

ISPSC VOTING SYSTEM FOR SSC

**JEBECCA MEICE A. DELA CRUZ
JESSA MAE J. ACOSTA
JONATHAN C. COMBIS
ANGELICA Q. CALINA**

**A CAPSTONE PROJECT PRESENTED TO THE FACULTY OF THE
ILOCOS SUR POLYTECHNIC STATE COLLEGE
INSTITUTE OF COMPUTING STUDIES
STA. MARIA, ILOCOS SUR**

**BACHELOR OF SCIENCE IN INFORMATION TECHNOLOGY
(GRAPHICS)**

JUNE 2018



TABLE OF CONTENTS

	PAGE
PRELIMINARIES	
TITLE PAGE	i
APPROVAL SHEETS	ii
EXECUTIVE SUMMARY	iii
TABLE OF CONTENTS	v
LIST OF TABLES	vii
LIST OF FIGURES	viii
LIST OF APPENDICES	ix
 CHAPTER	
I INTRODUCTION	
Project Context	1
Problem	2
Purpose and Description	3
Literature	4
Objectives	10
Scope and Limitation	11
II METHODOLOGY	
Developmental Model	14
Project Plan	16
Project Staff	18
Data Gathering Procedure	18
III RESULT AND DISCUSSION	
The Design and Development of the System	21



The Effectiveness of the System	29
The Functionality and Usability of the System	29
REFERENCES	32
ACKNOWLEDGEMENT	34
CURRICULUM VITAE	49



Chapter I

INTRODUCTION

Project Context

An election is a formal group decision-making process by which a population chooses an individual to hold public office. Elections have been the usual mechanism by which modern representative democracy has operated since the 17th century. Elections may fill offices in the legislature, sometimes in the executive and judiciary, and for regional and local government. This process is also used in many other private and business organizations, from clubs to voluntary associations and corporations.

The universal use of elections as a tool for selecting representatives in modern representative democracies is in contrast with the practice in the democratic archetype, ancient Athens, where the Elections were considered an oligarchic institution and most political offices were filled using sortation, also known as allotment, by which officeholders were chosen by lot.

Coinciding with the government elections, students learned about government and electoral process, so elections is not new to students anymore. The importance of electing or allocating a student in an organization is not only to give the students an opportunity to develop



leadership by organizing and carry out school activities and service projects but also hear the student's voice and solved their problems.

Problem

However, the old process of election is the traditional paper based voting system; it records votes, count votes, using one or more ballot cards or paper ballots. Voters usually used this traditional process of election to vote the deserving candidates. Many schools are using this process, especially here in ISPSC, Sta. Maria campus. The problem with the paper voting system in the school is time consuming. The researchers observed that it allows the students to fall in a long lane in able to vote and some of students of ISPSC have physical illnesses. The other problem is the manual counting of votes, because it takes a lot of time to know the final results. So, the researchers were triggered to develop the ISPSC Voting System for SSC. This is a web and computer based voting system. It is the solution that w' ill solve the problems during SSC election in the college.

The main advantage of ISPSC voting system for SSC is faster than the traditional paper based voting specially in counting of votes. Web voting were preferred because it reduces the manual work and with one press of the button the votes are recorded and conserves resources by reducing the amount of paper associated with an election. Paper ballots,



envelopes, flyers, and other paper collateral are either moved to electronic format or eliminated. This is particularly important if your association members are sensitive to the use of natural resources. Students who have physical illnesses will no longer impoverishes itself in order to vote and this project is a great way to get younger members involved in the decision-making process. (Khan, 2017)

Purpose and Description

This voting system is intended to help not only those who have physical illnesses or disabled person but also the students who are struggling to wait a queue time just to vote in a polling station in the school. The researchers usually observed that during election, people are going to fall in a long lane just to take the votes. With the web and computer based voting system, the public don't need to fall in line, they can vote through laptop or desktop, no need to use papers, and it also avoids tiredness and violence. The voting could also reduce the number of errors made by both the voters and the electoral administrators. Web based voting in the case of this research has the ability to increase election turnouts by providing voters with a convenient voting mode that does not require them to leave in their place.



Administrators - full access to the system. It refers to the person(s) who will be managing or in charge of the student election. This project is a great help for them, it will lessen their workload.

Students - are the beneficiaries of this research. They can exercise their civic right and vote from anywhere around the school. Since many democracies face ever – decreasing voting rates, the opportunity to reverse, or at least, stop the trend, and increase turnout seems particularly promising.

Future Researchers - This will allow the researchers to apply different principles in creating a voting system and indeed it will not only enhance their skills and provides the researchers more knowledge about this research.

