

.....

Developing a Decision Support Application for Selecting New Scholars

**Jonathan Mark N. Te
and Albert Geroncio Y. Rivera**
*College of Computer Studies
Silliman University*

The Scholarship Decision Support System was developed to allow the Scholarship and Student Aid Division (SSAD) of Silliman University to generate the general ranking list and valedictorian list that would provide support to the Scholarship and Aid Committee (SAC) in their deliberation for awarding scholarships to applicants. The decision support system provides a list that also matches an applicant to a scholarship based on the scholarship's requirements in terms of the course, gender, graduation honor, and province or region of origin.

In generating the ranking lists, the SSAD follows a rating system to determine the rank of each applicant. The applicant's high school general average, number of siblings, and parents' annual family income are taken into consideration and are given corresponding ratings based on the SSAD's criteria.

Microsoft Visual C# 2010 and MySQL Server 5.6 were used in developing the decision support system. After initial completion of the system, refinement was done through prototype reviews. The prototype reviews provided several improvements for the system that were not initially seen. The refinements were immediately taken into consideration and applied to the system.

Test cases were used to fully test if the features of the system work as originally intended. The test case results showed that all of the features worked and that the system had passed the test.

Keywords: Decision support, Applicant matching, Scholarship matching, List generation

INTRODUCTION

The Silliman University Scholarship and Student Aid Division (SSAD) is a unit in Silliman University that is responsible for the granting of scholarships to students. In a typical year, there would be about a hundred qualified applicants who would submit their application and credentials to the said unit in pursuit of availing a scholarship in order to enroll. Qualified applicants are ranked by the division, and the ranking list is endorsed to the Scholarship Aid Committee (SAC) for deliberation.

From the list of all qualified applicants, the SSAD prepares two separate lists: the general ranking list and the valedictorian list. The general ranking list contains all the qualified applicants ranked according to the SSAD's ranking system while the valedictorian list contains only qualified applicants who were awarded as valedictorians in their high school and ranked according to their high school grade average.

The primary problem of the SSAD is the generation of the two ranking lists in just two weeks. Two weeks is the available amount of time between the deadline of the submission of application and the SAC deliberation. The deadline of submission is always set on April 30 of every year to accommodate all high school graduates. With the dates of the registration for the new school year in mind, the SAC has to deliberate as soon as possible since the result of the deliberation can encourage the awarded applicant to actually continue to enroll in the university. On average, the SSAD accepts about a hundred applicants. Each applicant's rating score is calculated individually and all the applicants are sorted out according to the rating score to comprise the general ranking list.

In a typical year, there are about 20 scholarships that are awarded by the SAC to qualified applicants.

An applicant is considered to be qualified if he/she is able to satisfy the following minimum criteria: being in the top 10% of their high school graduating class; having a high school grade average of 87 and with no subjects having a grade below 80; and belonging to a household with a total annual income of not more than P250,000. An applicant who does not satisfy the minimum criteria is disqualified.

The SSAD ranking system involves giving corresponding ratings to the applicant's high school grade average, household annual income, and number of siblings. The ratings are shown in Appendix A.

The applicant's rating for each category is added, and the total of the three ratings is used as basis for the ranking. The applicant with the lowest total score is the highest ranked applicant and so on.

LITERATURE REVIEW

Decision support systems are meant to be support systems that decision makers can use in order to come up with a decision. Marakas (2003) has outlined several characteristics of a decision support system. From the number of characteristics, two are of note: A decision support system is intended to support decision makers rather than replace them and a decision support system supports all phases of the decision-making process.

As is the reason of most computerized systems, a decision support system can also shorten the time needed in making a decision, but it is also limited upon the computer system that it is running in, its design, and the data that is stored in it that can be used as the knowledge for generating the decision support (Marakas, 2003).

These are the considerations in defining the reasons for creating a decision support system: a decision support system has to have an intended purpose; a proposed decision support system has to have a context within which it will be used; and a decision support system has to have an outcome objective (Marakas, 2003).

Turban and Aronson (2001) also state that speedy computation is a reason for creating a decision support system. Also, a computer, in this instance, would allow for the performing of large numbers of computations quickly and at a low cost for the decision makers.

Turban and Aronson (2001) further add that a decision support system is a content-free expression and that the system would mean differently to different people.

DecisionSupportSystem.info, a website that encourages the use of decision support systems for organizations, defines the system as new applications that are computerized to act as a support system. Such support includes support for organizational and business decision-making. The site sells its own decision support system application, the Business Intelligence Suite, to support its cause for encouraging organizations to use such systems (Decision Support Systems, 2012).

SYSTEMS REVIEW

The University of Michigan's Administrative Information Services has developed a software application that allows the said university to match students with scholarships. In an article from 2007, the University of Michigan News Service described the system as being able to access all enrolled students, and when a scholarship is chosen, a list of all eligible students would pop up. (U-M develops, 2007).

There are several generic scholarship management softwares advertised on the Internet. Next Gen Web Solutions, Inc. and AcademicWorks, Inc. both feature a scholarship management software.

