Perceived Usefulness Without Ease of Use: A TAM-Based Evaluation of Enhanced Isabela State University Echague Online Resource App for a New Guild of Education (ISUE ORANGE) Functionalities

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***Abstract*—This study introduced a target enhancement for ISUE ORANGE, a customized learning management system (LMS) at Isabela State University (ISU)-Echague Campus, developed to address the post-2022 implementation challenges, specifically in progress tracking and exam integrity, through features such as question analytics, monitoring student reading progress, and online proctoring/examination. Modules were designed based on user-reported issues, and evaluated through the Technology Acceptance Model (TAM) with 145 students and 18 faculty using a 30-item Likert-scale questionnaire. Both groups demonstrated a strong acceptance with rating "strongly agree" on high perceived ease of use (PEOU) (grand means 4.56–4.65) and perceived usefulness (PU) (4.62–4.75), particularly for monitoring tools, indicating strong acceptance despite the atypical TAM path in this mature, localized context. Cronbach's Alpha (CA) confirmed excellent reliability (0.85–0.97), while the structural equation method (SEM) tested PU = γ_1 PEOU + ζ, revealing non-significant paths (β=0.118–0.145, $p>0.05$), supporting the null hypothesis (H_0). The research demonstrated faculty-led innovation for ISUs or SUCs, with direct PU driving adoption over ease, offering a scalable model for hybrid learning sustainability.**

Keywords*—ISUE ORANGE; learning management system; Technology Acceptance Model; perceived ease of use; perceived usefulness; structural equation modeling; Cronbach's Alpha; question analytics; reading progress monitoring; exam proctoring; SUCs; faculty-led innovation

I. Introduction

The shift from traditional to online instruction, accelerated by the COVID-19 pandemic, fundamentally changed how students and faculty manage learning in higher education institutions (HEIs). In the absence of face-to-face classes, information and communication technology (ICT) tools became the primary vehicle for delivering instruction. HEIs without customized learning management systems (LMS) turned to platforms such as Edmodo, Schoology, and Google Classroom, while mobile technologies like Facebook, Messenger, and text messaging served as supplementary channels for communication and monitoring student visibility. These tools proved critical for maintaining the flow of knowledge and skills outlined in course syllabi. However, a significant gap persisted: none of these platforms offered faculty a built-in mechanism to track whether students had actually read the uploaded learning materials, a function essential for confirming learner engagement and categorizing learning performance before assessments.

This gap, together with the need to adopt functionalities from Google Classroom and Edmodo that fit the university's specific instructional delivery processes, served as the impetus for designing and developing the Isabela State University Echague Online Resources App for a New Guild of Education (ISUE ORANGE). ISUE ORANGE was a web-based, unified learning management system customized for ISU, featuring sign-in, announcements, classes, modules, classwork, gradebook, and student progress tracking. The development was conducted last August, 2021, using a consultative process with the faculty from the College of Computing Studies, Information and Communication Technology (CCSICT)–Echague, incorporating the observations and recommendations into the system before pilot testing (Second Semester of 2020–2021). Issues were encountered during pilot testing. Further refinements and a User's Training held on December 13–17, 2021, to yield positive feedback and suggestions. Based on the refinement process, ISUE ORANGE was deployed campus-wide beginning in the first semester of 2022.

As expected with any campus-wide implementation, post-deployment challenges emerged. Faculty encountered difficulties with team teaching arrangements, managing student classwork, and, most critically (3) three persistent operational problems: the inability to confirm whether students had read learning materials before assessments, time-consuming manual tallying of correct and incorrect answers that reduced faculty productivity, and concerns about cheating during unmonitored online examinations. Students, for their part, perceived uneven assessment conditions without proctoring and received scores without meaningful feedback on specific item performance. These issues signaled that the first version of ISUE ORANGE, while functional, had not yet reached its full potential in supporting the hybrid learning environment on the campus.

Recognizing that a customized LMS offered the advantage of continuous, targeted improvement, unlike generic commercial platforms, the researcher undertook the design and development of ISUE ORANGE enhancements to directly address these reported issues. Following the Rapid Application Development (RAD) model within the System Development Life Cycle (SDLC) framework, three new modules were developed: question analytics to enable faculty analysis of item

difficulty based on correct and incorrect response counts, monitoring of student reading progress with idle-time detection to verify actual engagement with uploaded materials, and online proctoring/examination to enforce exam-session integrity and reduce opportunities for cheating. RAD was selected for its emphasis on rapid prototyping and iterative refinement, allowing the research team to move from feedback collection through analysis, quick design, development, testing, and deployment in cycles responsive to actual user needs.

