

# Automated Students' Rating Distribution System for a Local College

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## Abstract

It is imperative for educators to provide frequent and immediate feedback concerning the academic performances of their respective students. However, this mandate is quite taxing to implement without an automated system in place. This applied research is all about an automated system that may be used in the distribution of the students' academic performance ratings. The agile software development methodology has been employed; a number of stakeholders also used a product quality evaluation system - the ISO/IEC 25010. The system achieved the research participants' expectations about the facets of a quality software product. Such is also a commendable start for the promotion of e-governance in the academe, once the said application program has been ultimately implemented and maintained.

**Keywords:** automated system, academic performance ratings, agile software development methodology, ISO/IEC 25010, e-governance

## I. INTRODUCTION

Assessment has a primary part on how learners acquire knowledge, their drive to study, and how educators impart learning (Government of Manitoba; Cornell University, 2022). It is indeed an imperative course of action for educators to provide frequent and immediate feedback concerning the academic performances of their respective students.

On the other hand, according to Drexel University School of Education, technology is important in every classroom because it offers instantaneous availability of informative data. Drexel University School of Education further asserted that one of the vital applications of technology inside the classroom is online grading systems. Such expedites transmission of communication between the teachers and students, that is – by using online grading

systems, the faculty can publish grades which is one of the ways of providing speedy and beneficial feedback among the learners.

Moreover, a good number of schools, colleges and universities across the world are already using technology in their operations. It is an established fact that technology shall indeed reengineer the future of higher learning (Glenn, 2008).

As a final point, most educational institutions set a strict deadline for the faculty concerning the submission of grades (*Southern Philippines Agri-Business and Marine and Aquatic School of Technology*, 2017). Thus, this mandate involving the timely submission of grades is quite taxing to implement without an automated system in place.

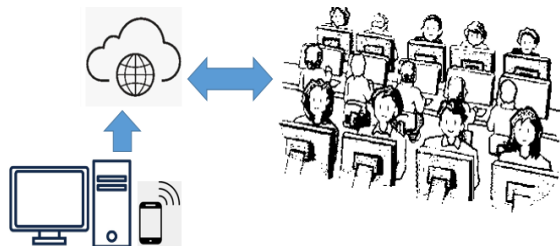
## II. METHODOLOGY

This applied research is all about an automated system that may be used in the distribution of the students' academic performance ratings. The agile software development methodology has been employed.

Agile-based software development is fairly popular; it offers receptiveness to changes in user requirements, providing for their prompt absorption during software development. Also, the said software development methodology covers a set of five values - communication, simplicity, feedback, courage, and respect (Matharu et al., 2015; Beck, 1999). In a parallel context, Ericksson et al. (2005), describe that agility upholds rapid reaction to the changing environments, user requirements, and fast-tracked project time limits, among others.

### Requirements and Logical Specifications

The application discussed in this paper is basically Excel-based; the system may use a basic web host - the google drive or even a Facebook page. In a nutshell, the aforesaid program is stored in the cloud and authorized users may be granted access.



**Figure 1.** Data Flow Diagram for the Automated Students' Rating Distribution System

Figure 1, portrays that desktop/laptop computers and/or mobile phones may be utilized, as long as these devices have an Excel application, and Internet connection. The Excel program which has been automated to reveal students' ratings, may be stored in the cloud and consequently, access shall be allowed among the learners.

### Other Specifications

For effectiveness and efficiency of the said application, the following supplementary specifications are essential: processor [Pentium of one *Gigahertz*], Random Access Memory (RAM) [two gigabytes], hard disk space of three gigabytes, display [32 bit, 800 x 1280].

### Testing Procedures

The automated students' rating distribution system has underwent unit testing, integration testing, system testing and acceptance testing (Pearson, 2020).

Consequently, the test data approach validated the precision of the application's expected outputs (Association of Chartered Certified Accountants). Pilot test has been made using a select group of students.

