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# Design and Development of Faculty Performance Evaluation System (FPES) v2.0

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**Abstract.** One of the essential ingredients in establishing trust in academic institutions among its stakeholders is the quality of its learning providers. Hence, it is imperative to continually adapt innovations to improve educators' evaluation process and deliver a reliable result for data-driven decision-making. This study focused on enhancing the existing faculty performance evaluation system (FPES) for the Camarines Sur Polytechnic Colleges (CSPC) following the RUP's Iterative Model as its system development methodology (SDM). A total of 75 respondents were identified using specific sampling techniques according to the respondent type. The participants' responses from the unstructured interview and survey were the basis of the upgrade, uncovering the current status of the FPES version 1.0 (FPES v1.0) and its level of acceptability according to the ISO 9126 Software Quality Metrics. Using the same indicators, respondents evaluated the proposed FPES version 2.0 (FPES v2.0) and employed Chi-Square Statistics and Cramer's Rule to compare the performance of both systems. Findings revealed an overall rating of 4.0025 Likert Score for the FPES v1.0, indicating its acceptability in terms of functionality, reliability, efficiency, maintainability, and portability. However, a significant improvement in the overall rating for the FPES v2.0 with a 4.53 Likert Score justifying the system as strongly acceptable. The results signify that the enhancement of the faculty performance evaluation system (FPES v2.0) manifested a positive impact in the institution's faculty performance evaluation process, thus a favorable alternative to the existing system. Nonetheless, carrying out the recommendations, particularly enhancing the system's functionalities as needed over time, will ensure the sustainable use of the system.

## INTRODUCTION

Faculty Evaluation has been defined as a tool to evaluate the vitality of tenured faculty, assess faculty performance, guide supervisors in personnel decision-making, and know the faculty's contribution to the learning experience of the students (1,2). This is an essential customary practice in academic institutions wherein paper-based and cloud-based faculty performance evaluation methods are two commonly utilized approaches for assessing quality teaching in Higher Education Institutions (HEIs). Many colleges and universities started considering the move towards a cloud-based method because of the many issues encountered in the implementation of the traditional approach – paper-based faculty performance evaluation (FPE) and the strengths of a cloud-based / web-based procedure. Given that several studies highlighted some deficiencies of the former method (3), and many have asserted the strengths of the latter hence, several private and government HEIs started considering the transition to online or the use of a cloud-based or web-based platform in carrying out the faculty evaluation process. Weaknesses of a paper-based method such as instructors may manipulate ratings through their comments and actions when distributing the questionnaires, alteration of results before turning the evaluation forms in is a vast possibility, and the lack of written comments due to time constraints (3) are underpinning factors of the transition. On the contrary, the online evaluation has proven its potential benefits in Administrative Cost, Accessibility and Convenience, Survey Cycle Time, and Security (4–9).

In the Philippines, the FEU Teaching Performance Evaluation System (FEU-TPES), a web-based FPE implemented at the Far Eastern University (FEU) since 2004, evidently presented the benefits of using the system, such as integrity of the source of data, reduction in the use of resources, ease in revisions, accuracy and confidentiality of data, lower administrative cost, rise in student participation, availability of reports, and data accessibility (4). Likewise, the Apayao State College supports the conduct of a web-based FPE, proving that automation of the assessment process shall eradicate the possibility of data manipulation and shall produce better and flexible reports (10). Along with this, a study conducted by Salas on developing a web and mobile-based FPES

confirms that there is a positive approval from the respondents in terms of the level of acceptability of the system based on the ISO 9126 Software Quality Standard (9).

The establishment of the affirmative influence of the online faculty evaluation technique prompted researchers and developers to expand technological innovations in web-based platforms. Among these modernizations include the incorporation of algorithms to manage and interpret quantitative and qualitative data, the inclusion of other indicators to assess faculty performance beyond the classroom context, and the integration of prescriptive analytics to cover the recommendations based on the faculty performance assessment results (11–13).