Beyond development, however, the critical question was whether these enhancements would actually be accepted and used by the intended users. To answer this, the study employed the Technology Acceptance Model (TAM) as its evaluation framework. TAM, originally proposed by Davis (1989), posits that two core beliefs, the perceived ease of use (PEOU) and perceived usefulness (PU), are the primary determinants of technology adoption. A 30-item Likert-scale questionnaire was administered to 145 students and 18 faculty members to evaluate their perceptions of the three new functionalities. Cronbach's Alpha (CA) was used to assess internal consistency of the instrument, while structural equation modeling (SEM) tested the causal path from PEOU to PU ($PU = \gamma_1 PEOU + \zeta$), examining whether ease of use significantly influenced perceptions of usefulness in this specific, localized LMS context.

This methodological design was deliberate. While TAM has been extensively validated in studies of commercial and generic LMS platforms, its application to a faculty-developed, institution-specific system operating in a mature post-deployment phase, where users are already familiar with the platform, represents a less conventional but increasingly relevant research context. The study hypothesized (H_0) that PEOU does not have a significant effect on PU of the ISUE ORANGE enhanced functionalities, testing whether the canonical TAM assumption holds in a setting where users have moved past initial adoption hurdles and where usefulness may be driven more by direct productivity gains from specific features than by ease of navigation.

The study thus pursued two specific objectives: 1) to design and develop modules addressing the problems encountered as enhancements to ISUE ORANGE functionalities using the RAD model, and 2) to evaluate user acceptance of the newly developed functionalities using TAM, specifically assessing perceived usefulness and perceived ease of use and testing the PEOU → PU structural path. The use of TAM in this evaluation showcases faculty-driven innovation tailored for ISU and other state universities and colleges (SUCs), where perceived usefulness may outweigh ease of use in driving adoption, offering a scalable and replicable framework for sustaining hybrid learning beyond the pandemic context.

II. Literature Review

A review in January 2017 reported that in the Philippines alone, there are an estimated 40 million social network users this year [2]. Filipinos spend more time on social media than any other nationality worldwide, averaging 4.17 hours daily and ranking the Philippines among the top users of social networking sites (SNS). Additionally, nearly 93% of public schools nationwide were equipped for online learning during the 2020-2021 school year [3].

Since March 2020, after the COVID-19 virus turned into a worldwide pandemic [4], many public and private institutes, including schools and universities, were closed across the countries. In June 2020, the Ministry of Higher Education (MoHE) came up with a countrywide learning management system project called HELMS (Higher Education Learning Management System), which is a web-based service used as a tool to assist universities in different functions like managing, delivering, planning, and tracking the learning and teaching process. It was introduced as a primary medium for education during the pandemic. After a large-scale and meticulous analysis through interviews. The result proves that e-learning adoption has not been considered as a priority for the Ministry of Higher Education (MoHE), and they have not anticipated the situation, such as countrywide quarantine, under which online learning should be replaced with onsite education. It also found that the absence of an inclusive policy and guideline for management and use of the system has also affected the quality aspects of the HELMS. The findings of this research were consistent with the results from previous studies [1][5][6][7][9].

This led to examining the factors of the Filipino college students' behavioral intention to use LMS as part of their education journey from the constructs of integrated multimedia instruction, perceived quality work-life, system interactivity, and internet connectivity experience, perceived ease of use, perceived usefulness, and social media influence. The aim of this study was to discover the factors that influence college students' acceptance of e-learning technology, specifically LMS, as a reinforcement of the teaching and learning process in Philippines. As a result, the study discovered that internet communication experience has a positive relationship with perceived ease of use and behavioral intention; it also discovered that system interactivity has a positive relationship with perceived usefulness, but contrary to system interactivity, there is no clear evidence that it also affects the perceived quality of work life. The interaction within the system (learner–interface, learner tool, learner-task, learner-content, learner-instructor, and learner-student) undoubtedly resolves one of the established weaknesses of eLearning, which is the absence of face-to-face interaction. And the results are also meant to serve as one of the pioneers that offer information on e-learning acceptance in the Philippines [10].

One of the new tools available was released by Google under GSuite. The Pangasinan State University is currently subscribed to GSuite for Education, and recently, Google introduced Classroom as an eLearning platform for educational institution. This research aims to evaluate the new product, and its functionalities for the purpose of adapting and deployment. The main objective of this study is to identify the usability and evaluation of the Learning Management System (LMS) Google Classroom, its functionalities, features, and satisfaction level of the students. As a result, Google Classroom plays a great role in making learning more easy. Based on the usability evaluation of the platform, Google Classroom is extremely useful in understandability, attractiveness, and operability. Although the platform is useful for non-academic activities, it is especially useful for assignments and collaborative learning. It is suggested that you test in a fully online environment. As the study collects more data, it is also recommended to assess other problems

based on the data, such as the relationship between the profile and the platform's level of usability. This study is also recommended to continue collecting data for future studies [8][11].

