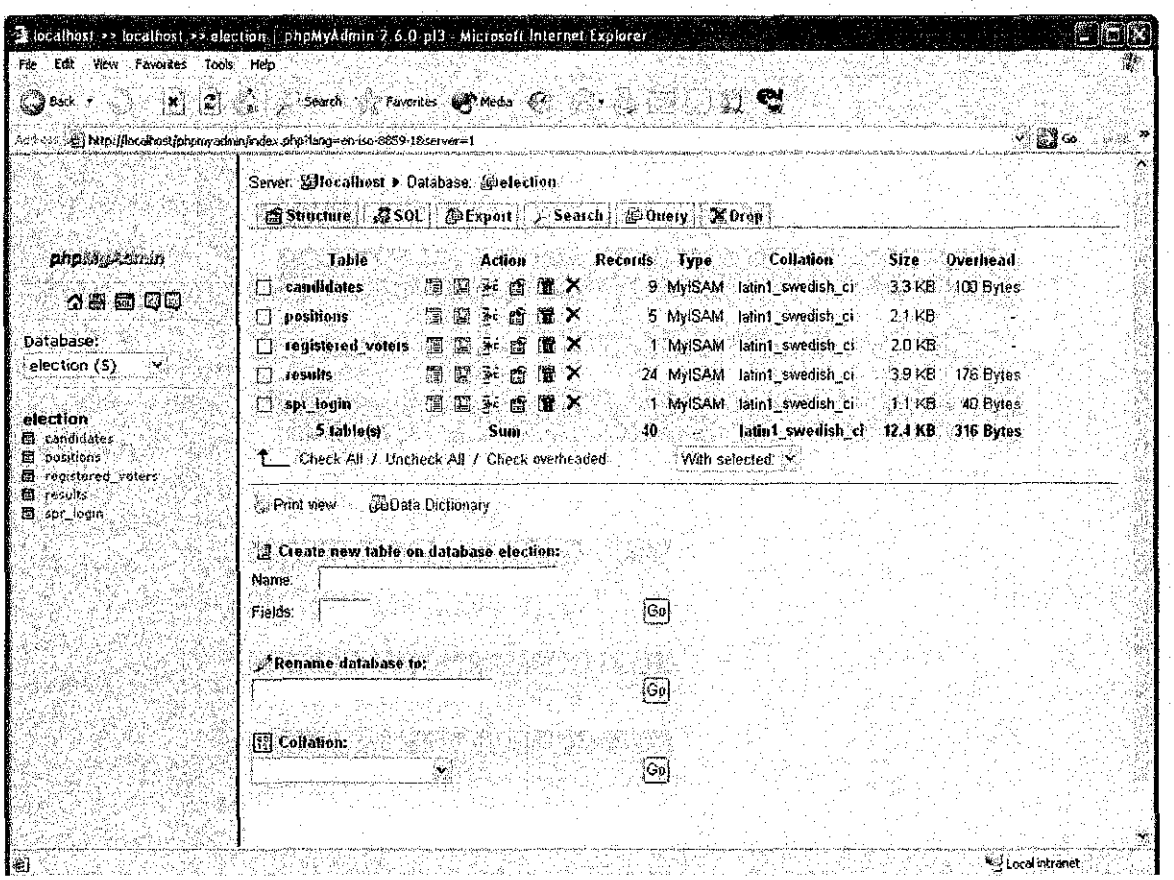


Figure 4.2.26: The tables and fields in the database

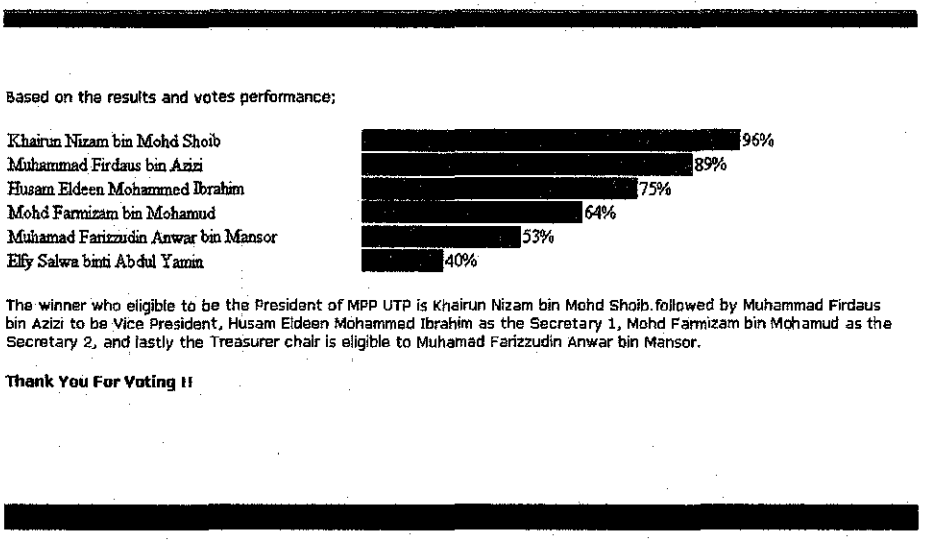


Figure 4.2.27: The results for the whole statistic which being posted by the admin at the end of the election day to be announce for the students.

4.3 Findings

For this moment, the system have achieve all the objectives of the project, but the system have lack to be improve which is for the future recommendation and the future enhancement. The system has completely finished with the working functions.

The author finds that there are some difficulties in managing the database which involved in tables of the voter, the candidate, the candidate id, the voter id and the results (which is the counting vote). As for the results part, the graph should be plotted in the website based on the voting performance in the election events. Based from the results, or current results, the author can't create the bar graph or the chart bar to show the results performance.

There is also need to concentrate for the authentication part which allowed only one vote comes from one student/voter. This statement means that once the student login into the system, he/she only get one chance to vote. After successfully cast the votes, if the student wants to vote again, the system won't allowed them to do so since the ballot page would not appear again in the website.

4.4 Discussion

We have the technology today to perform computerized elections. In fact, some companies, universities and unions already use e-voting to elect their officials. There are some benefits when using e-voting system, which are:-

a) Better fit between electoral practice and modern lifestyles

b) Cheaper, more effective electoral administration

c) Faster election results

d) Empowerment of citizens

e) Streamlining the voting process.

f) Preventing ballot errors and confusion.

g) Increasing national voter turnout.

h) Each machine (or website application) can easily be programmed to display ballots in different languages.

i) The system can be made fully accessible for persons with disabilities.

j) Election management will be simplified, the risks of the procedure will be minimized and logistics and personnel involved in the process will be reduced.

In addition to the anticipated management advantages linked to the introduction of electronic voting (instant analysis, lower costs etc.) there are arguments relating to greater simplicity and comfort for voters. A renewed enthusiasm for citizenship is expected due to the introduction of information and communication technologies and the new forms of direct debate, expression and consultation that they make possible.