CSPC has long been initiating its innovations on ICT-zation, pertaining to the integration of Information and Communication Technology (ICT) in its day-to-day transactions. The administration's move has traversed from the automation of office transactions to the essential academic processes of the college, including the computerization of the faculty performance evaluation process. The existing faculty performance evaluation system (FPESv1.0) is a cloud-ready system covering the following modules: [1] Login Module, which improved the data security and data integrity because of the presence of secured authentication process; [2] Manage Evaluation Module, allowing the administrator and super administrator to update evaluation settings in the system. These settings include activation of schedule, updating of the list of subjects, instructors, and students, and automatic calculation of faculty ratings resulting in the reduction in the consumption of resources; [3] Evaluation Module, allows the students to evaluate all their instructors for the semester at their own pace and convenience because of the cloud-based structure of the system; [4] Generate Ticket Code, the system generates ticket codes for the students after completion of the evaluation process, this provides control in the students' participation in the evaluation process; [5] Generate Report Module, this provides reports needed by the college, which are in accordance to the required format by requesting offices; [6] Manage User's Account, this feature allows any users to update details in their account; and [7] Generate Logs, this provides accountability to the selected user, who has a crucial role in the evaluation process.

Despite the positive impact of the abovementioned system, necessary upgrading is essential to cater to the users' growing needs and the underlying technical improvements following the end-user's requirements. The enhancement was based on the features needed by respective departments, which were not considered in crafting the first version. Moreover, identified technical flaws of the system, particularly the database design and other relevant deficiencies, were considered for further improvement. These were completed by conducting an initial investigation and collating important information on the FPESv1.0 and integrated revisions accordingly.

## METHODOLOGY

This section contains a discussion of the research methods and processes applied in the study.

### Software Development Methodology (SDM)

Among the number of existing SDMs, the researcher adopted the Rational Unified Process (RUP) Iterative Model (14) in crafting this research, the design and development of Faculty Performance Evaluation System (FPES) v 2.0. An illustration of the development process of FPES v2.0 is simulated in the model presented in Fig 1.

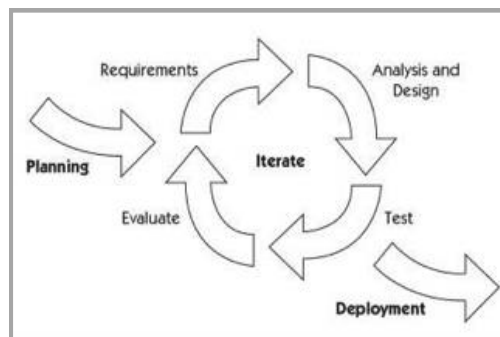


FIGURE 1 RUPs Iterative Model

The RUPs Iterative Model consists of six (6) phases covering the processes in the development of the system along with the deliverables for each phase. The initiation of the project begins in the *Planning Phase*. It deals with the specification of scope and preparation of data gathering tools; the iteration process starting with the *Requirements Phase* gathered the project requirements (both functional and non-functional); *Analysis and Design Phase* covered the analysis of the gathered requirements and converted it into system models. Further, the system development proper following the crafted system models as the blueprint of the proposed system; *Test Phase* ensured that the system covered entirely the requirements based on the client's needs through Beta testing. The test was documented and guided by a test plan; the *Evaluation Phase* included the assessment of the system's acceptability in terms of the identified ISO Software Quality Standard by the end-users and IT experts. The results decide whether another iteration is needed for the refinement of the system or shall be moved towards deployment; Lastly, the *Deployment Phase* is where the implementation of the system and training for the administrator and other significant end-users occur.

### Research Methods and Statistical Tools

The nature of the research dealt with the characterization of specific subjects using descriptive methods and establishing significant relationships among these using statistical tools, thus the adoption of the *descriptive-comparative research design*. Descriptive methods such as a *face-to-face Unstructured Interview* and a *survey* using a questionnaire were implemented to elicit responses to the following specific objectives: to evaluate the level of acceptability of FPES v1.0, to develop FPES v2.0, to evaluate the level of acceptability of FPES v2.0, and to determine the statistical difference of the two systems based on the identified metrics.

Since the system shall be utilized by the academic departments and other personnel involved in the faculty performance evaluation process, the selected respondents include the students, and faculty members of the College of Computer Studies (CCS), the deans and clerks of the academic departments, and IT experts as presented in Table 1.

