CCA Research Journal
ISSN 2599-414X

The Electronic Faculty Performance Appraisal Tool for a Local College

Lovell M. Abello[1], Jean Paolo G. Lacap[2], Amor I. Barba[3], Jula V. Ong[4], Lennard J. De Luna[5] and Camille M. Garillo[6]

[1]Academic Coordinator, BS in Accountancy Program, City College of Angeles, Angeles City, Pampanga, Philippines
[2]Vice President for Research and Extension, City College of Angeles, Angeles City, Pampanga, Philippines
[3]Dean, Institute of Business and Management, City College of Angeles, Angeles City, Pampanga, Philippines
[4]Academic Coordinator, BS in Tourism Management (with specialization in MICE Tourism) Program, City College of Angeles, Angeles City, Pampanga, Philippines
[5]Faculty Member, Institute of Business and Management, City College of Angeles, Angeles City, Pampanga, Philippines
[6]Practicum Coordinator, Institute of Business and Management, City College of Angeles, Angeles City, Pampanga, Philippines

A local college in Angeles City, Philippines uses manual system for faculty performance appraisal. This performance appraisal is usually conducted twice every academic year. The proponents of this applied research feel the urgent need for the local college to develop a functional program that could facilitate an efficient, cost-effective but reliable process of faculty performance appraisal. The Agile Extreme Programming software development methodology has been utilized. Agile Extreme Programming uses an object-oriented approach as its preferred development paradigm and encompasses a set of rules and practices that occur within the context of four framework activities: planning, design, coding, and testing. The developed functional program satisfied the respondents' understanding about the attributes of a quality system. The application may not be sophisticated – thus, it is cost-effective, without compromising reliability of results. The objectives of an efficient and reliable faculty performance appraisal have been satisfied. The development, the eventual implementation and the furtherance of this application is a good start in the advocacy of e-governance for one of the academic thrusts of the local college.

Keywords: faculty performance appraisal, agile extreme programming, functional program

Introduction

The City College of Angeles, which is a local college in Angeles City, Pampanga, Philippines, uses manual system for faculty performance appraisal. This performance appraisal is usually conducted twice, which is at the end of every semester of each academic year. The institute deans, academic program coordinators and the vice president for Academic Affairs, observe classes of faculty members who are within their respective jurisdictions, to affect the said appraisal.

Tyler and Taylor (2010) assert that faculty performance appraisal has become a prevailing topic in academic reforms. Through the faculty performance appraisals, teachers can obtain information from evaluation, consequently, progress new skills, increase long-run effort, or both.

Instructor classroom observations take numerous forms, measure diverse facets of teaching, and differ significantly in their execution. To wit, there may be applications purchased from software vendors that come with rater training and scoring. However, the degree to which observations can or should be used for specific purposes rest onthe instrument, how that instrument was developed, the level of training and monitoring raters obtain, and the psychometric properties of the instrument. Researches propose that observation scores have been correlated to important outcome measures such as student achievement (Gallagher, 2004; Kimball, White, Milanowski, & Borman, 2004; Milanowski, 2004).

Shaikh and Kasat (2009) suggest to apply the e-governance in education. The researchers trust that in the framework of electronic governancesuch will result in improved transparency, swift information distribution, advanced administrative efficiency and superior public services in sectors including transportation, education, power, health, water, security and the state administration and municipal services.

Based on the foregoing, the proponents of this applied research recognize the urgent need for the City College of Angeles to develop a functional program that could facilitate an efficient, cost-effective but reliable process of faculty performance appraisal through the "E-APPRAISALapp". This functional program ensures the accurate – that is, reducing (if not fully eradicating) errors in calculations regarding the grand mean rating, with the corresponding adjective rating scale. Software and hardware requirements, research instruments for the study, and pertinent human resource department information to complete the inquiries, are also incorporated.

Methodology

The study utilized the Research and Development Model and the Agile Extreme Programming (XP) software development methodology during the system development. In today's software industry, technological aptitude and ever-evolving client requirements have steered to more complex software demands. Agile-based software development is progressively being embraced by the software practitioners, as it reassures early software development and high value software products. Furthermore, it offers receptiveness to changes in user requirements, providing for their swift absorption during software development (Matharu, Mishra, Singh, and Upadhyay, 2015).

Accordingly, Beck (1999) describes a set of five values that form a foundation for all work performed as part of XP. These five values are as follows: communication, simplicity, feedback, courage, and respect. Another, the Extreme Programming uses an object-oriented approach as its preferred development paradigm and encompasses a set of rules and practices that occur within the context of four framework activities: planning, design, coding, and testing (Pressman, 2010). Figure 1 demonstrates the XP process and notes some of the fundamental ideas and tasks that are linked with each framework activity.