Next Gen Web Solutions' Scholarship Manager features multiyear functionality allowing access to two concurrent years of application processing, automated matching allowing the review of candidates who qualify for a scholarship, simplicity for students to complete the application process, centralized processing for the institution, and reliability, scalability, and security. The application is also described as a cloud-based solution (Scholarship Management, 2013).

AcademicWorks' Scholarship Management Software is also a cloud-based solution and is very similar to Next Gen Web Solutions' Scholarship Manager. AcademicWorks' solution adds the feature of allowing each donor to have a profile page for recognition (Scholarship Management, n.d.).

There are several other scholarship-matching softwares or websites which are not entirely the same with the three existing systems as stated in the previous paragraphs.

In Kent State University, their scholarship-matching webpage allows searching with the following criteria: college, major, high school grade point average, campus, state, country, ethnicity, gender, and age. The webpage can also specifically hide scholarships for athletics, music, military, and honors college. The search returns a match for a list of scholarships that an applicant can apply for in the university (Kent State, 2014).

Other websites have a wider coverage with how they match a scholarship to an applicant. These websites can include a search return for a scholarship and the university that the former is available for the application for the prospective student. They also offer searching for any available scholarship and providing a service of assisting the student in

enrolling in an appropriate university or college with the said scholarship. These websites do not award the scholarship immediately since the student still has to apply for it. The matching is done by showing that the prospective student is eligible to apply for the said scholarship. ScholarMatch.org, Zinch.com, Niche.com, and ScholarshipExperts.com are such websites that offer the said service (What We, 2012; Scholarships, 2014; Origins and More, 2012).

Scholarship Management System is a web-based application developed by BS in Information Technology students for their Capstone Project. The application deals with the scholarships in the university. It also allows the SSAD to provide information about scholarships and also store the information of all the scholars who are enrolled in the university (Bastona, Liu, & Mascariñas, 2012).

DISCUSSION

The considerations mentioned by Marakas (2003) were applied in this study. The intended purpose for the decision support system of the study was to provide support for the SAC members in the granting of the scholarships. The context of where the decision support system of the study was used was on deciding on the providing of grants for the scholarship applicants. The outcome objective of the decision support system of the study was the two ranking lists which were then used for generating the suggestion matching the qualified applicant to an open and available scholarship.

Next Gen Web Solutions' Scholarship Manager and AcademicWorks' Scholarship Management Software are both scholarship management software available for purchase. These are generic software applications that can be used as a solution for scholarship matching and records keeping.

Kent State University's scholarship-matching webpage matches several scholarships to a student applicant (Kent State, 2014). The other websites such as ScholarMatch.org, Zinch.com, Niche.com, and ScholarshipExperts.com do the same only that they are not connected to any university (What We, 2012; Scholarships, 2014; Origins and More, 2012). Their scholarship matching though is different since the applicant searches for a scholarship that would match to him/her and not the scholarship matching to possible applicants.

The University of Michigan's scholarship-matching system is the

closest inspiration of this study based on how a scholarship is matched to possible applicants.

LIMITATIONS OF THESE STUDIES

The systems cited were all relevant but did not quite perform the task needed by SSAD. Furthermore, most of the systems were proprietary software and were not customized to the needs of the client. Only the University of Michigan system was developed for their own internal use.

METHOD

This study aimed to observe and describe the effectiveness of the decision support system that emulates the manual ranking and rating system used by the SSAD in determining the ranking lists and providing the names of the qualified applicants for scholarships according to the specific preferences. To gather the necessary data, an interview was conducted with the SSAD unit head. Current forms collected included a sample application form that would be accomplished by the applicants and a sample of the ranking lists.

Test cases were used to test whether the features of the decision support system have been successfully implemented. Furthermore, the test cases verified whether the system had been able to emulate the ranking and rating system of the SSAD as well as to provide the correct suggestions of applicants matched to a scholarship. The test cases were accomplished by the users while being guided by the developer.

EVALUATION

Test cases were administered to test if the features of the system were functioning as they were planned out to be before development. Actual applicant and scholarship data were used during the testing. The SSAD office assistant administered the testing by following all the instructions and checking the expected results. Other database-related results were shown to the office assistant during the testing.

The SSAD Decision Support System passed all the tests.

CONCLUSIONS AND FUTURE STUDY

The success of the features of the proposed decision support system through the test cases validates that the system has emulated the SSAD's process of generating the general ranking list and valedictorian ranking list. The ranking lists are easily generated through a module, thus reducing the time that is needed to produce the said ranking lists. The ability for the user to print the ranking lists provides the support that is essential for the Scholarship and Aid Committee in their deliberation when they award a scholarship to an applicant.

The system is also able to provide suggestions on the applicants that can be awarded a scholarship. This is also another essential support that is provided to the SAC during deliberation.

While this decision support system was developed as a separate system from the Web-based Scholarship Management System, an integration of the two systems would be a major recommendation going forward. The Web-based Scholarship Management System can provide the facility the inputs of the applicants' data which would then be used for the generation of the ranking lists and the suggestions for the scholarships. There could also be integration with the deliberation process. Once the SAC is able to decide on the awarding of the scholarship grant, the decision can be inputted immediately into the system rather than recording the award manually. The same can also be done with the renewal of scholarships.