Candidates – the system is secured because the only admin will have the full access to the system and each student had their passcodes for them to vote.

Literature

As the Philippines prepares for its first automated national elections in May 2010, we may as well look to the University of the Philippines-Diliman, which has implemented automated voting for all its local student university-wide elections since 2009. While the framework of the U.P. Diliman voting system (dubbed “Halalan”) requires no paper



ballots and is thus radically different from that which will be utilized in our own national polls, it may be a source of inspiration and future lessons as our country adjusts to the prospect of an automated electoral future.

According to Reyes (2010), with the assistance of U.P. College of Law Secretary Solomon Lumba, he was able to interview the current Project Manager of Halalan, Rystraum Gamonez, a second year Computer Science student at the U.P. College of Engineering. Rystraum explained that Halalan was developed after members of his campus organization, the UP Linux Users Group (UnPLUG), their watching a typically prolonged tabulation of paper ballots for the University Student Council election, wondering whether an automated voting system for the campus was possible. They scoured the Internet for available election software for their purposes, only to find none. To their credit, they decided then to develop one themselves, and the software they developed was used, first in local College of Engineering elections, then by three other colleges in their own local council elections, before it was finally adopted by the entire university for the student council elections of 2009. The efforts of the developers of Halalan have hardly remained anonymous. For developing the Halalan software, UnPLUG won an award during the 2006 Software Freedom Day, a worldwide celebration of Free and Open Source Software initiated by Software Freedom International



and co-sponsored then by IBM. The prize — an IBM Power5 server which is currently used as the central server for Halalan. The team of developers who invented Halalan: Waldemar Bautista, Ralph Justin Arce, John Michael Bitanga, Vanessa Rose Castro, Wigi Vei Oliveros, Antonio Mari San Miguel, DJ Sison, Carlo Santos and Orly Tarun (Reyes 2010).

An automated Elections implemented in Baguio. Winners were already known right after the last vote was cast during an automated election at the University of the Cordilleras (UC-BCF).

Four of its colleges utilized a computerized system during the Supreme Student Government (SSG) Elections last July 24.

While the Supreme Court is still settling the P1.3 billion worth computerization issues on the 2007 elections, the UC-BCF has proven that automation of elections is plausible.

The automated poll system was created under the supervision of Engr. Eliseo Ruiz of the College of Information and Computing Sciences (CICS).

According to Engr. Ruiz, the said system, at first it was a stand-alone system when developed and used in 1997, but in 1999, they were able to implement a network system for it.



CICS was certified by the Commission on Higher Education as the Center of Development for Excellence (CODE) for Information Technology.

UC-CICS has been sharing the program to other colleges for the past four years. This 2006, engineering, accountancy and nursing students were able to benefit from the automation process.

In the system, all the students did was input their student ID number and click beside the name of their chosen candidate.

To avoid flying voters, student ID access numbers were automatically blocked upon voting. Votes were automatically tallied.

(Automated Election Implemented in Baguio, 2006)

The Lycean community, being a strong proponent of responsible leadership, once again showcased their appreciation of the aforementioned virtue during this year's College Student Council Elections. The auspicious event transpired last July 15 and 21, 2014 at the Arsenio "Dodjie" Laurel Sports Arena for the Main Campus and at the lobby in front of the Registrar's Office at LIMA Campus.

Just like last year, the Office of Student Affairs has coordinated with the Management Information System (MIS) Office in order to provide a reliable election system. Meanwhile, the help of the Internal Audit



Office was elicited with regards to the strict monitoring of tallied votes. One of the outstanding recognized student organizations, Christ's Youth in Action (CYA) served as the committee for the entrance and exit of voters. On the other hand, staff members of Phoenix, the Official Student Publication of the university, served as ushers and usherettes for the student voters. This year's election was special as the COMELEC adapted a distinctive name for the event – ALECYEAN (The Automated Election of Lyceans).

The voting process used includes the initial screening of student voters. They were asked to present their student ID or registration form at the entrance as a confirmation that they are enrolled students who are entitled to vote. Those students who are valid to vote will be marked with a "valid" seal on their wrists. After the screening, they were instructed to proceed directly to vacant computer units or take the front seats as they wait for their turn. During the voting proper, the student voters were asked to have their IDs scanned by barcode readers placed beside some computer units. Some were asked to type their student numbers should the barcode readers fail to scan the IDs or if there is no barcode reader available. After the said process, they proceeded with the election of their favored candidates on their computer screens, which is accomplished by gently tapping the screens and posting their vote. Then they were assisted to the exit area where indelible ink will be placed on their right



forefinger, serving as evidence that they have successfully voted. The number of posted votes was strictly recorded and checked before and after each Election Day. Additionally, the different colleges were informed from time to time regarding their current standing in the turnout of votes.