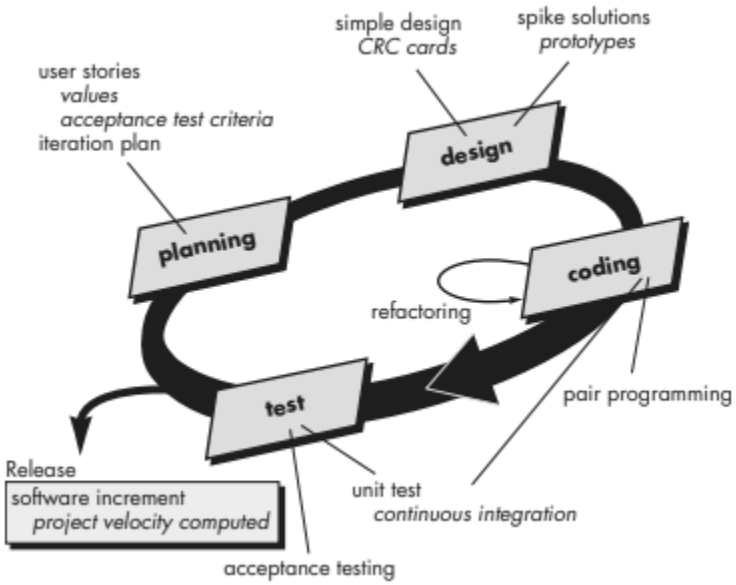

Figure 1. The Agile Extreme Programming Process (Pressman, Roger. S., 2010. Software Engineering, A Practitioner's Approach. McGrawHill, USA.)

One of the key XP activities is planning. The planning activity begins with listening, which is a requirement collecting activity that permits the technical members of the XP group to comprehend the practical aspect of the program and to get a comprehensive impression for the required output and major features and functionality. Another is XP design, which is anactivity that meticulously follows the "keep it simple" principle. A simple design is constantly preferred over a more intricate representation. In addition, the design provides implementation guidance for a story as it is written (nothing less and nothing more). The succeeding XP activity is coding. After stories are developed and the primary design work is done, the team does not move to code, but fairly develops a series of unit tests that will exercise each of the stories that is to be involved in the current release. After the unit test has been produced, the developer is better able to focus on what must be implemented to pass the test. Once the code has been completed, it can be unit-tested straightaway, thereby providing immediate response to the developers. Finally, the testing activity. Itis said that the creation of unit tests before coding begins is a crucial element of the XP approach. Whenever the individual unit tests are systematized, integration and validation testing of the system can happen on a regular interval. This affords the XP team with an incessant indication of development and canalsoraise warning flags promptly, if things may go twisted (Pressman, 2010). It is worth mentioning that the aforementioned XP planning activities and pertinent principles guided the researchers in the completion of this project.

Requirements Specifications Analysis

This part of the paper expounds the attributes of the functional program, which were identified from the human resource department (HRD) of the local college. Belowrecapitulates the apparent

features from gaining access into the system until the display of end-result through the use of the application.

1. *Access into the E-APPRAISALapp.* This application is basically a functional program (Microsoft Excel-based). A password is required to gain access.
2. *Encoding of ratings*. The faculty evaluator may encode scoresor ratings from a scale of 1 to 5. The grand mean is being calculated, with the corresponding adjective rating scale, after the rater completed the input of scores. Scores encoded greater than five (5) and/or less than one (1), shall be marked as 'red'. Only scores of 1 to 5 (shall be automatically filled with gray color when data were correctly encoded) are acceptable. Moreover, majority of the cells within the workbook are protected with a password.
3. *Worksheets*. Extra sheets are createdor inserted or may be inserted within the workbook; the number of worksheets included depends on the total number of teachers to be observed and evaluated during their delivery of classroom instruction.
4. *The output*. After the scores and other pertinent entries had been posted, the program will generate a report – which may be printed for filing purposes or may be sent, through Dropbox oremail, to the human resources department and/or other school authorities.