### Evaluation Criteria and Procedures

The participants of the study evaluated the application using an evaluation tool (Appendix 1) that is based on Systems and Software Engineering - Systems and software Quality Requirements and Evaluation (ISO/IEC 25010), which is the foundation of a software product quality evaluation system. The said standard has eight (8) product quality characteristics: functional suitability, performance efficiency, compatibility, usability, reliability, security, maintainability and portability.

The said evaluation tool has been distributed among nine (9) evaluators - including one faculty, one institute dean, six students, and one information technology expert. A five-point Likert Scale (Table 1) has been used to rate each of the characteristics of the program.

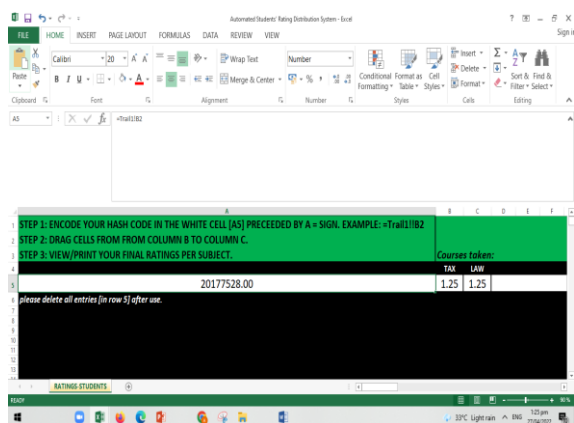
**Table 1.**

Grand Mean of Scores and the Corresponding Adjective Ratings

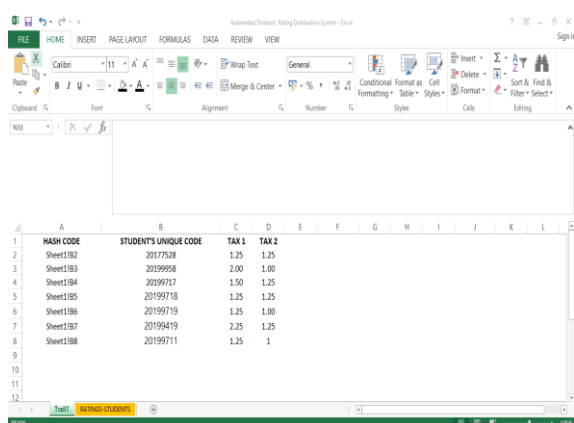
GRAND MEAN	ADJECTIVE RATING
5	Outstanding
4	Very Satisfactory
3	Satisfactory
2	Fair
1	Poor

## III. RESULTS AND DISCUSSION

After the development of the system, the graphical user interface of the application shown in Figure 2 is in fact the module visible to the students as they have been given access into the system. Figure 3 on the other hand includes two modules – both are visible to the faculty.



**Figure 2.** Graphical User Interface of the Automated Students' Rating Distribution System in One Module



**Figure 3.** Graphical User Interface of the Automated Students' Rating Distribution System in Two Modules

To maintain anonymity and confidentiality of the students and their respective ratings/grades – only one module shall be made visible among the students. The other module is hidden and protected; such is visible/accessible only by the faculty.

### The Manual of Basic Operations

This part articulates the basic procedures on how to operate the system. Part 1 is intended for the faculty; part 2 for the students:

#### Part 1:

1. At the start of the class, each student shall be issued with unique codes and hash codes, respectively. All students shall be advised not to divulge the said codes to anybody.
2. At the end of each grading period, the faculty shall encode the ratings of each student starting from cell “C2”. If more than one course, in the same class/section, has been assigned to the faculty – cells “D2”, “E2” and so forth, may be utilized in the encoding of students’ ratings. The teacher may opt to link the class record to this system, as well.
3. After the encoding of ratings, the faculty may now send the application to the students for them to access their respective grades. However, it is crucial that the first module [in this application, it is called Trai1], be hidden and well-protected. And if the class record has been linked to the system, the same shall be made hidden and protected before publishing/sending the application among the students. The faculty may use the google drive or a Facebook page as web host for the application.