Lyceans showed an unfazed spirit, not hesitating to enthusiastically exercise their rights to vote. It is not surprising that during the first five hours of voting, there are already 3,337 students who have casted their votes, amounting to an overall turnout of 40.41%. At the end of the first Election Day, each college has been successful in meeting their respective majority votes. This was a big achievement considering the fact that the election proceedings have been hampered by an announcement of class suspension due to an approaching typhoon.

As the continuation of the election finally ensued on the 21st of July, students from all colleges continued to display an exemplary amount of support for their chosen candidates. At around 5:30 PM of the same day, the candidates and their supporters were asked to proceed to the gymnasium to witness and hear out the formal announcement of winners by Atty. Reynold S. Beredo, Officer in Charge of the Office of Student Affairs and the 2014 COMELEC Chairman, Mr. Meldrick Arjay A. Magsino. It was a moment of joy and accomplishment as COMELEC



and OOSA started to express their utmost gratitude to the people who helped in making the event such a success.

It was also a moment of ambivalence as both victors and competitors hear out the names of the new College Council Officers. Each and every candidate was greeted with loud cheers from their avid supporters. The announcement of winners has also been an instrument to display a great deal of sportsmanship and nobility among all the political parties. Everyone hopes in anticipation that the political platforms of the winners will help their respective departments (The CSC-LSSC Election, 2014).

Objectives

The aims of the study is to develop a web and computer based ISPSC voting system which is helpful to the public.

Specifically, this study sought to:

1. Design and develop ISPSC Voting System for the SSC Election;
2. Test the effectiveness of the ISPSC Voting System for SSC; and
3. Test the functionality and usability of the ISPSC Voting System for SSC.



Scope and Limitations.

This study was conducted at Ilocos Sur Polytechnic State College, Sta. Maria Campus on December 2017 to April 2018.

This study aims to create web and computer based voting system for SSC to ease the voting system in our school. This project is a web based system which will allow the students to vote via the web and computer based application for the admin who will manage or to be in charge in the proposed system. The Web Based Voting System will make the voting process easier and faster. Votes are automatically counted after the student cast its vote, the students have their own accounts and they are given a one-time passcode in order for them to vote.

It will also shorten the time of counting and preparing the reports because the results are generated right after the election has been closed or ended.

The scope of this project is a web based and computer based application that is applicable to run on any system including desktop and laptop. There is no limit number of students can vote, but only the students of ISPSC Main Campus can use this project. Voters can only vote anywhere around the school.



System Functionalities

The Administrator can manage student accounts (create, update, delete) and can import list of students from external source such as csv file. The administrator can generate passcode for each student, print list of students, manage candidates information (create, update, delete). The admin can also manage electoral positions like President, Vice President, etc. (create, update, delete) and print electoral positions. Lastly, the admin can manage courses (create, update, and delete) and print list of courses.

For Canvassing (Administrator)

Administrator can view the total number of students registered, the students who have not yet voted, and the students who already voted. Admin can print students who actually voted, and print students who did not voted. They provide real-time counting of votes and print reports for canvassing and winners.



Chapter II

METHODOLOGY

The main goals of this study are security, reliability, and independence. Security is the most talked about sub-goal of accuracy is security. While often thought of as its own goal, security is simply a means to accuracy. The researchers don't want it to be possible for bad actors to deliberately add, remove or change votes and in particular the votes total.

No sub-goal is a "must" because there might be another way to implement the main goal. The main goal is that the voters are confident that the system has met the other goals, particularly accuracy and precision. There are a number of possible ways to attain that trust. Perversely, the trust goal may actually be faked as long as the other goals are attained. The trust goal is one of feelings. While some people must truly understand the correct reason why the system can be trusted, it is quite possible that many voters might trust the system for incorrect reasons. As long as everybody is not incorrect, and this universal error does not permit accuracy to fail, the system is still returning the right result.

System should record votes as cast. Systems should not break down, impeding or delaying voting. System must be up to the job of handling the full complexity of a ballot.



The researchers wish to record a voter's true will. While people are free to influence voters with persuasion and argument. Every vote should be casted because the voter thinks it is the right choice.

System development life cycle model provides a sequence of activities for system designers and developers to follow. It consists of a set of steps or phases in which each phase of SDLC uses the results of the previous one. This model adheres to important phases that are essential for developers, such as planning, design, and implementation.