For all that, the introduction of electronic voting raises lots of questions. For some, polling security, confidentiality and sincerity are principles which seem to have been brought into question by electronic voting. Others stress the importance of economic factors caused by these new markets, the importance of which should not justify adoption without discussion of solutions adopted by other countries. The specific nature of national cultures must be kept in mind since this may translate into different relationships with voting and its principles.

For e-Government - Point of view

Voter interest in Internet voting is growing and will continue to grow. Government's job is to provide the convenience of an online voting system while making no compromise of the democratic election system. Current systems have the advantage of being based on commonly understood systems like the US Mail, poll sites, and the telephone. The internet, while people are learning how to use it, is largely unknown.

People do not understand all of the information that is moving in and out of their computers while they are online. Nor do they understand the underlying infrastructure or technology of the web. Recently it was revealed that some software products and some computer chips were surreptitiously marking documents and files with serial numbers. This process was intended for internal use by the chip and software companies, but the function was accidentally left active in the real world. In another case, "anonymous" e-mail transmissions to a media website were identified through the display if their unique web identifier.

When a person is online, information about the person is being stored on their computer and other identifying information is being read largely without the user's knowledge. Hackers have found ways to use "Trojan Horse" type software to read and transmit an online user's files without their knowledge. These issues are all real and must be addressed. This sort of thing presents real barriers to acceptance of the technology.

CHAPTER 5:

CONCLUSION AND RECOMMENDATION

5.1 Relevancy to the Objectives

In this voting system, I would like to recommend that besides the student voting, the lecturers also can experience the election event held by UTP. This election event automatically will create good relationship between the candidates and the lecturers. The lecturers just need to vote who they think the candidate is eligible for the position since they know their students also. This will also show that the student will excited to get involved into MPPUTP and encourage them to work hard to win in the election.