#### Part 2:

1. Using the hash code provided by the faculty, the student may now use it preceded by an equal (=) sign starting at cell “A5”. From that particular cell-the student’s unique code shall be revealed-that indicates that he is the owner of any ratings that shall be revealed thereafter. Thus, incorrect unique code would be an indication of a mistake/error in the hash code provided. In such case, the student must notify the faculty. Now, if the correct unique student code appeared in cell “A5”, the student may now drag the cell to “B5” to reveal the rating/grade. If more than one course/subject is being taken by the student from the same faculty, the student may

continue dragging the cell to “C5”, “D5”, and so forth. It is important to reiterate that only the second module shall be made visible to the students [in this application, it is called Ratings-Students].

- The students must never divulge their respective hash codes and unique codes to anybody – for the benefit of anonymity and confidentiality.

On the other hand, Table 2 depicts the mean scores [per criteria, for each respondent] and total mean scores of the criteria [per respondent]. The system has been evaluated in terms of functional suitability, performance efficiency, compatibility, usability, reliability, security, maintainability and portability.

**Table 1.** Mean Scores-Using the ISO/IEC 25010 Standard

CRITERIA	A	B	C	D	E	F	G	H	I	Mean	Descriptive Rating
										[Per Criterion for Each Respondent]	
Functional Suitability	5	5	5	5	5	5	5	5	5	5	Outstanding
Performance Efficiency	5	5	5	5	5	5	5	5	5	5	Outstanding
Compatibility	5	5	5	4	3	5	5	5	5	4.67	Very Satisfactory
Usability	5	5	4	5	5	5	5	5	4	4.78	Very Satisfactory
Reliability	5	5	5	5	5	5	5	5	5	5	Outstanding
Security	4	4	3	4	4	4	4	3	4	3.78	Satisfactory
Maintainability	5	5	5	5	5	5	5	5	5	5	Outstanding
Portability	5	5	5	5	5	5	5	5	5	5	Outstanding
<b>Total Means [Sub-samples]</b>	<b>4.88</b>	<b>4.88</b>	<b>4.63</b>	<b>4.75</b>	<b>4.63</b>	<b>4.88</b>	<b>4.88</b>	<b>4.75</b>	<b>4.75</b>	<b>4.78</b>	<b>Very Satisfactory</b>

*Note.* Letters A to C represent the faculty, the institute dean, and the information technology expert who participated in the development and pilot testing. Letters D to I represent the students in the class selected for pilot testing.

Moreover during the pilot implementation of the system, the faculty and the developer used the test data approach to scrutinize the precision of the result generated by the system. Table 2 shows the result of such testing.

**Table 2.** Result-Test Data Approach

Test Cases	% of Error	% of Accuracy of the Result
	Generated by the System	Generated by the System
1	0	100
2	0	100
3	0	100

Table 2 depicts three test cases. Test case 1 ensures that the hash codes provided to the students generate the correct student unique codes in the system. Test case 2 confirms that the rating of each student for the first subject handled by the faculty is accurate – by comparing the system’s result with that of the class record of the teacher. While test case 3 also checks the precision of the rating provided for the second subject that the faculty handled to the same group of students – such has also been done

by comparing the system result with that of the class record of the teacher.

#### IV. CONCLUSIONS AND RECOMMENDATIONS

The Automated Students’ Rating Distribution System obtained a grand mean of 4.78 (very satisfactory) from all the nine respondents. Minor enhancements on the graphical user interface have been suggested. The chief benefit acknowledged by the respondents is – the system’s capacity to easily address user requirements.