Rapid application Development Model primary importance is on building a prototype that looks and acts like the desired product in order to test its usefulness. The prototype is a vital parts of the requirements determination phase, and may be created using tools different from those used for the final product.

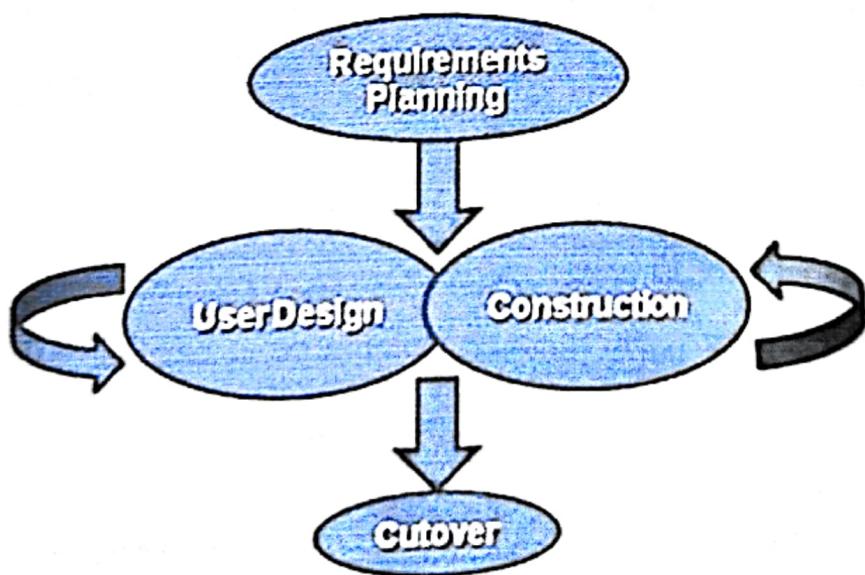


Figure 1. Rapid Application Development Model



Requirements Planning phase - This phase combines elements of the system planning and system analysis phase of the system Development Life Cycle (SDLC). According to James Martin, users, managers, and IT staff members discuss and agree on business needs, project scope, constraints and system requirements. It ends when team agrees on the key issues and obtains management authorization to continue. In our team, we contacted each other in able to discussed the objectives and how to start the project. The team also discussed the issues or errors of the past election, and some of the team members conducted interview to some students and high official organizations. This is how vital communication is to success (Martin, 1991).

User Design phase - During this phase, users interact with systems analysts and develop models and prototypes that represent all system processes, inputs and outputs. User design is a continuous interactive process that allows users to understand, modify, and eventually approve a working model of the system that meets their needs. While undergoing this phase, the researchers made sure all the updates to the working models were immediately shared: you don't want even one loose end (Martin, 1991).

Construction phase - It focuses on program and application development task similar to the SDLC. In RAD, however, users continue



to participate and can still suggest changes of improvements as actual screens or reports are developed. Its tasks are programming and application development, coding, unit-integration and system testing. While constructing, the researchers discussed the features of the system, there were a few that were debated, which help them catch any issues early, and it helped clear the way for the final implementation phase (Martin, 1991).

Cutover phase - The last phase resembles the final tasks in the SDLC implementation phase, including data conversions, testing, changeover to the new system, and user training. Compared with traditional methods, the entire process is compressed. As a result, the new system is built, delivered, and placed in operation much sooner. As the researchers finished developing the project, they conducted final testing if it's functionally working and no errors (Martin, 1991).

Project Plan

This section presents the procedural courses of action, which were actually observed in performing the tasks set in order to achieve the requirements to develop a Web and Computer Based ISPSC Voting System.



Table 1. Gantt Chart

PHASES	DEC 2017				JAN 2018				FEB 2018				MAR 2018				APRIL 2018			
	WEEKS																			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Requirements																				
Planning																				
User Design																				
Construction																				
Cutover																				

The activities tackled and the week duration of each activity are shown in table 1. The project is from December 2017 – April 2018 that includes requirements analysis, design, development, testing and maintenance. The team conducted an interview just to analyze the requirements and it was included the sharing of ideas for the design. It shows in the table that the construction of the project took 8 weeks, it's obvious that the development is the hardest part just to finish the project and if users continue to participate, the team changed and improved if there are more suggestions. Cutover, they finalized the project, it includes the final testing, data conversions, changeover and user training.