They utilized the Technology Acceptance Model (TAM) to examine factors driving Learning Management System (LMS) adoption in higher education. Their systematic review found perceived usefulness (PU) and perceived ease of use (PEOU) as the strongest, most consistent predictors of acceptance. Key external variables—digital self-efficacy, system quality, institutional support, and social influence—also proved essential determinants. These results validate TAM's ongoing applicability in edtech while underscoring the value of incorporating context-specific and organizational elements to enhance model precision and foster long-term LMS utilization [12].

Cronbach's Alpha evaluated the research instrument consistency for constructs like attitudes and knowledge. This study assesses engineering students' (n=25) perceptions of online Calculus across course content and instructor effectiveness dimensions. Overall alpha=0.83 indicates good reliability per Nunnally's standards (>0.7 acceptable), though specific items need refinement for enhanced internal consistency in LMS perception surveys [13].

Examined the factors influencing student LMS adoption at the GITAM University Bengaluru to enhance pedagogy in higher education. Data from UG/PG students via online questionnaires tested an extended TAM model incorporating PU, PEOU, attitude, behavioral intention (BI), actual use (AU), plus student education (SE), perceived self-efficacy (PSE), and system quality (QoS). Cronbach's Alpha exceeded 0.7 and AVE >0.5 across constructs. Seven of ten hypotheses were supported; non-significant paths included PEOU→PU, PSE→PU, and SE→PEOU. BI strongly predicted AU, driven by PEOU and PU, offering insights for stakeholders on Moodle optimization [14].

III. Materials and Methods

A. Methodology

To enhance the functionalities of ISU ORANGE, the researcher applied the System Development Life Cycle (SDLC) by using the Rapid Application Development (RAD) model, as shown in Fig. 1 below. RAD was a software development methodology that used minimal planning in favor of rapid prototyping. A prototype was a working model that was functionally equivalent to a module of the system.

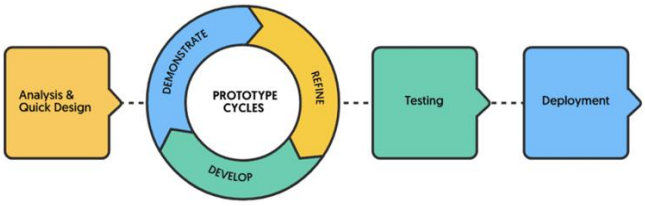

Fig. 1. Rapid application development framework

The collection began when issues were encountered by both faculty and students in using the system, and it was systematically gathered by the researcher. Feedback mechanisms were facilitated through integrated social media platforms such as Facebook and Messenger, ensuring accessibility and real-time communication. Additionally, user training sessions were conducted prior to the start of each semester to refresh faculty members on system functionalities and to collect their insights regarding system usability and challenges.

1) Analysis and quick design: The development team formulated solution strategies based on the identified issues. A series of collaborative meetings was conducted to review existing system processes and identify areas for improvement. Guided by RAD principles, initial design solutions and prototypes were rapidly developed using available software and hardware development tools, enabling immediate visualization and refinement of system enhancements.

2) Testing phase: The development, refinement, and testing phase involved the iterative construction and improvement of system modules. Proposed solutions were translated into a functional code, followed by simulations and demonstrations to validate system performance. These prototypes were presented to end-users—faculty and students—to gather feedback and ensure that the enhancements effectively addressed identified concerns. Continuous refinement was undertaken based on user evaluation, reflecting the cyclical nature of the RAD approach.

3) Deployment phase: The implementation of the refined system was conducted in its actual working environment. Enhanced modules were installed and integrated into the operational platform, ensuring accessibility and functionality for all users. Consistent with RAD principles, deployment was not considered the endpoint but part of an ongoing cycle of evaluation and improvement to sustain system effectiveness and user satisfaction.

B. Research Model

Fig. 2 illustrated the concept flow of the study. The developmental phase was the collection of data, where it involves data gathering through conducting user's satisfaction in using the first version of the ISUE ORANGE. User's feedbacks and issues were sent through the ISUE ORANGE messenger account and conducted literature reviews on the possible enhancements of the functionalities. Data gathered was analyzed and interpreted to devise solution strategies leading to the development of the algorithms to satisfy the identified problems. The design and development of the functionalities were realized through using software and hardware development tools. The developed modules were uploaded in the ISUE ORANGE to eventually enhance the services provided to the target users. The last phase was the evaluation and analysis phase which covers the evaluation of the user's perception on the user's perceived of usefulness and ease of use using the Technology Acceptance Model (TAM). In addition, the evaluation does not cover the impact of the functionalities towards the management of learning like comparison on the face-to-face versus online examination.