Logical Specifications

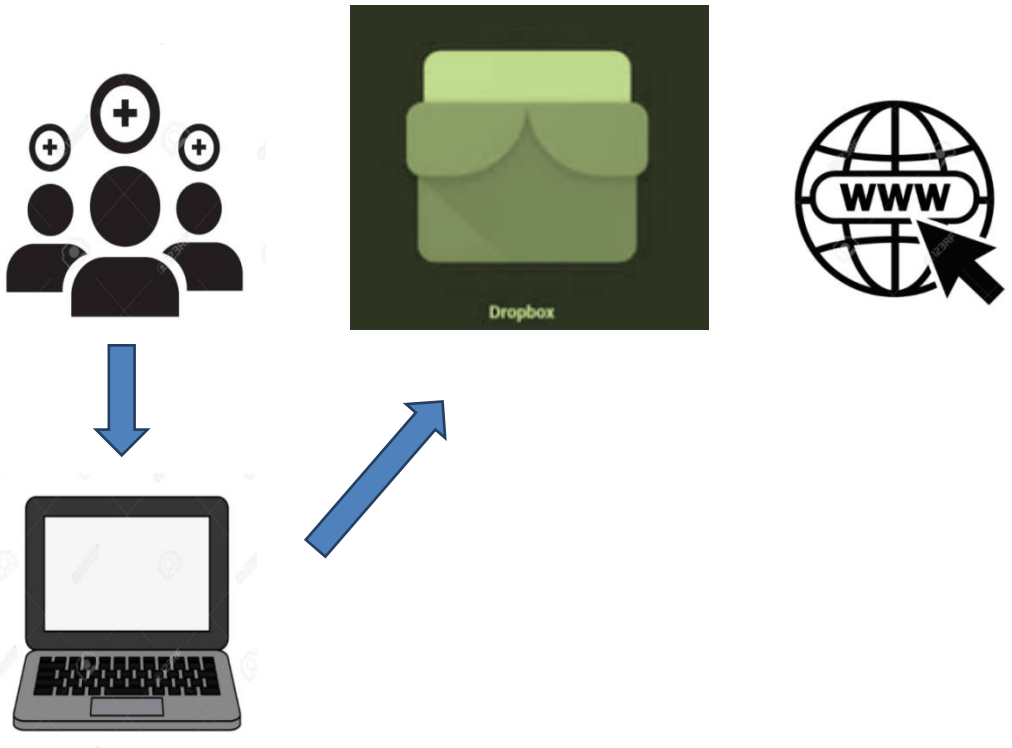

Figure 2. Data Flow Diagram for E-APPRAISALapp

The data flow shows the main process of using the application. Once the supervisors, deansor heads encoded the scores within the system E-APPRAISALapp using a laptop computer or android mobile phone with MS Excel application, the record may be savedor stored inside the computer and/or the mobile phone, or perhaps be forwarded (by means of email/dropbox) to other authorities within the local college – such as the human resource director, the Vice President for Academic Affairs or the College President. It is noteworthy that even in the absence of internet connection, the program would work; internet is only required when the record shall be forwarded electronicallyto other college authorities.

Physical Specifications

1. *Software Requirements*. The E-APPRAISALapp, as asserted beforehand, is a functional program, hence, it is MS Excel-based. The basic software specification is the inclusion of the MS Excel application within a laptopor desktop computer and/or android mobile phone. The E-APPRAISALapp consistsof algorithms that calculated the mean ratings, the grand mean and the corresponding adjective rating scales, as show in Table 1.

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

2. *Hardware Requirements*

Table 2. Recommended Specifications for Hardware Requirements

DEVICE & EQUIPMENT	RECOMMENDED SPECIFICATION
Operating System	Windows 1.0
Processor	Intel(R) Core(TM) i5-6200U Processor @ 2.30GHz 2.40 Ghz
Memory	4GB DDR3L
Storage	1TB SATA HDD

Test Procedures

Before the release of E-APPRAISAL app, the functional program was tested with different test procedures to ensure that the application will work with its intended function. Firstly, the application was tested through “unit testing”. This is to ensure if the program provides the accurate

output per level of input; test data were utilized. The researchers did manual calculations and had comparisons with the data generated by the application. Secondly, the researchers conducted “integration testing”, whereinthe worksheets (per faculty included within the performance appraisal) inserted within the workbook had been tested for accurate result. Thirdly is “system testing”, wherein the application had been evaluated by the respondents based on functionality, reliability, usability, efficiency, maintainability, and portability. Finally, "acceptance testing” has been conducted. This step aimed to testthe acceptability of the entire system, wherein the users made assessments on the aspects of functionality, reliability, usability and efficiency of the system. In a nutshell, acceptance testing answers the basic questions: Did the system delivered the user requirements? Is the application ready for implementation?

Evaluation Criteria and Evaluation Procedures

Aside from the point that the researchers prepared structured interview questionsand observation to collect facts in developing this research, various stakeholders (the respondents of the study), had been allowed by the researchers to evaluate the application using the evaluation toolor questionnaire that is based ontheInternational Organization for Standardization (ISO) 9126. ISO 9126 (Software Quality Assurance), is a quality model that determines which quality characteristics shall be accounted for when evaluating the properties of a software product. Moreover, there are six quality characteristics as defined in ISO 9126. First is “functionality”, which represents the performance of the system, from executing the task required to keeping the system safe from possible intrusions. Second is “reliability”, which refers to the degree to which a system, product or component performs the specified functions under specified conditions, for a specified period of time. Third is “usability”, whichrepresents the degree to which a product or system can be used by specified users to achieve specific goals, effectively and efficiently (with satisfaction, too). Next is “efficiency”, whichrefers to the performance relative to the amount of resources used under constrained conditions. Fifth is “maintainability”, whichrepresents the level of effectiveness and efficiency with which a productor system could be modified for improvement, or makes it possible to adapt to certain changes in the environment and/or user requirements. The sixth quality characteristic based on ISO 9126 is “portability”, wherein this attribute represents the degree of effectiveness and efficiency with which a system, product or component can be transferred from one hardware, software or other operational environment to another.