**Table 1.** *Distribution of Respondents*

Respondents	Frequency	Percentage
CCS Students	30	40
Faculty	25	33
Department Deans	5	7
Department Clerks	10	13
IT Experts	5	7
Total	75	100

This study made use of *total enumeration* for the department deans and clerks. However, *convenience sampling* was implemented for CCS Students, CCS Faculty, and IT Experts because of the ongoing pandemic. The respondents evaluated the existing and the proposed system using the identified variables, namely, the Functionality, Usability, Efficiency, Portability, and Maintainability of the system based on ISO 9126 Software Quality Metrics. Further, the summary of results obtained from frequency, each indicator's weighted mean (WM), and the average weighted mean (AWM) for each variable were interpreted using the 5-Point Likert Scale with the range, verbal description, and verbal interpretation shown in Table 2.

**Table 2.** *Likert Scale*

Scale	Range	Verbal Interpretation (VI)	Verbal Description
5	4.2 – 5.0	Strongly Agree	This response indicates the process is highly acceptable with respect to the described criteria.
4	3.4 – 4.19	Agree	This response indicates the process is acceptable with respect to the described criteria.
3	2.6 – 3.39	Fairly Agree	This response indicates the process is barely acceptable with respect to the described criteria.
2	1.80 – 2.59	Disagree	This response indicates the process is unacceptable with respect to the described criteria.
1	1.0 – 1.79	Strongly Disagree	This response indicates the process is terrible with respect to the described criteria.

The verbal description for each verbal interpretation was employed to interpret the calculated numerical ratings to justify the research findings, specifically on the evaluation of both the existing and the proposed systems. However, to validate any improvement brought by the FPES v2.0, the application of the *Chi-Square Statistics* tested the statistical relationship among the associated variables, which include the ISO 9126 metrics result and measured the strength of association between the categorical variables (Performance of FPES v1.0 vs. FPES v2.0 based on ISO 9126) using Cramer’s V (15).

Cramer’s V	Verbal Interpretation
> 0.25	Very Strong
> 0.15	Strong
> 0.10	Moderate
> 0.05	Weak
> 0	No or Very Weak

## RESULTS AND DISCUSSION

### The Present Status of FPES v1.0

The researchers conducted a consultation session with the deans, faculty members, clerks, and students regarding FPES v1.0 and gathered several feedbacks. Further, a questionnaire was distributed to each respondent to elicit responses based on their assessment of the FPES v1.0 in terms of Functionality, Efficiency, and Usability. Similarly, a separate questionnaire was provided to the IT experts to evaluate the existing FPES in terms of Portability and Maintainability. This was analyzed and was made the basis for the development of the proposed system.

**Table 3.***Level of Acceptability of the FPES v 1.0 (in terms of Functionality, Efficiency, and Usability)*

Indicators	Students		Clerks		Faculty		Deans		Overall	
	WM	VI	WM	VI	WM	VI	WM	VI	AWM	VI
Functionality	4.3	SA	3.2	FA	4.3	SA	4.2	SA	<b>4.0</b>	<b>A</b>
Efficiency	3.8	A	4.1	A	4.2	SA	4	A	<b>4.03</b>	<b>A</b>
Usability	4.2	SA	3.3	FA	3.43	A	4	A	<b>3.73</b>	<b>A</b>
AWM	<b>4.1</b>	<b>A</b>	<b>3.53</b>	<b>A</b>	<b>3.98</b>	<b>A</b>	<b>4.07</b>	<b>A</b>	<b>3.92</b>	<b>A</b>

Based on the collated data, the respondents generally agreed that FPES v1.0 is **acceptable** in terms of *Functionality*, *Efficiency*, and *Usability*, consistent with the 4.0, 4.03, and 3.73 Likert Scores, respectively. The specified ratings imply that majority of the respondents were certain that the process meets its specified purpose. Nevertheless, the clerks, who are considered the system's administrator, believed that the system did not meet some of its required goals, particularly under its Functionality and Usability from their end, relative to their comments during the consultation or unstructured interview. In general, the existing process was rated as a 3.92 Likert Score, signifying that all respondents agreed on the acceptability of the process. The researcher, however, emphasized the weaknesses of the system as indicated in the gathered inputs to enhance the process.

On the other hand, the IT Experts evaluated the acceptability of the existing FPES in terms of Portability and Maintainability, as presented in Table 4.

**Table 4.***Level of Acceptability of the FPES v 1.0 (in terms of Maintainability & Portability)*

Indicators	IT Experts	
	WM	VI
Maintainability	4.03	A
Portability	4.14	A
AWM	<b>4.085</b>	<b>A</b>

The existing system was rated 4.03 and 4.14 under Maintainability and Portability, implying that the technical experts agreed that the system is **acceptable** aligned with the criteria under the two metrics. However, the discovered specific lapses under the indicators were considered, such as the database design and the system's behavior in other devices.