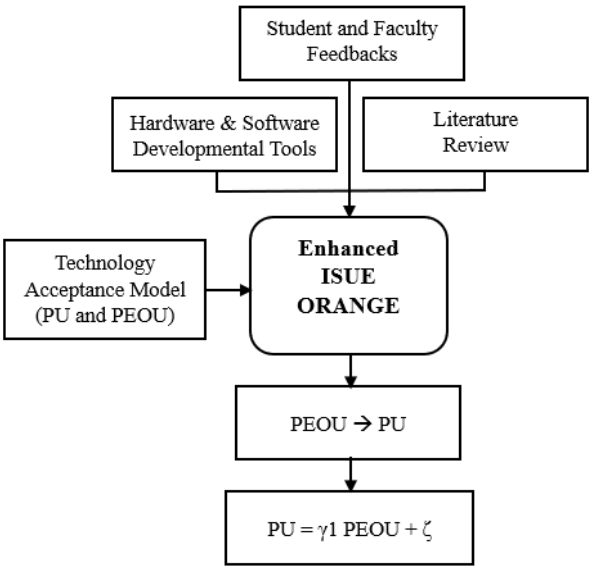

Fig. 2. Research model of the study.

The TAM evaluation framework, presented in Fig. 3, outlined user adoption of the ISUE ORANGE. It underpinned the assessment by measuring key factors that predict usage and effectiveness in the delivery of instruction. The ISUE ORANGE was a homegrown learning management system tailored for the delivery of instruction processes of the Isabela State University, with key features like virtual class creation and activity monitoring. TAM evaluates its success by surveying users on usefulness (teaching efficiency) and ease of use (user friendliness), informing training improvements as seen in faculty workshops conducted.

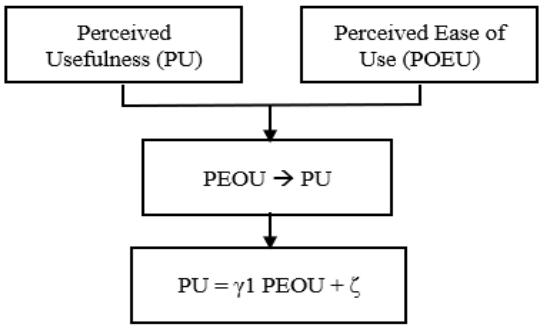

Fig. 3. TAM evaluation framework

Table I presents the alignment of constructs, indicators, and analysis. Key constructs from the TAM were applied to evaluate the enhancements of ISUE ORANGE, focusing on question analytics, monitoring of students' reading progress, and online examinations. Each construct (PEOU and PE) has separate indicators for faculty and students. Data was gathered from the survey questionnaire and captured as ordinal through a 5-point Likert scale: 1=Strongly Disagree, 2=Disagree, 3=Neutral, 4=Agree, and 5=Strongly Agree, and analyzed using reliability like Cronbach's Alpha (CA) for internal consistency, plus a Structural Equation Model (SEM) to determine how PEOU affects the usage intention of the users.

TABLE I. ALIGNMENT OF CONSTRUCTS, INDICATORS AND ANALYSIS

Constructs	**Indicators** (5-point Likert scale)	**Data Type**	**Analysis**
Perceived Ease of Use (PEOU)	***Faculty*** Easy to use in learning the question analytics feature. Easy access report on students' reading time, online examination tools are easy to use.	Ordinal	Reliability (Cronbach's Alpha and Structural Equation Model)
	Student Question analytics, monitoring of reading progress and online examination features are easy to use.		
Perceived Usefulness (PE)	***Faculty*** Useful in enhancing assessment practices, useful in teaching and student's learning, useful in teaching.	Ordinal	Reliability (Cronbach's Alpha and Structural Equation Model)
	Student Question analytics is useful for my learning, useful in helping me keep up with the course, allows to take the test in a convenient way.		

The Cronbach Alpha was used for reliability assessment, and the SEM for TAM validation strengthens the methodological rigor offering a limited novelty, as these were standard practices in technology acceptance research. The methodological role of the CA in the research measured the internal consistency of TAM's constructs, with values above 0.7 indicating reliable scales. The SEM on the other hand, tests causal relationships in TAM, confirming that model fit below 0.08 and paths like ease of use to usefulness, as presented in Fig. 3, a frequent approach in educational technology validation:

$$PU = \gamma_1 PEOU + \zeta \quad (1)$$

where, PU – dependent variable measuring user's belief that the enhancements of ISUE ORANGE are useful both for the faculty and students, γ_1 (gamma 1) – Standard path coefficient, PEOU – Exogenous predictor capturing perceived effortlessness of the enhancements, ζ - error term (<0.005).

With these, the study attempted to prove the hypotheses (faculty and students) below:

H_0: Perceived ease of use (PEOU) does not have a significant effect on perceived usefulness (PU) of the ISUE ORANGE enhanced functionalities among respondents.