**Project Staff****Table 2. Team Assignments**

TEAM ASSIGNMENTS	
ALL MEMBERS	REQUIREMENT ANALYSIS
JONATHAN COMBIS	DESIGN
JESSA MAE ACOSTA	
ALL MEMBERS	DEVELOPMENT
JONATHAN COMBIS	TESTING
JEBECCA MEICE DELA CUZ	
ALL MEMBERS	MAINTENANCE

Each member has its own task in the system project from the leader, one of them served as a system analyst, system developer and researcher. Project role shows the perspective activities of each member of the team. Each member worked together for the completion of the project and some of them have their different task.

Data Gathering Procedure**Interview**

The team conducted an interview to the teachers, and SSC Officers at ISPSC, ICS Department about how the SSC election process done and what are the issues unsolved. Some of the information collected are asked to some students.



Internet Surfing

The team also used the internet for relevant information for the study as well as new technologies that could be used in developing and implementing the proposed system.

Library Research

The team gathered information from books, magazines and research manuscripts that are related to the project at the college library.

Website Analysis and Measurement Inventory (WAMMI).

It is founded on expertise gained from evaluating software for usability and international software standards. To help you accomplish your digital goals, **WAMMI**: measures website user experience based on your visitors reaction. (<http://www.wammi.com/about.html>)

The usability of the system is evaluated based on the Software Measuring Instrument. The weighted mean comes from the result of this questionnaire.

Table 3. Interpretation of Weighted Mean

Scale Rating	Statistical Range	Descriptive
5	4.21 – 5.0	Strongly agree
4	3.41 – 4.20	Highly agree
3	2.61 – 3.40	Moderately agree
2	1.81 – 2.60	Fairly agree
1	1.0 – 1.80	Not agree



Based on the table, the mean rating per item were calculated and described. The class width was computed $(HS - LS)/5$ or highest score (HS) minus lowest score (LS) divided by five. Since there are five scale ratings. The computed class width is .80, which gives the first class interval 1.0-1.80 1.81-2.60 for the second class interval and so on.



REFERENCES

Online Materials

- Homstad, N. (2010). Importance of logging out. Retrieve on April 13, 2018 from https://www.internetwork.net/Importance_of_logging_out/
- Khan, H. (2017). Top 10 Advantages and Disadvantages of Paper Ballot Voting. Version 1.0. Retrieve on February 26, 2018 from <https://www.worldblaze.in/advantages-disadvantages-of-paper-ballot-voting/>
- LYCEUM OF THE PHILIPPINES UNIVERSITY, Batangas City (2014). The CSC-LSSC Election. Version 1.0 Retrieve on October 9, 2017 from <http://lpubatangas.edu.ph/alecyean-2014-the-csc-lssc-elections/>
- Madsen, T. (2012). The Importance of Association Elections. Retrieve on April 16, 2018 from https://www.onlinedebate.net/The_Importance_of_Association_Elections/
- Maeung, S. (2005). An Internet-Based Voting System for Student Government Elections. Version 1.0 Retrieve on December 19, 2017 from https://www.researchgate.net/publication/277290195_An_Internet%20Based_Voting_System_for_Student_Government_Election_s#rft
- Martin, J. (1991). Rapid Application Development. Macmillan. pp. 81–90. Retrieve on January 13, 2018 from https://www.worldblaze.in/Rapid_Application_Development/
- Mpeko, N. (2014). Designing, developing and testing a computer based voting system in the South African context. Version 1.0. Retrieve on September 3, 2017 from https://www.researchgate.net/Designing_developing_and_testing_a_computer_based_voting_system_in_the_South_African_context/



Pran, V. (2007). NDI Handbook: Monitoring Electronic Technologies in Electoral Processes. pp. 85–88. Retrieve on October 9, 2017 from https://www.businessdictionary.com/Monitoring_Electronic_Technologies_in_Electoral_Process/

UNIVERSITY OF CORDILLERAS, Baguio City (2006). Automated Elections implemented in Baguio. Version 1.0. Retrieve on March 22, 2018 from <http://www.ucbcf.edu.ph/Students/News?Category=Students&NewsID=17>

UNIVERSITY OF HAMPSHIRE, United Kingdom (2010), Importance of Logging Out, Version 1.0 Retrieve on March 22, 2018 from <https://www.unh.edu/it/news/2010/10/importance-of-logging-out/>

UNIVERSITY OF THE PHILIPINES, Diliman, Quezon City (2010). How UP Diliman Implemented Its Own Automated Voting System. Version 1.0. Retrieve on March 22, 2018 from <https://www.google.com/amp/s/lawinnovations.wordpress.com/2010/02/18/halalandiliman/amp/>

UNITED STATES (2012), Advantages and Challenges for Associations of Online Voting, Version 1.0. March 22, 2018 from <http://www.socialfish.org/2012/08/online-voting-advantages-and-challenges-for-associations/>