Results and Discussion

After the development of E-APPRAISALapp, the following screenshots from the functional program are evident, based on identified features in requirements specification analysis:

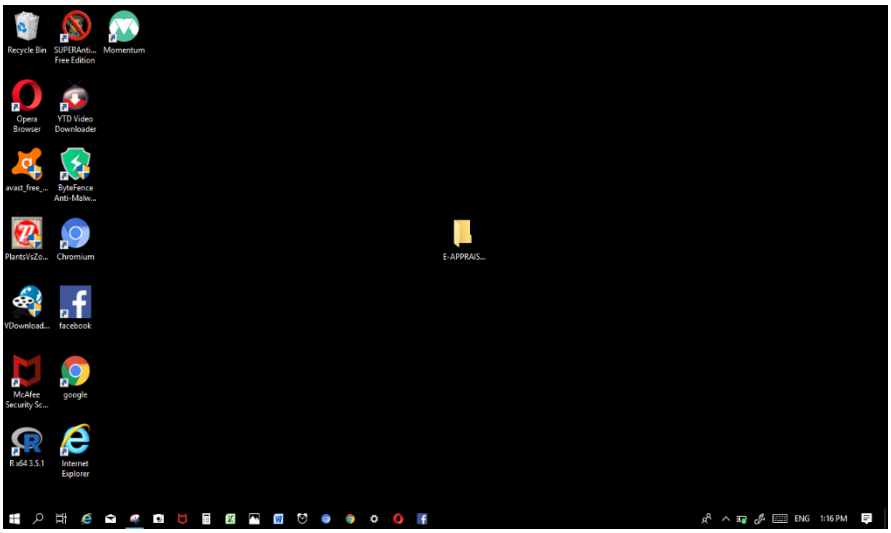

Figure 3. The Icon of E-APPRAISALapp as Installed in a Laptop Computer (the folder at the center of the image)

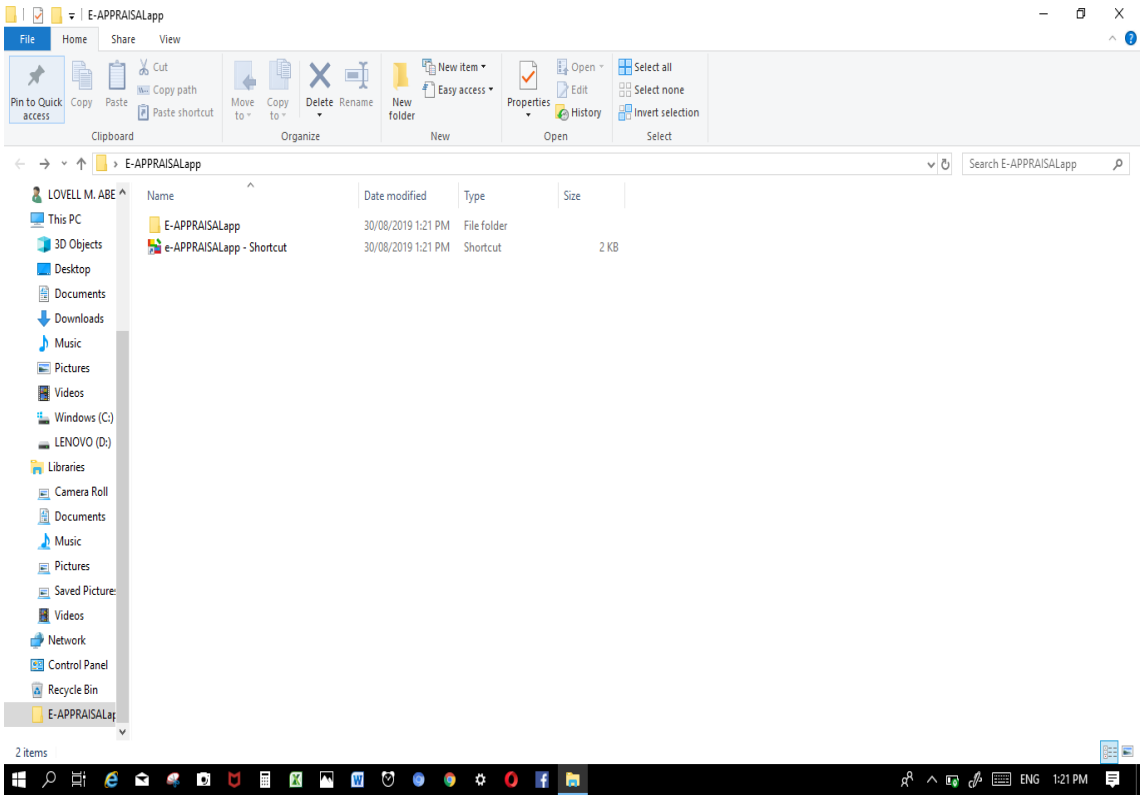

Figure 4. Contents of the Folder for E-APPRAISALapp as Installed in a Laptop Computer (as shown in Figure 3)