IV. RESULTS AND DISCUSSION

Table II shows how the ISUE ORANGE functionalities evolved, keeping all essential classroom tools such as class dashboards, class creation, uploading and downloading of learning materials, quizzes, announcements and gradebook, while adding three new functionalities that the first version lacked. These enhancements were directly addressed what faculty and students encountered during the implementation of the first version. Faculty dealt with no way to confirm if students actually read materials before assessments, time-consuming manual tallying of correct/incorrect answers that hurt productivity, and cheating concerns from unmonitored online

exams. Students, meanwhile, felt that the playing field was uneven without proctoring and got scores without useful feedback on *why* they missed specific questions. These led on the development of added functionalities of ISUE ORANGE.

TABLE II. COMPARISON OF ISUE ORANGE TO ENHANCED ISUE ORANGE BASED ON THEIR FUNCTIONALITIES

Functionalities	ISUE ORANGE	Enhanced ISUE ORANGE
Course Classes Dashboard	Existing	Existing
Creating Classes	Existing	Existing
Uploading/Downloading Learning Materials	Existing	Existing
Learning Materials Preview	Existing	Existing
Classwork List	Existing	Existing
Multi – format Quizzes and Assignments Creation	Existing	Existing
Announcement	Existing	Existing
Question analytics	Not Existing	Existing
Student reading progress	Not Existing	Existing
Flexible gradebook and grading system	Existing	Existing
Course Overview	Existing	Existing
Proctoring online examination	Not Existing	Existing

A. ISUE ORANGE 2.0 Enhancements

The question analytics were featured and presented in Fig. 4, allowing faculty to view and analyze the number of students who answered correctly or incorrectly and provide information to faculty regarding the level of difficulty of each item in the exam. This was supported by informed decisions, such as eliminating questions based on assessment rules. Ultimately, it improved the quality of student examinations.

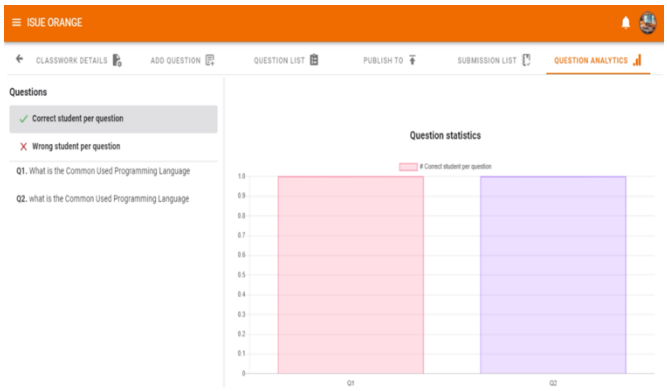

Fig. 4. Question analytics

This feature enabled the faculty to track the time students spend reading uploaded modules. It also detected the student idle time that if no scrolling occurred for 5 minutes, accumulated reading time pauses. Students must meet or exceed the faculty-set maximum reading time for green compliance highlights (aligning with syllabus timelines for skill and knowledge delivery); otherwise, red highlights indicate noncompliance, as shown in Fig. 5.

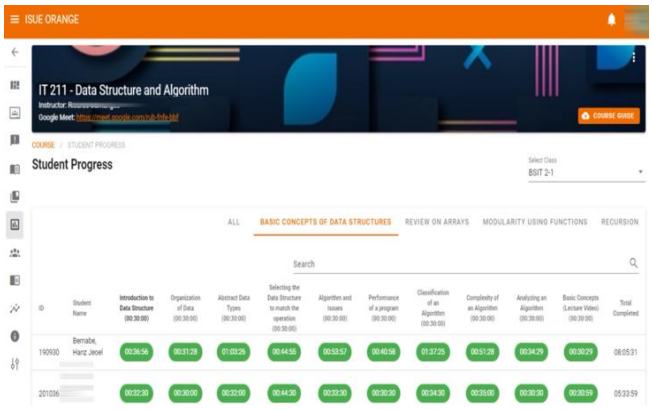

Fig. 5. Monitoring of reading progress by the faculty.

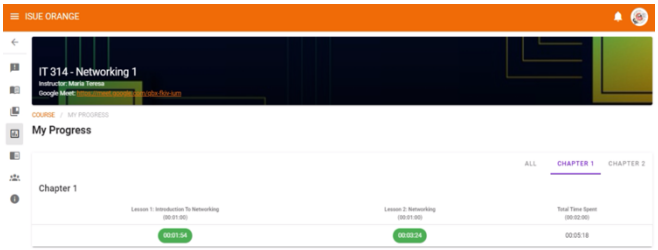

Fig. 6. Monitoring of reading progress by the student.

Fig. 6, shows a progress page in an online course where students can determine how far they have gone in each lesson within a chapter. It displays each lesson in a row, marks completed lessons with clear green labels, and shows the total time spent, so students and teachers can monitor study efforts.