## Development of FPES v2.0

Considering the users' experience based on the consultation and survey results, the researcher proposed this solution: upgrading the existing FPES v1.0 or the design and development of the FPES v2.0. A software development methodology guided the development process – RUP's Iterative Model, as conceptually discussed in the previous section.

With the emergence of web-based and mobile-based faculty evaluations, which were proven to improve the process of faculty evaluation of several institutions in terms of the integrity of the source of data, reduction on the use of resources, ease in revisions, accuracy, and confidentiality of data, lower administrative cost, rise in student participation, availability of reports, data accessibility, and eradicate the possibility of data manipulation (4,9,10). Hence, the researcher proposed an upgraded cloud-based structured system tailored-fit for the Camarines Sur Polytechnic Colleges (CSPC) to enhance the existing system.

To better understand the scope of the project based on the users' needs, the following functional requirements of the proposed system, summarized in Table 5, were crafted by the researcher and were discussed and approved by the academic departments. The primary purpose was to develop the system's scope (\*), which can be acceptable to the users in terms of Functionality, Efficiency, and Usability.

**Table 5. FPES v2.0 Functional Requirements**

Functional Requirements	
Student	<ul style="list-style-type: none"> <li>• The implementation of the Single-Sign-On (SSO) process since the system shall be integrated with the other School Information Systems (IS)*</li> <li>• The system shall provide an updated evaluation instrument*</li> <li>• The system ensures confidentiality</li> <li>• The system shall generate a list of faculty to be evaluated by the student</li> <li>• The system shall generate a ticket code as a confirmation of the completed evaluation process.</li> </ul>
Faculty	<ul style="list-style-type: none"> <li>• The system shall allow/enable faculty to view the Summary of his / her rating and comments</li> <li>• The system shall provide a progress report</li> </ul>
Secretary/Administrator	<ul style="list-style-type: none"> <li>• The system shall allow the administrator to manage the evaluation process and data*</li> <li>• The system shows a real-time update on the status of the evaluation, such as the overall and per faculty percentage turnout</li> <li>• The system shall provide a progress report of the faculty by semester</li> <li>• The system shall generate a summary of student-faculty evaluation in ISO Format with options to print it by rank or alphabetically</li> <li>• The system shall automatically calculate the numerical ratings with its verbal interpretation of the evaluation</li> </ul>
Dean	<ul style="list-style-type: none"> <li>• The system shall allow the dean to view the evaluation status, showing the overall percentage turnout on the current and previous semesters.</li> <li>• The system shall allow the dean to generate a summary of student-faculty evaluation in ISO Format with options to print it by rank or alphabetically</li> <li>• The system shall allow the dean to view the faculty's progress report*</li> </ul>
Super Administrator	<ul style="list-style-type: none"> <li>• The system shall allow the super administrator to manage the year and semester, manage the department, manage the account, export data, and generate a log report*</li> <li>• The system shall provide options for updating the evaluation instruments.*</li> </ul>

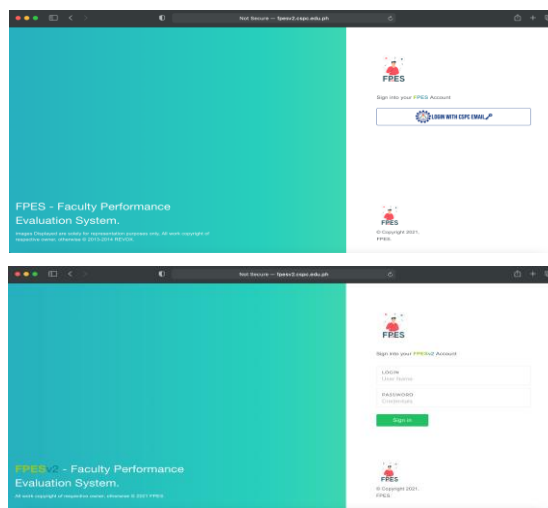
The implemented upgrades (\*) were further discussed in the subsequent section. It examined the seven system modules with descriptions of how the old and proposed system behaves and a sample graphical user interface (GUI), highlighting its additional features.