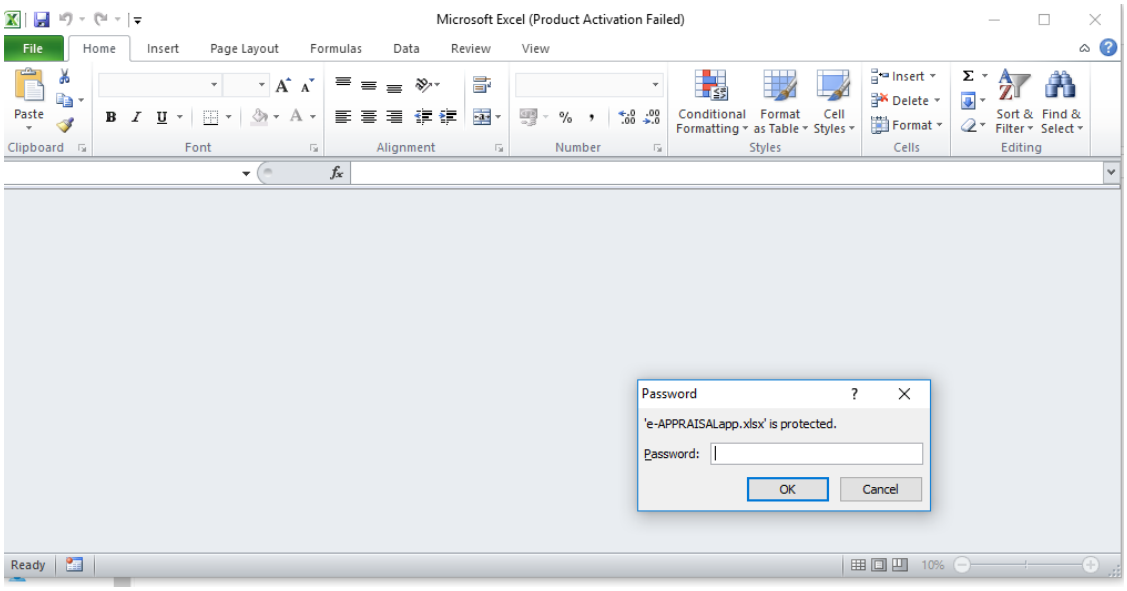

Figure 5. Access of E-APPRAISALapp Prompts a Password

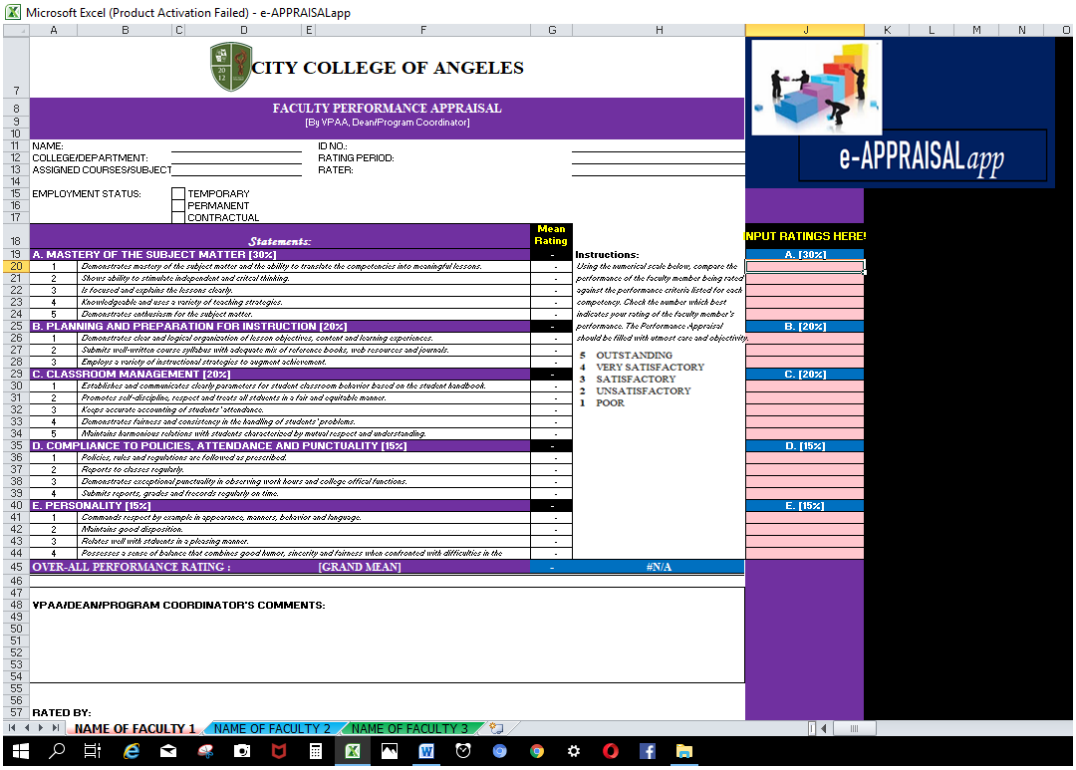

Figure 6. User Interface of E-APPRAISALapp

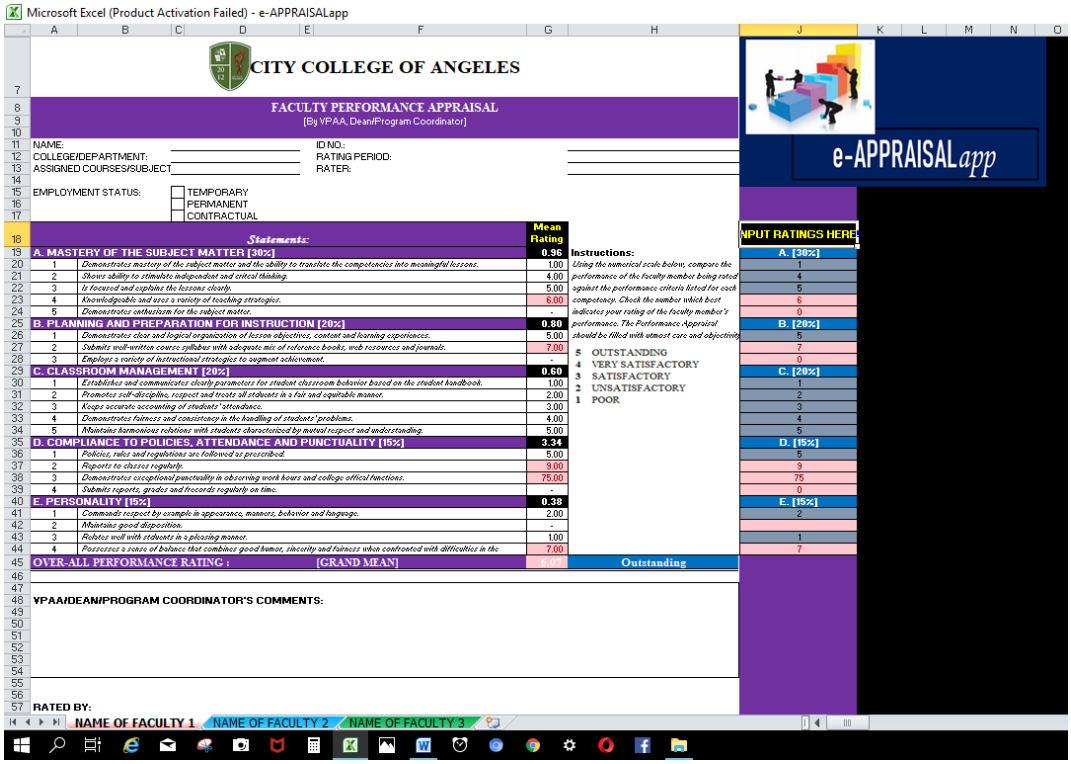

Figure 7. User Interface of E-APPRAISALapp with Erroneous Encoded Scores/Ratings

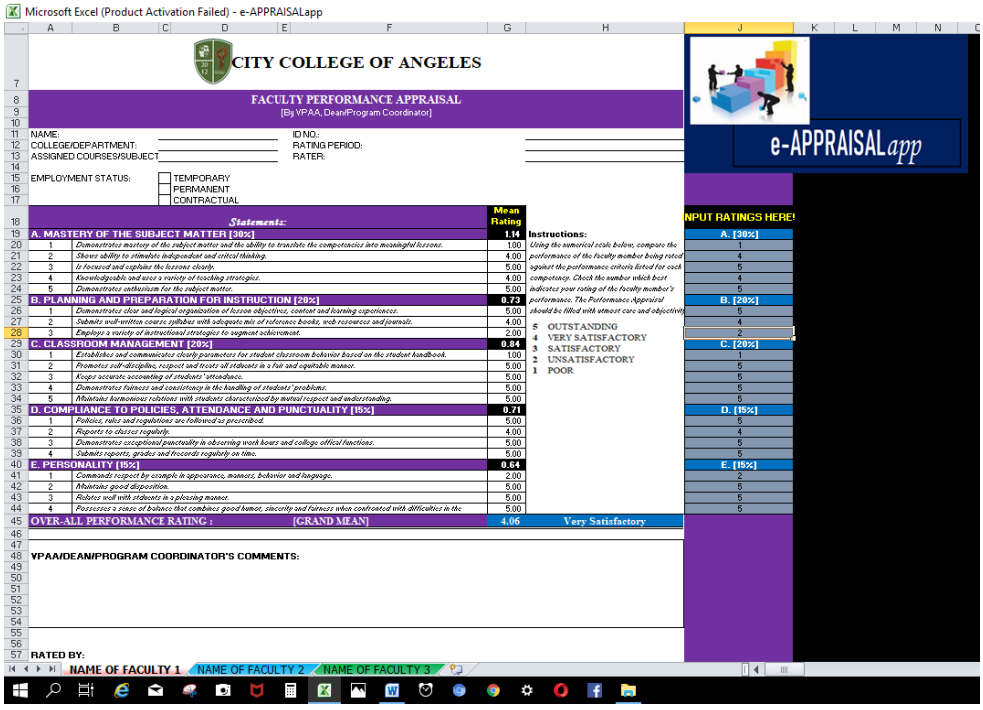

Figure 8. User Interface of E-APPRAISALapp with Complete and Accurate Encoded Scores/Ratings

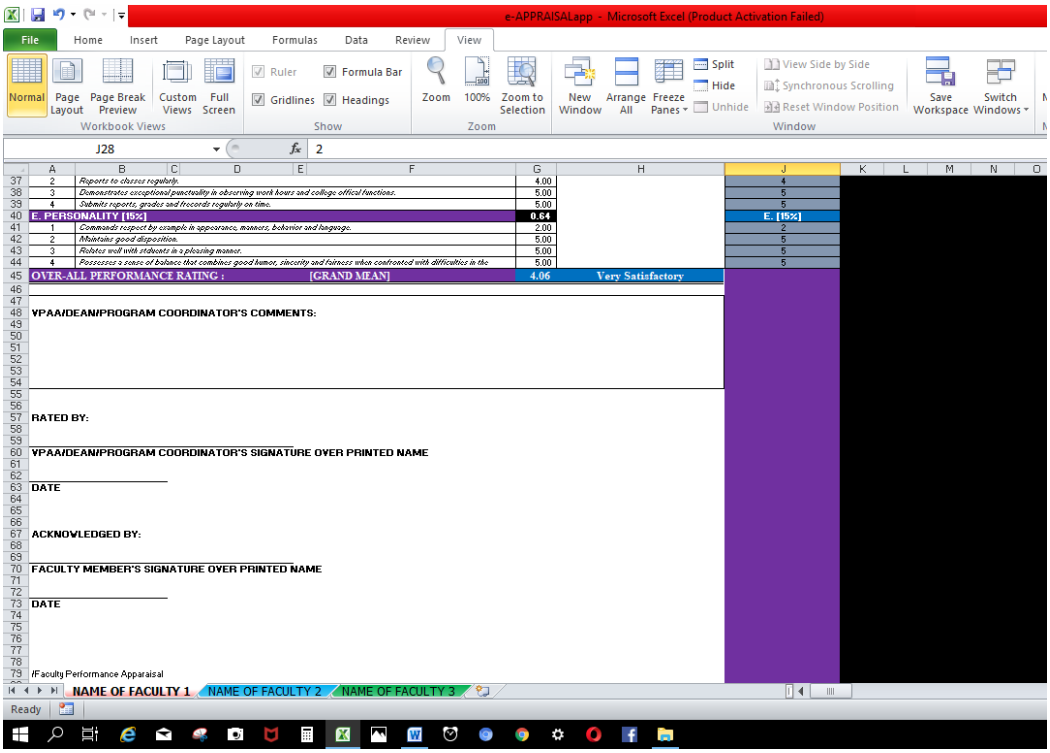

Figure 9. Portion of User Interface of E-APPRAISALapp with Showing the Comments and Signatories Sections

It is apparent from the screenshots presented, particularly in Figure 7, that erroneous scores (zero and any score greater than 5) would result in a red color mark. While in Figure 8, correct entries (range of 1 to 5 scores) resulted to a gray color mark. The default color is "red" for the ratings portal. However, the color would change to "gray" once am acceptable range of scores were encoded; the cells would remain red until a valid score has been entered. The user interface also includesworksheets (name of faculty 1, 2 and 3 – located below the application), which are intended for more than one (1) faculty member being evaluated.

Moreover, the functional program has been evaluated by a total of 22 respondents. The compositions are: 13 academic program coordinators, 3 I.T. experts, 3 institute deans, the HRD director, the Vice President for Academic Affairs and the College President. The system has been evaluated in terms of functionality, reliability, usability, efficiency, and portability.

Evaluation questionnaires were given to the evaluators where the Likert Scale has been used to rate each of the characteristics of the functional program. The evaluation criteria were explained explicitly to the evaluators.