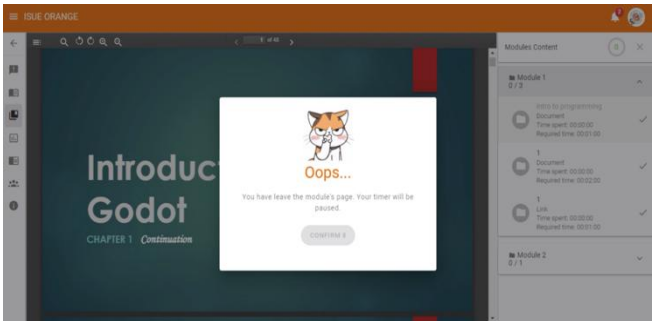

Fig. 7. Track students idle time in reading module.

Fig. 7 presents a module viewer interface within a learning management system displaying a slide-based learning object, overlaid by a modal dialog that manages time-on-task tracking. The central pop-up, triggered when the learner navigates away from or becomes inactive on the module page, communicates that session timing was paused to prevent inflating engagement metrics with idle time. The dialog included a confirmation button that, when activated, resumes or acknowledges the state change, while the underlying layout showed standard viewer controls and a side panel listing additional modules or activities, indicating integration of the time-tracking logic with the course's structured content hierarchy.

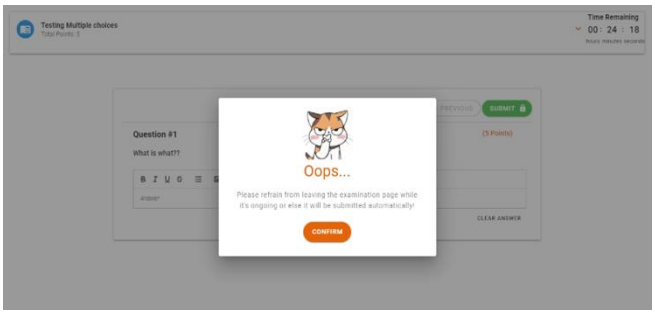

Fig. 8. Monitor student activities in taking exam.

Fig. 8 presents the online assessment interface of ISUE ORANGE in which a modal dialog was programmatically triggered on top of the quiz viewport. The underlying layer shows the active item, response editor, and countdown timer, while the modal enforces exam-session integrity by warning that navigating away from the assessment context was invoked automatic submission of the current attempt. This privilege provided the mechanism to lessen the act of cheating while taking the exam.

B. TAM (PEOU and PU) Evaluation Results

The evaluation on the user's perceived ease of use and usefulness on the enhancements was done on the conducted user's training both for faculty and students. There were 145 students and 18 faculty members who rated the question analytics, monitoring of students reading progress and online examination features of the system.

TABLE III. PERCEIVED EASE OF USE (FACULTY)

Enhancements	Mean	Descriptive Rating
1. Question analytics	4.55	Strongly Agree
2. Monitoring of student reading progress	4.59	Strongly Agree
3. Monitoring of online examination	4.53	Strongly Agree
Grand Mean	**4.56**	**Strongly Agree**

Table III shows that the faculty strongly agree that ISUE ORANGE enhancements like question analytics, reading progress tracking, and online exam monitoring are easy to use, with an overall average of 4.56 on the 5-point scale (where 4.21–5.00 means "Strongly Agree"). This beats typical LMS benchmarks for smooth adoption, like scores above 4.0 that signal high intent to keep using it, fully backing Davis's TAM idea that ease of use sparks real-world commitment.

These steady top scores (all over 4.5) highlight how intuitive these tools are for ISU faculty in hybrid setups which lighten the mental load of preparing assessments, checking student progress, and managing modules to make teaching more efficient and less overwhelming.

Table IV reveals the faculty giving top marks to how useful ISUE ORANGE's enhancements like question analytics, reading progress tracking, and online exam monitoring which truly are for their teaching, with an overall average of 4.75 on the 5-point scale (where 4.21–5.00 means "Strongly Agree"). This past standard TAM benchmarks for strong usefulness, such as scores above 4.3 that tie to 80%+ adoption in LMS research, positioning usefulness as the key factor over ease of use in Davis's model is directly fueling ongoing use and better teaching outcomes. The highest ratings, reaching 4.82 for tracking reading progress and exams, show how these tools empower faculty at the Isabela State University to keep real-time tabs on students effortlessly in hybrid classes while cutting down on manual checks, spotting issues early with data insights, and ramping up efficiency way beyond basic LMS options.