*Login Module.* This module covered the system's user account's authentication process—sample interface presented in Fig. 2.

FPES v2.0: Since the system uses an Application Programming Interface (API) connected to profile.cspc.edu.ph, it implements a unified login for students using their institutional emails. This made it easier for the students to remember their login credentials, reducing “password fatigue” among them. Further, this initiates an efficient step to access the system.

FPES v1.0: Among the procedures are the following: Step 1—Admin extracts the list of students in CSV format from the school's enrollment system; Step 2—Admin uploads the file to FPES v1.0; Step 3—the System generates login credentials separate to their accounts in the school's enrollment system, and Step 4—the office manually distributes the username and password during the scheduled faculty evaluation.

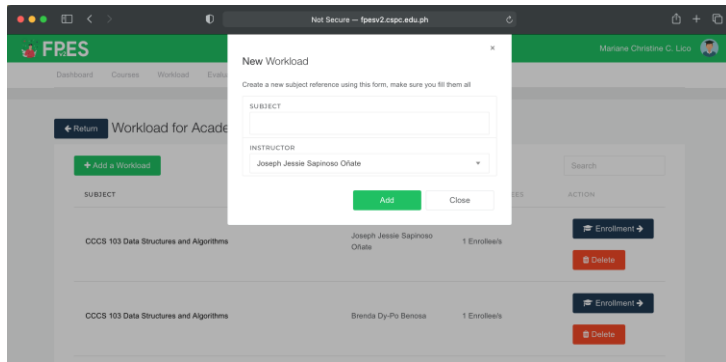
*Manage Evaluation.* This is a major process in the system



**FIGURE 2** FPES v2.0 Login Interface

incorporating all the needed setup for the conduct of the online evaluation procedures. The activation of the evaluation schedule spared the clerk's time and effort from roaming around the campus to look for the instructor's classes to facilitate the evaluation process. Thus, it manifests control in the process by providing a flexible time opportunity for each student to evaluate their respective instructors as per the allotted schedule. Note that the evaluation process follows a particular schedule every semester, and the number of evaluators per faculty is indicated as academic targets. This way, it shall ensure its accomplishment given the system's capability.

In addition, another feature in this module is the updating of faculty workload, as shown in Fig 3. This function adds the different courses/subjects handled by the faculty members. The faculty workload can be uploaded in two ways: uploading a CSV file with the list of faculty and respective subject loads and assigning multiple subjects for each faculty using the web form.



**FIGURE 3** Adding of Faculty Workload

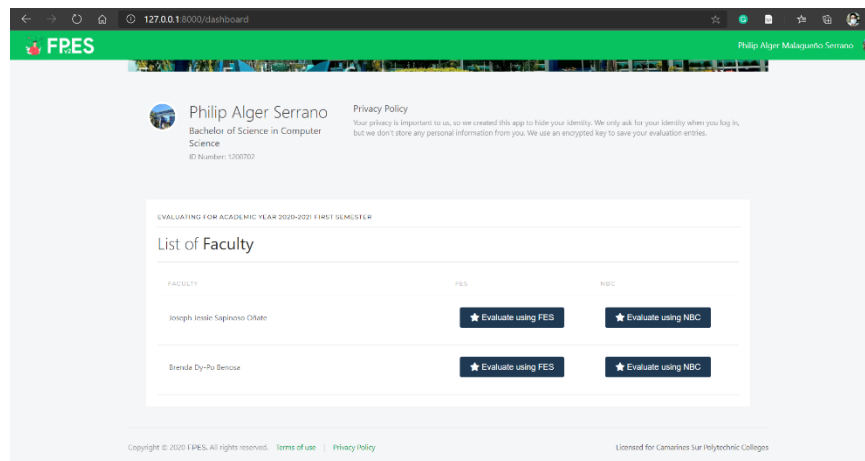
The process of uploading the workload entails the selection of the instructor and their assigned subjects. The subjects/courses are pre-encoded; therefore, an effective searching method given the list of courses/subjects in all programs. Moreover, after the setting-up of faculty workload, the module also facilitates the students' enrollment for each subject. The process is done by uploading the list of students enrolled in the subject under the

assigned faculty. It is a CSV file populated with the student's ID number.