REFERENCES

- Bastona, R.P., Liu, R.S., & Mascariñas, C. (2012). *Scholarship management system: Web based*. Dumaguete City: Silliman University.
- Decision Support Systems (2012). Retrieved from <http://www.decisionsupportsystem.info>.
- Kent State University Scholarship Search (2014). Retrieved from <http://www.sfa.kent.edu/SchGuide/IFScholarshipSearchEnterCSE.asp>.
- Manual for the SU Scholarship Program (2012). Dumaguete City, Philippines: Silliman University.
- Marakas, G. (2003). *Decision support systems in the 21st century* (2nd ed.). Upper Saddle River, New Jersey: Prentice Hall.

Origins and More (2012). Retrieved from <http://www.scholarshipexperts.com/about/index.jsp>.

Scholarship Management Software. (n.d.). Retrieved from <http://www.academicworks.com/>.

Scholarship Management Software. (2013). Retrieved from <http://www.ngwebsolutions.com/scholarship-management-software/>.

Scholarship Matcher (2014). Retrieved from <http://colleges.niche.com/scholarships/match.aspx>.

Scholarships (2014). Retrieved from <http://www.zinch.com/scholarships>.

Turban, E. & Aronson, J. (2001). Decision support systems and intelligent systems (6th ed.). Upper Saddle River, New Jersey: Prentice Hall.

U-M develops software to match students with scholarships (2007, June 29). Retrieved from <http://ns.umich.edu/new/releases/5925>.

What we do (2012) Retrieved from <http://scholarmatch.org/about/>.

APPENDIX A

Criteria rating

Indicated below are the criteria used in generating the ranking.

Table A1. Student General Average and Rating.

Student general average	Priority rating
97–100	1
94–96	2
91–93	3
88–90	4
85–87	5

Table A2. Family Annual Income and Rating.

Annual income (in pesos)	Priority rating
Less than 70,000	1
70,001–128,000	2
128,001–186,000	3
186,001–244,000	4
244,001–300,000	5

300,001–360,000	6
360,001–418,000	7
418,001–476,000	8
476,001–534,000	9
534,001–592,000	10
592,001–650,000	11
650,001–708,000	12

Table A3. Number of Siblings and Rating.

Number of siblings	Priority rating
9 and above	1
7–8	2
5–6	3
3–4	4
0–2	5

APPENDIX B

Application Screen Shots



Figure1. SSAD DSS Home Form. This figure shows the SSAD Application home form which has all the available options for the user.

Figure 2. Add Applicant Form. This figure shows the Add Applicant form which will allow the user to add applicants to the application.

Figure 3. Add Scholarship Form. This figure shows the Add Scholarship form which will allow the user to add scholarships to the application.

Last Name	First Name	High School	Year	Honor	Graduates	1st Choice	2nd Choice	3rd Choice
Huang	April Joy	San Pedro Academy	2014	Rank 2	78	BS Accy	BS CE	BS Math
De Tomas	Glesanette Ghy	San Pedro Academy-Recoletos	2014	Rank 5	47	NONE	NONE	NONE
Gravador	Raisa	Tanjay High School (Legislated)	2014	Valedictorian	121	NONE	BBA-Mgt	NONE
Galido	Jahnmaine Shophie	Negros Oriental High School	2014	Rank 2	630	BS Accy	NONE	BS MT
Dominado	Julia Elizabeth	Catherina Cittadini School	2014	Rank 4	62	BS MT	BS Bio	BS Accy
Inovenon	Annabelle	Dauin National High School	2014	Valedictorian	23	BSED-Math	BS Accy	BBA-Mgt
Cafiete	Richmond James	La Consolation College	2014	Valedictorian	86	BS Accy	BS MT	NONE
Bassadre	Alona	Casa Marie	2014	Rank 2	43	BS MT	AB PolSci	BSN

Figure 4. Ranking List Report Form. This figure shows the Ranking List Report form where the user can print the chosen ranking list.

Select scholarship
Lexmark

Semester and School year
Semester 1st
School year 2014 - 2015

1. Wayne, Bruce - Rating: 4
 2. Rizal, Jose - Rating: 6
 3. Upton, Kate - Rating: 10

Print Assign scholarship Close

Figure 5. Match Form. This figure shows the Match form where the user can select a scholarship to view the matched applicants.

Select filter options
Semester 1st Scholarship Lexmark
School year 2014 - 2015 Update filter Reset

Semester	School Year	Scholarship Name	Scholar Name
1	2014	Abby Jacobs	Amigo, Cadness Jeanine
1	2014	Tenorio Memorial Foundation Scholarship	Wayne, Bruce
1	2014	Tenorio Memorial Foundation Scholarship	Howlett, James
1	2014	Tenorio Memorial Foundation Scholarship	Durant, Kevin
1	2014	Lexmark	Upton, Kate

Print Renew scholarship Close