Based on the foregoing, the applied research output presented in this paper positively addressed the necessity for educators in providing frequent and immediate feedback concerning the academic performances of their respective students – that is by the implementation of an automated system that will deliver such an objective. And according to some of the stakeholders of this research, this scholarly endeavor is also a commendable start for the

promotion of e-governance in the academe, once the said application program has been implemented in full scale and maintained, as well.

## V. ON CONFLICTS OF INTEREST AND FUNDING

The proponents of this paper state that conflicts of interest with respect to the research/authorship/publication of this material, do not exist.

Any financial support for the research/authorship/publication of this paper, has not been provided to the authors - except for the registration fee paid for the international research conference, wherein, this paper has been presented. The said fee had been paid for by the Local Government of Angeles, City, Pampanga, Philippines.

### On Ethical Considerations

All conceivable ethical concerns have had been considered, plus a consent form (Appendix 2), has been adopted.

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**Appendices**

**Appendix 1: The Evaluation Tool - Software Product Quality**

Name (Optional): \_\_\_\_\_

Affiliation/Designation: \_\_\_\_\_

Direction: Put a check (/) mark.

CHARACTERISTICS	SUB-CHARACTERISTICS	1	2	3	4	5
Functional Suitability	Functional Completeness					
	Functional Correctness					
	Functional Appropriateness					
Performance Efficiency	Time Behavior					
	Resource Utilization					
	Capacity					
Compatibility	Co-existence					
	Interoperability					
Usability	Appropriateness Recognizability					
	Learnability					
	Operability					
	User Error Protection					
	User Interface Aesthetics					
Reliability	Accessibility					
	Maturity					
	Availability					
	Fault Tolerance					
Security	Recoverability					
	Confidentiality					
	Integrity					
	Non-repudiation					
	Accountability					
Maintainability	Authenticity					
	Modularity					
	Reusability					
	Analyzability					
	Modifiability					
Portability	Testability					
	Adaptability					
	Installability					
	Replaceability					

**Appendix 2: The Consent Form**

**INFORMED CONSENT TO PARTICIPATE IN A RESEARCH STUDY**

**Title of Research Project:** Automated Students’ Rating Distribution System for a Local College

**Name of Principal Investigator:** Dr. Lovell M. Abello, CPA [City College of Angeles]

**Phone Number of Principal Investigator:** 09667185474

- A. PURPOSE AND BACKGROUND: This applied research is all about an automated system that may be used in the distribution of the students’ academic performance ratings.
- B. PROCEDURES: The agile software development methodology has been employed; a number of stakeholders also used a product quality evaluation system - the ISO/IEC 25010.

- C. CONFIDENTIALITY: The records from this study will be kept as confidential as possible. Individual identities shall never be used in any reports or publications resulting from the study. Research information will be kept in locked files at all times. Only research personnel will have access to the files and only those with an essential need to see names or other identifying information will have access to that particular file.
- D. BENEFITS OF PARTICIPATION: Educators and students may primarily benefit because the aforementioned application program may be used by the faculty in the distribution of the students’ academic performance ratings.
- E. VOLUNTARY PARTICIPATION: Your decision whether or not to participate in this study is voluntary. If you choose to participate in this study, you can withdraw your consent and discontinue participation at any time without prejudice.
- F. QUESTIONS: If you have any questions about the study, please contact DR. LOVELL M. ABELLO, CPA by calling 09667185474

**CONSENT**

YOU ARE MAKING A DECISION WHETHER OR NOT TO PARTICIPATE IN A RESEARCH STUDY. YOUR SIGNATURE BELOW INDICATES THAT YOU HAVE DECIDED TO PARTICIPATE IN THE STUDY AFTER READING ALL OF THE INFORMATION ABOVE AND YOU UNDERSTAND THE INFORMATION IN THIS FORM, HAVE HAD ANY QUESTIONS ANSWERED AND HAVE RECEIVED A COPY OF THIS FORM FOR YOU TO KEEP.

Name/Signature: \_\_\_\_\_

Date: \_\_\_\_\_