These processes ensure that all handled subjects by the faculty will be considered and that all students under all handled subjects will be given a chance to evaluate. However, if the faculty handles two subjects in a section, the faculty will only be assessed once. This is in accord with the existing process of the college. The conglomeration of the different components under this module responded to the issues on the ease in the conduct of the faculty evaluation and conservation of sufficient resources similar to the cited benefits of the web-based evaluation process of the Far Eastern University (4).

**Evaluation Module.** This enables all students to evaluate all their instructors for the semester quickly and conveniently because of remote access.

**FPES v2.0:** Two instruments are available in the system illustrated in Fig. 4; therefore, students can assess their respective instructors using both instruments. These forms are both being utilized in the manual process. Although the required number of respondents for the NBC Form is only 30 based on the NBC guidelines, it was designed as mandatory for all students. What separates this version from the existing one is its dynamic input form, which allows the user to update, add, or change the faculty evaluation instrument whenever needed, such as revisions due to irrelevance.



**FIGURE 4** Access to Evaluation Instruments

**FPES v1.0:** Hard-coded evaluation instrument; thus, any updates in the instrument are not possible using the web form.

**Generate Ticket Code Module.** The system generates ticket code on the side of the students' interface after the completion of the evaluation process, i.e., all the respective instructors were completely evaluated by the student evaluators. This process ensured the participation of the students in the evaluation process since the ticket code serves as proof of completed evaluation. Although this ticket may be printed, the student may just present the ticket



code with his/her ID. Since the completion of the student-faculty evaluation process shall be a requirement in the signing of the student's final clearance, the student ticket validator under the clerk's access shall be the tool to confirm the participation of the students. Therefore, easier implementation of total enumeration, i.e., giving every student a chance to assess the teaching performance of a faculty.

**Generate Report Module.** The reports generated by the system are within the needed format of the college. The generated reports are the following: summary of rating per faculty and rating per department with options either to print alphabetically or by rank. The summary of rating per faculty summarizes all comments given by the students and automatically calculates the rating with its corresponding verbal interpretation. The clerk and dean can access the summary of faculty ratings arranged according to rank based on numerical ratings. Besides the tabular forms, the system can also generate graphical reports. Generated visual reports depict the evaluation rate per semester. It exhibits the summary of faculty ratings at a glance. The clerk, and the dean, can access this report for departmental performance monitoring.

Similarly, the system can also generate a progress report per faculty. This shall easily convey a visual representation of the faculty's performance over time. The individual performance of faculty members contributed to the ease in the implementation of the method as it resulted in timely generation and submission of reports. Further, it provides accurate numerical ratings and verbal interpretation since the computations were embedded in the system.

**Manage User's Account Module.** Managing accounts, which involves the generation of accounts and updating of users' details, are implemented in this module. Generation and updating of the user's details can be accessed from the super administrator's dashboard. A single account or bulk accounts can be generated in the system. This can be done by uploading a CSV file with the user's ID number, full name, and gender. The ID number will serve as the username, and a temporary alphanumeric password will automatically be generated. With the process of account authentication, mandatory updating of the user's password for the initial access of the system is necessary for security. Once the user has updated the password, it will be hashed from the back-end, which responded to the issues on unauthorized access, data integrity, confidentiality, and security.

**Generate Logs Module.** As displayed in Fig. 5, the system records the activity logs of both the super administrator and the clerks.

The screenshot shows the 'Activity Logs' page in the FPES system. It features a search bar and a table with columns for 'ACTION', 'IP', 'USER ID', 'IP', 'DATE TIME', and 'PAGE'. The table contains several entries for 'Signed out' and 'Signed in' actions, all performed by user ID 122.52.213.183. The system information for each entry includes 'Mozilla/5.0 (Windows NT 10.0; Win64; x64; AppleWebKit/537.36 (KHTML, like Gecko) Chrome/88.0.4324.96 Safari/537.36 Edg/88.0.705.56' and IP address 1300702.

ACTION	IP	USER ID	IP	DATE TIME	PAGE
Signed out	122.52.213.183	122.52.213.183	1300702	02/02/21 09:55 AM	
Signed out	122.52.213.183	122.52.213.183	1300702	02/02/21 09:55 AM	
Signed out	122.52.213.183	122.52.213.183	1300702	02/02/21 09:55 AM	
Signed in	122.52.213.183	122.52.213.183	1300702	02/02/21 09:55 AM	
Signed out	122.52.213.183	122.52.213.183	1300702	02/02/21 10:00 AM	

**FIGURE 5** Log Report

Other upgrades include the following:

FPES v2.0: Normalized Database Design; Migrated online and accessed as a subdomain of the existing CSPC website.