Table 3. Assessment of Academic Program Coordinators

CRITERIA	MEAN	DESCRIPTIVE RATING
Functionality	4.57	Very Good
Reliability	4.42	Very Good
Usability	4.15	Very Good
Efficiency	4.86	Very Good
Maintainability	4.56	Very Good
Portability	4.68	Very Good
Total	4.54	Very Good

Table 4. Assessment of I.T. Experts

CRITERIA	MEAN	DESCRIPTIVE RATING
Functionality	4.57	Very Good
Reliability	4.42	Very Good
Usability	4.15	Very Good
Efficiency	4.86	Very Good
Maintainability	4.12	Very Good
Portability	4.68	Very Good
Total	4.47	Very Good

Table 5. Assessment of Institute Deans

CRITERIA	MEAN	DESCRIPTIVE RATING
Functionality	4.68	Very Good
Reliability	4.52	Very Good
Usability	4.68	Very Good
Efficiency	4.86	Very Good
Maintainability	4.1	Very Good
Portability	4.68	Very Good
Total	4.59	Very Good

Table 6. Assessment of the HRD Director

CRITERIA	MEAN	DESCRIPTIVE RATING
Functionality	4	Very Good
Reliability	5	Very Good
Usability	4	Very Good
Efficiency	5	Very Good
Maintainability	4	Very Good

Portability	5	Very Good
Total	4.5	Very Good

Table 7. Assessment the Vice President for Academic Affairs

CRITERIA	MEAN	DESCRIPTIVE RATING
Functionality	4	Very Good
Reliability	5	Very Good
Usability	5	Very Good
Efficiency	5	Very Good
Maintainability	4	Very Good
Portability	4	Very Good
Total	4.5	Very Good

Table 8. Assessment the College President

CRITERIA	MEAN	DESCRIPTIVE RATING
Functionality	4	Very Good
Reliability	5	Very Good
Usability	5	Very Good
Efficiency	5	Very Good
Maintainability	4	Very Good
Portability	5	Very Good
Total	4.67	Very Good

Tables 3 to 8 resulted to an overall mean that states that the functional program evaluated by a total of 22 respondents (with compositionof: 13 academic program coordinators, 3 I.T. experts, 3 institute deans, the HRD director, the Vice President for Academic Affairs and the College President) is "very good". This signifies that the E-APPRAISALapp met the qualities of a good functional program. On the other hand, some of the hints provided by the respondents are: (1) additional worksheets be inserted, for the anticipation that more faculty members shall be evaluated; and (2) improvement of the user interface, in terms of color, font, font size and the like.

Conclusions and Recommendations

Based on the foregoing, apparently the functional program E-APPRAISALapp satisfied the respondents' understanding about the attributes of a quality system. The application may not be sophisticated. Thus, it is cost-effective without compromising reliability of results. So far, the objectives of an efficient and reliable faculty performance appraisal have been satisfied. Furthermore, the development, the eventual implementation and the furtherance of this application is a good start in the advocacy of e-governance for one of the academic thrusts of the local college.

References

1. Beck, K. (1999). *Extreme programming explained: Embrace change*. Addison-Wesley.

2. Gallagher, H. A. (2004). Vaughn Elementary's innovative teacher evaluation system: Are teacher evaluation scores related to growth in student achievement? *Peabody Journal of Education*, *79*(4), 79–107.

3. *Information technology — Software product quality*. ISO/IEC 2000. Retrieved from https://www.cse.unsw.edu.au/~cs3710/PMmaterials/Resources/9126-1%20Standard.pdf

4. Matharu, G. S., et al. (2015). *Empirical Study of Agile Software Development Methodologies: A Comparative Analysis*. SIGSOFT Softw. Eng. Notes 40, 1, 1-6. Retrieved from https://doi.org/10.1145/2693208.2693233.

5. Kimball, S. M., et al. (2004). Examining the relationship between teacher evaluation and student assessment results in Washoe County. *Peabody Journal of Education, 79*(4), 54–78.

6. Milanowski, A. T., et al. (2005). *Teacher accountability measures and links to learning.* In L. Stiefel, A. E. Schwartz, R. Rubenstein & J. Zabel (Eds.), *Measuring school performance and efficiency: Implications for practice and research* (pp. 137–162). Larchmont, NY: Eye on Education.

7. Pressman, R. S. (2010). *Software engineering, a practitioner's approach*. McGrawHill, USA.

8. Shaikh, N., et al.(2009).*E-Governance in education as an effective management control tool in developing human resource-faculty appraisal system, second international conference on emerging trends in engineering & technology*,Nagpur. 410-415.

9. Taylor, E. S., et al. (2010). *The effect of evaluation on teacher performance*. Retrieved from https://scholar.harvard.edu/files/evaluation-performance-tt.pdf.