TABLE IV. PERCEIVED USEFULNESS (FACULTY)

Enhancements	Mean	Descriptive Rating
1. Question analytics	4.61	Strongly Agree
2. Monitoring of student reading progress	4.82	Strongly Agree
3. Monitoring of online examination	4.82	Strongly Agree
Grand Mean	**4.75**	**Strongly Agree**

TABLE V. PERCEIVED EASE OF USE (STUDENT)

Enhancements	Mean	Descriptive Rating
1. Question analytics	4.50	Strongly Agree
2. Monitoring of student reading progress	4.72	Strongly Agree
3. Taking online examination	4.73	Strongly Agree
Grand Mean	**4.65**	**Strongly Agree**

Table V reveals that students strongly agree that ISUE ORANGE's enhancements such as question analytics, reading progress tracking, and online exams are easy to navigate, with an overall average score of 4.65 on the 5-point scale (where 4.21–5.00 means "Strongly Agree"). This tops typical TAM benchmarks for smooth adoption, such as scores above 4.2 that signal strong intent to keep using it, as outlined in Davis's model. The standout ratings, hitting 4.73 for exams and progress checks, show how these tools lower mental hurdles for everyday student tasks in the Isabela State University's hybrid setup—making learning feel more natural and less clunky than standard LMS platforms.

TABLE VI. PERCEIVED USEFULNESS (STUDENT)

Enhancements	Mean	Descriptive Rating
1. Question analytics	4.53	Strongly Agree
2. Monitoring of student reading progress	4.68	Strongly Agree
3. Taking online examination	4.66	Strongly Agree
Grand Mean	**4.62**	**Strongly Agree**

Table VI shows students giving a big thumbs-up to how useful ISUE ORANGE's enhancements like question analytics, reading progress tracking, and online exams for their learning, with an overall average of 4.62 on the 5-point scale (where 4.21–5.00 means "Strongly Agree"). This beats standard TAM benchmarks for solid usefulness, like scores over 4.3 that predict students was stick with it long-term and see real performance boosts, based on Davis's original model. Top scores of 4.68 for tracking reading progress back this up, proving these tools help students tackle everyday hurdles like keeping tabs on classwork from afar or staying on pace in hybrid classes at ISU—sparking

real motivation by making schoolwork feel more doable and rewarding.

C. Cronbach's Alpha Results

A reliability analysis was conducted to determine the internal consistency of the questionnaire administered to 145 students and 18 faculty.

TABLE VII. RELIABILITY ANALYSIS USING CRONBACH'S ALPHA RESULTS FOR FACULTY RESPONSES.

Construct	No. of Items	Cronbach's Alpha	Interpretation
Perceived Usefulness (POU)	15	**0.94**	Excellent reliability
Perceived Ease of Use (POEU)	15	**0.853**	Very Good reliability
Overall Instrument	30	**0.932**	Excellent reliability

Table VII presents the reliability analysis, which revealed excellent internal consistency for the Perceived Usefulness construct ($\alpha = 0.940$) and very good reliability for Perceived Ease of Use ($\alpha = 0.853$). The overall instrument demonstrated excellent reliability ($\alpha = 0.932$), indicating that the questionnaire is highly consistent and suitable for further inferential analysis.

TABLE VIII. RELIABILITY ANALYSIS USING CRONBACH'S ALPHA RESULTS FOR STUDENT RESPONSES.

Construct	No. of Items	Cronbach's Alpha	Interpretation
Perceived Usefulness (POU)	15	**0.90-0.95**	Excellent reliability
Perceived Ease of Use (POEU)	15	**0.88-0.93**	Very Good reliability
Overall Instrument	30	**0.93-0.97**	Excellent reliability

The results in Table VIII show that the Perceived Usefulness construct demonstrated excellent reliability ($\alpha \approx 0.92–0.95$), while the Perceived Ease of Use construct showed very good to excellent reliability ($\alpha \approx 0.88–0.93$). The overall instrument yielded an excellent Cronbach's Alpha coefficient ($\alpha \approx 0.94–0.96$), indicating that the questionnaire is highly reliable and suitable for inferential statistical analysis.

D. Structural Equation Modeling Results

TABLE IX. CONSOLIDATED STRUCTURAL EQUATION MODELING

Group	B	R^2	p-value	Interp.	Decision
Students	0.118	0.014	0.163	Not Significant	Fail to Reject H_0
Faculty	0.145	0.044	0.214	Not Significant	Fail to Reject H_0

Table IX presents the structural equation modeling results. It revealed that the structural path from Perceived Ease of Use to Perceived Usefulness was not statistically significant for both students ($\beta = 0.118, p = 0.163$) and faculty ($\beta = 0.145, p = 0.214$). The low R^2 values (0.014 and 0.044, respectively) indicate weak predictive capability of the model, suggesting that Perceived Ease of Use is not a significant determinant of Perceived Usefulness in the context of ISU ORANGE enhancement functionalities. Moreover, in designing the future ISUE ORANGE evaluation instruments around enhancement functionalities, it is suggested to build a model where PU is predicted by system quality, information quality, service support, compatibility, and effectiveness with PEOU as a secondary or control variable rather than a primary predictor.