FPES v1.0: Non-Normalized Database Design; Uploaded in the CSPC's local server for internal network access only.

FPES v2.0: A log report can be viewed and downloaded from the super administrator's account using the web form. The logs ensured the data and process integrity of the system. Since all crucial actions are from the super administrator and Secretary, all system processes acted upon by these users are recorded.

FPES v1.0 can only generate and download the log reports in CSV format.

## Level of Acceptability of FPES v2.0

The proposed faculty performance evaluation system was tested and evaluated by IT Experts from the Center of Management Information and Communication Technology (MICT) and other end-users, as mentioned in the respondents. The basis of the evaluation was the defined variables and its indicators under the ISO 9126 Software Quality Metrics, Functionality, Efficiency, Usability, Portability, and Maintainability. Table 6 presents a summary of the results based on the evaluation of the direct end-users.

**Table 6.** *Level of Acceptability (Functionality, Efficiency & Usability)*

Indicators	Student		Secretary		Faculty		Dean		Overall	
	WM	VI	WM	VI	WM	VI	WM	VI	AWM	VI
Functionality	4.5	SA	4.5	SA	4.4	SA	4.6	SA	<b>4.5</b>	<b>SA</b>
Efficiency	4.1	SA	4.5	SA	4.2	SA	4.83	SA	<b>4.41</b>	<b>SA</b>
Usability	4.39	SA	4.7	SA	4.3	SA	4.68	SA	<b>4.52</b>	<b>SA</b>
AWM	<b>4.33</b>	<b>SA</b>	<b>4.57</b>	<b>SA</b>	<b>4.30</b>	<b>SA</b>	<b>4.70</b>	<b>SA</b>	<b>4.48</b>	<b>SA</b>

As per the ratings for each indicator, all of the respondents strongly agreed that the proposed FPES is highly acceptable in terms of Functionality (4.5), Efficiency (4.41), and Usability (4.52), which indicates the following: FPES was able to attain its functions based on the required features; the use of the system resulted in the conservation of a considerable amount of resources; and ease of use, learnability and pleasant user interface of the system, similar to the findings of reviewed related systems (10,16).

As for the evaluation of the IT Experts in terms of Maintainability and Portability, Table 7 displays the summary of the ratings per indicator.

**Table 7** *Level of Acceptability (Maintainability & Portability)*

Indicators	IT Experts	
	WM	VI
Maintainability	4.54	SA
Portability	4.62	SA
AWM	<b>4.58</b>	<b>SA</b>

The IT experts provided overall ratings of 4.54 and 4.62 in terms of the criteria, respectively, suggesting that the system was able to attain its technical requirements as defined by the experts. In general, the proposed FPES v2.0 was perceived to be highly acceptable by the respondents, confirming the positive approval of the end-users in the effect of the proposed system in the college's faculty performance evaluation process and considered a better alternative for the existing method.

During the testing of the proposed system, the researcher conducted an observation, and the following were evident: There was ease in the conduct of the evaluation process, the users believed that the proposed system was able to improve the process, the users showed an affirmative reaction on the user interface, there were convenience and understandability of the system's modules, the students were overwhelmed by the number of items in the evaluation questionnaire form; however, they were able to answer all questions quickly without any hurdles, the users considered the system as a timely initiative and the students gained more confidence in the process. These data were collated from different user types based on their actual feedback and reactions during the conduct of the faculty evaluation using the proposed system. The above-mentioned favorable feedback suggested the respondents' acknowledgment of the new faculty evaluation process using the proposed system. These perceptions are similar to the findings of local and foreign studies, probing the positive impact of online technology in the faculty evaluation process (8,17,18).

## Statistical Significant Relationship (FPES v1.0 & FPES v2.0)

To determine if there is a significant difference between the Faculty Performance Evaluation System (v1.0 and v2.0), the researcher used the Chi-Square Statistics and Cramer's Rule to identify the strength of the association of the two versions' level of acceptability.

*Research Hypothesis:* There is a significant difference between the FPES v1.0 and FPES v2.0 in terms of Functionality, Efficiency, and Usability.