Since the voting event is a seasonal event, this website can also be open for student to do their polls activity like the Quizilla.com. Any interesting polls which related to the studies, academics, the current issues, entertainment or any campus activities can be implemented. This website also can be link to the student portal or Grapevine Forum, so that student would not be left behind any latest things happening around them. More over, there would be any clubs or organizations to use this website as the medium for their operations, for them to communicate with the students.

Last but not least, since it finally successfully operates as the voting system in University, I would like to propose the voting system as for our country elections, since it cost low money, save time and easy for people to operate. The Malaysian Pilihanraya should implement the e-voting system and get involve in e-government since it is political event.

5.2 Suggested Future Work for Expansion and Continuation

It is suggested that this voting system would be implemented for our campus election which is in the next year, the system is ready to be used for the MPPUTP election. The system should be updated and be upgrade in term of the time. It is important for the committee of MPPUTP to have their organization chart for previous and the next committee, which is sorts year by year.

The database management should be updated year by year which is the seasoning voting event should be continue rearranging by other candidates each time of the election event. The website will be more like "fever" to vote the students and keep on updating with new stuff and campus activities so not letting them to be left behind from current activities.

There would be an addition for polls activities related to the campus life. For example, polls about the prom king and queen for every batch, the best student, polls and quizzes about career, personality, zodiac, and so on. So the website will always be visited by the students, sounds like the forum but it is all about well-rounded campus activities to prevent the website become boring, isolated and not only for certain event (seasoning election event).

Conclusion

An electronic voting system for these kinds of elections gives these organizations an opportunity to increase the efficiency, reliability and transparency of the elections. The logistics and personnel involved in the election will be reduced and it will mean a reduction in the costs of holding the election for the company, thereby increasing the efficiency of the process.

Security is a very important aspect in developing e-voting website. E-voting will always be limited in its integrity by factors beyond the e-voting algorithms. The encryption can be an important part of an overall election system. The voter authentication, vote integrity, voter anonymity, auditability, accountability, recountability, and so on, are all involved, and many of these requirements operate at cross-purposes with one another. The massive vulnerabilities of standard personal-computer operating systems represent very serious concerns, in terms of hidden viruses, worms, Trojan horses, and further surprises unknowingly downloaded by the user with other packages, and waiting to pounce on Election Day. One proposed solution would be to boot a fresh system from external media in order to vote, but even such an approach does not adequately address these potential vulnerabilities.

Deficient network protocols and the opportunities for insider fraud and accidental misuse abound. Neither the client nor the server systems will be adequately secure under foreseeable technology including Internet Service Providers and Web servers. As always in any election environment, there are many opportunities for fraud, mischief, and manipulation, despite ostensible checks and balances. These problems are exacerbated with e- voting, where the lack of any physical ballots makes such manipulations impossible to detect and correct because there is no meaningful recount capability. Extraordinary vigilance is necessary, but never sufficient.

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APPENDIX

ID	Task Name	Start	Finish	Duration
1	Meeting with supervisor	1/23/2006	1/27/2006	1w
2	Review the flow of the system	1/30/2006	2/3/2006	1w
3	Discuss on the content of the Progress Report	2/6/2006	2/10/2006	1w
4	Design the user interface	2/13/2006	2/17/2006	1w
5	Submit the Progress Report	2/20/2006	2/24/2006	1w
6	Do some enhancement with the Progress Report	2/27/2006	3/3/2006	1w
7	Develop the system and the basic functions	3/6/2006	3/10/2006	1w
8	Meeting with supervisor and discuss on improving the user interface	3/13/2006	3/17/2006	1w
9	Study some formulas for database elements and counting votes	3/20/2006	3/24/2006	1w
10	Prepare the presentation slides for Pre-Edx	3/27/2006	3/31/2006	1w
11	Done with counting votes functions in voter part and ready for Pre-Edx presentation	4/3/2006	4/7/2006	1w
12	Proceed with Weekly Report	4/10/2006	5/5/2006	4w
13	Completing the system	5/8/2006	6/2/2006	4w
14	Submit Final Report	6/5/2006	6/16/2006	2w
15	Oral Presentation with internal and external examiners	6/19/2006	6/23/2006	1w

Appendix : The Gantt Chart of Final Year Project Semester 2