V. IMPLICATIONS

The findings revealed the distinct yet interrelated implications for students, faculty, administrators, and stakeholders, particularly in sustaining hybrid learning through ISUE ORANGE. For students, the high grand mean scores in Perceived Usefulness (PU) and Perceived Ease of Use (PEOU) indicated an enhanced learning support, enabling greater focus on understanding module content, tracking assigned readings, and completing online assessments. The system's features further promote self-paced learning by allowing students to monitor their engagement and academic performance, thereby fostering independent learning and facilitating timely academic recovery. Moreover, the combination of usability and functionality contributes to increased student engagement, resulting in more consistent participation in online tasks and improved involvement in hybrid learning environments.

For faculty members, the results indicated an improved efficiency in assessment-related tasks. Strong PU ratings suggest that ISUE ORANGE reduces the effort required in the preparation, administration, and evaluation of assessments, thereby allowing faculty to allocate more time to feedback provision and instructional design. In addition, integrated analytics and monitoring tools support data-informed teaching practices by providing concrete evidence of student performance and learning gaps, enabling targeted and timely interventions. The consistently high PU and PEOU scores also imply a strong likelihood of sustained system utilization, indicating that faculty are inclined to integrate ISUE ORANGE into regular instructional practices beyond emergency remote teaching contexts, thus reinforcing ongoing digital transformation.

From an administrative perspective, the findings provided empirical support for policy development and strategic decision-making. The positive Technology Acceptance Model (TAM) results were justified by the continued investment in, scaling of, and refinement of ISUE ORANGE, including enhancements in training, infrastructure, and system integration, rather than adopting generic learning management systems. The results also informed the design of faculty development programs by identifying features that were already effective and areas that require further capacity building. Furthermore, the documented levels of usefulness and ease of use support institutional efforts in accreditation and quality assurance, as these align with outcomes-based education (OBE) principles, student performance monitoring, and the digitalization requirements of accrediting bodies.

For stakeholders, the study positions ISUE ORANGE as a model of state university and college (SUC)-led innovation. It demonstrates that a locally developed learning management system, grounded in the Technology Acceptance Model, can meet or exceed adoption benchmarks commonly associated with commercial platforms, thereby strengthening ISU's identity as a technology-enabled institution. The findings also highlight the system's scalability and transferability to other campuses or

partner institutions with similar instructional delivery contexts. Finally, the quantitative evidenced on PU and PEOU provides a compelling accountability and impact narrative, illustrating that investments in ISUE ORANGE yield measurable benefits in teaching and learning processes, an essential consideration for budgeting, grant acquisition, and long-term strategic planning.

VI. Conclusion

The ISUE ORANGE enhancements effectively developed to address the post-2022 implementation challenges at ISU–Echague Campus, with 145 students and 18 faculty members demonstrating strong acceptance of the updated LMS. This acceptance was underpinned by robust measurement properties, as shown by high CA coefficients and a contextually grounded SEM aligned with established TAM literature.

Key functionalities including question analytics (Fig. 4), reading progress and idle-time monitoring (Fig. 5 to Fig. 7), and online proctoring/examination (Fig. 8) were perceived as particularly beneficial in supporting teaching and learning. Both students and faculty rated perceived ease of use at 4.56–4.65 and perceived usefulness at 4.62–4.75 ("Strongly Agree"), with monitoring tools obtaining the highest mean scores, indicating strong practical value in a hybrid learning environment.

The reliability analysis were yielded Cronbach's Alpha values between 0.85 and 0.97 across constructs, indicating good to excellent internal consistency and exceeding the commonly accepted 0.80 threshold for strong reliability. These coefficients justify the use of the 30-item instrument for both student and faculty samples and support its application in inferential analyses.

SEM results showed that the PEOU → PU path was non-significant for both groups (students: $\beta = 0.118$, $p = 0.163$; faculty: $\beta = 0.145$, $p = 0.214$; $R^2 < 0.05$), diverging from the canonical TAM assumption that ease of use substantially influences perceived usefulness. In a mature and familiar LMS context such as ISUE ORANGE, this pattern suggests that perceived usefulness is driven less by ease and more by direct productivity and performance gains afforded by specific features, consistent with findings that PU often dominates as the primary predictor of system acceptance in established technologies. Consequently, the null hypothesis (H_0: PEOU has no significant effect on PU) is supported in this setting.

Despite very high descriptive ratings for perceived usefulness among both students and faculty, the low variance was explained in the structural model which indicates that additional determinants beyond ease of use may be shaping perceptions of usefulness. This highlights that high mean scores alone was insufficient to claim full system effectiveness; a more comprehensive evaluation incorporating behavioral intention, actual usage, learning outcomes, and system performance metrics was necessary to substantiate long-term acceptance and educational impact, in line with extended TAM and LMS effectiveness research.

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