*Null Hypothesis:* There is no significant difference between the FPES v1.0 and FPES v2.0 in terms of Functionality, Efficiency, and Usability.

\*with a 5% margin of error.

The statistical values presented in Table 8 were generated using SPSS.

**Table 8** *Statistical Results for Significant Difference (Functionality, Efficiency, Usability)*

STATISTICS	FUNCTIONALITY	EFFICIENCY	USABILITY
Chi-Square Result	26.343	24.738	20.833
Cramer's V	0.593	0.574	0.527
P-Value	0.000008087	0.000004248	0.000002993
df	3	2	2

Relative to the functionality, efficiency, and usability of the two versions of the system, the results showed a unanimous finding, indicating a statistical difference between FPES v1.0 and FPES v2.0 in every variable as evaluated by the end-users. Thus, it rejected the null hypothesis (with a 0.05 margin of error) and accepted the research hypothesis that there is a significant difference in the quality of the existing and the new system. This implies that the end-users are more satisfied with FPES v2.0. Further, this also signifies that the new system yields a positive influence on the conduct of the faculty performance evaluation.

However, in terms of the system's maintainability and portability as assessed by the IT experts, Table 9 displays the generated statistical values from SPSS.

**Table 9** *Statistical Results for Significant Difference (Maintainability, Portability)*

STATISTICS	MAINTAINABILITY	PORTABILITY
Chi-Square Result	0.833	1.875
Cramer's V	-	-
P-Value	0.3614	0.1709
df	1	1

The values suggest acceptance of the null hypothesis, pointing that there is no significant difference in the quality of the systems in terms of maintainability and portability. This implies that the performance of both systems under the mentioned criteria is acceptable and did not have a substantial and noticeable implication in the conduct of faculty evaluation.

## CONCLUSION

As per the conducted evaluation to cover the users' experience and the level of acceptability of the existing faculty performance evaluation system (FPES v1.0) through the unstructured interview and survey, all of the users agreed that the FPES v1.0 is acceptable in terms of the system's Functionality, Efficiency, Usability, Maintainability, and Portability. However, the enhancement focused on the suggestions made by the dean's office clerks, considering their participation in the process. They are regarded as the main end-user of the system covering the setting-up and managing the evaluation process. The result of their acceptance test expressed their sentiments on some aspects of Software Quality relative to the system's Functionality and Usability.

Further, using RUP as SDM, the system's development or enhancement contains the updated "Login Module," incorporating the SSO process; the "Manage Evaluation" component, carrying the most load of the system's processes; the system allows updating of the faculty evaluation instruments as needed; the "Evaluation Module," allowing students to assess their respective instructors using the two instruments. Further, the re-designing of the database was also undertaken to ensure the normalization of data and migration of the system in the cloud.

On the evaluation emphasizing the level of acceptability of FPES v2.0 per ISO 9126 software quality metrics, the respondents strongly agreed that the proposed FPES v2.0 is highly acceptable in terms of Functionality, Efficiency, Usability, Maintainability, and Portability. These results conformed with the 4.53 overall Likert Score of the proposed faculty performance evaluation system, thus indicating a positive approval on the effects of the proposed method in the faculty performance evaluation process of the college.

In terms of Functionality, Efficiency, and Usability, the above evaluation results manifested an improvement of the system as shown in the statistical results, indicating a significant difference between the FPES v1.0 and FPES v2.0. However, on the technical assessment conducted by the IT Experts on Maintainability and Portability, the statistical outcome shows no significant difference in its performance in terms of the indicated metrics.

Based on the drawn findings and conclusions, the following recommendations may be taken into consideration:

A stress testing may be conducted to ensure that the system can carry out the same performance when utilized simultaneously by students. In relation to the evaluation instruments adopted in the system, the NBC form only requires thirty respondents per NBC Guidelines; thus, the system may randomly select the 30 students per faculty who will evaluate using the instrument. Further, the user interface may be improved based on the client's specific needs. In terms of security, an additional measure may be implemented, such as an application of a long-term archiving scheme for data security and easy data retrieval. Finally, a qualitative analysis or sentiment analysis may be conducted to gain perceptions and insights based on the students' comments /suggestions/recommendations to improve the system's analytics. The data, which will be collated, may be used to develop faculty development programs and similar ideas for the improvement of the academic human resource.

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To God Be All the Glory.

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