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An Empirical Study on the Usability and Performance of the eCONDEV+ Event Management System

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ABSTRACT

Automating event management tasks and processes in higher education institutions has become essential, as conferences, competitions, and collaborative initiatives and programmes increasingly rely on digital coordination. The eCONDEV+ event management system is a sophisticated web-based platform designed to assist with the planning, management, administration, and judging stages of Universiti Teknologi MARA's flagship annual International e-Content Development Competition (eCONDEV). The eCONDEV+ platform effectively and reliably supported 260 participants, 75 juries, and 20 administrators in a real-world setting, demonstrating its operational reliability, robustness, and scalability. This study used a five-point Likert-scale questionnaire to empirically assess the system's usability and performance, administered to 30 end users, including educators, juries, and participants. The evaluation process followed a usability-based analytical framework that combined the Technology Acceptance Model (TAM) and Usability Heuristics. Descriptive statistics for both user satisfaction scores and system performance measurements show a high usability mean of M=4.79, SD=0.41. This indicates strong acceptance across ease of use, clarity, fairness, responsiveness, and stability. The findings suggest that eCONDEV+ delivers what users need and offers a theoretical and practical roadmap for designing future event-management systems focused on human-system interaction, interface optimisation, and adaptive automation. Finally, eCONDEV+ also aligns with broader digital transformation goals in higher education, including the United Nations Sustainable Development Goals (SDG 9: Industry, Innovation and Infrastructure; SDG 12: Responsible Consumption and Production; and SDG 17: Partnership for the Goals).

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1. INTRODUCTION

Educational institutions worldwide use events as essential elements for their academic and institutional operations. Educational institutions worldwide organise a diverse range of events annually, encompassing academic, cultural, and social activities such as conferences, seminars, symposiums, exhibitions, and sporting festivals and competitions (Islam et al., 2019; Hadiwiyanti et al., 2022). These events enable organisations to achieve multiple objectives, including sharing knowledge, fostering professional connections, showcasing new ideas, and involving the public in their activities. At the departmental level, universities typically host several academic gatherings each year, including conferences, invited talks, and seminars that support postgraduate research and public outreach. The nature and delivery of these activities vary with institutional characteristics, including size, areas of specialisation, and planned institutional objectives, while also fostering a strong intellectual atmosphere within higher education institutions.

Successful event execution is typically closely associated with factors such as public service delivery and stakeholder engagement. This is particularly relevant in higher education. Universities serve not only as centres of learning but also as hubs for knowledge exchange and the dissemination of innovation. Events such as academic conferences, exhibitions, and workshops provide platforms for institutions to facilitate collaboration among scholars, practitioners, and industry experts and to promote the dissemination of emerging research and technological advances (Islam et al., 2019; Thomas & Stephens, 2022; Paz et al., 2024). Event management, whether for large-scale international symposia or smaller departmental seminars, typically follows structured phases: pre-planning analysis, event planning, execution, and post-event evaluation. The success of institutional events depends on efficient process management, which helps organisers achieve their educational, social, and developmental goals.

The eCONDEV+ system was designed to meet operational needs as an enhanced web-based platform for managing UiTM's e-Content Development Competition. The system handles all processes, from registration and submission through judging to feedback report generation, fully automating operations and ensuring transparent processes and accountable results. The system has been used successfully in multiple competition cycles. However, it has not been fully tested for usability and performance to determine its effectiveness from users' perspectives.

System usability directly affects adoption likelihood, user satisfaction, and productivity. Human-computer interaction research shows that an application succeeds through two factors: functional completeness and the user experience of interacting with the system. System performance can influence users' trust, including response time, system stability, and operational consistency. Operational inefficiencies within an organisation have two negative effects: they decrease productivity and diminish the visibility and academic impact of university-supported initiatives (Sunder, 2016; Amin et al., 2025; Mark et al., 2025; Alvarez et al., 2024; Salloum et al., 2019). As such, it is important to understand how eCONDEV+ performs across these dimensions to support scalability and continued user engagement.

This research adopts a user-centred methodology to assess the usability and system performance of the eCONDEV+ system. The methodology draws on the established principles of the Technology Acceptance Model (Davis, 1989) and Nielsen's Usability Heuristics (Nielsen, 1994). The study addresses three primary objectives. First, it evaluates users' perceptions of the system's reliability and interface design. Second, it benchmarks eCONDEV+ against comparable web-based event management applications. Third, it examines how educational institutions can improve human–system interaction across broader institutional networks.

2. LITERATURE REVIEW

Digitalisation has fundamentally transformed how academic institutions manage academic conferences, competitions, and large-scale events. Contemporary event management systems (EMS) are expected to function as all-in-one platforms that support tasks ranging from registration and paper submission tracking to judging rubrics, scheduling, and final analytics. Many modern studies highlight that for any EMS to be successful, the EMS needs to balance heavy-duty feature sets or essential capabilities, an intuitive interface for tech-averse users or front-end friendliness, and reliable, robust back-end performance – all while keeping multiple groups of stakeholders reasonably satisfied (Lew et al., 2019; Mata Domingo, 2018). Tools like EasyChair and ConfTool have long handled standard conference processes. However, these tools often rely on rigid frameworks that must be modified to meet very specific local requirements.

In general, system deployments are expected to be smooth. However, deployments rarely go smoothly. In many cases, platforms end up with rigid, awkward interfaces or experience significant latency during surges in concurrent traffic (Ali, 2019; Chaturvedi et al., 2024). Many existing systems are inflexible and not easily customised for different structures, making them impractical to apply beyond a few narrow cases (Angeljulie et al., 2025). Gao et al. (2024) address these challenges by proposing an iterative, user-centric design workflow. Such an approach focuses on reducing implementation friction and ensuring a much better user experience. This research is driven by the same notion that the eCONDEV+ system remains dependable, scalable, and responsive to the community it serves.

2.1 Technology Acceptance Model (TAM)

The Technology Acceptance Model (TAM), developed by Davis (1989), remains the foundation for analysing and understanding user adoption of new information systems. The model centres on two main factors: Perceived Usefulness (PU) and Perceived Ease of Use (PEOU). These two perceptions shape a user's attitude, which influences behavioural intention to use a system and, ultimately, actual adoption over time. Extensive empirical studies in educational technology continue to support and validate TAM's predictive strength, confirming its reliability across a wide range of digital learning environments (Salloum et al., 2019; Venkatesh et al., 2016).

When applying TAM to event-management software, users typically relate PU to improved operational efficiency and data clarity. Similarly, PEOU reflects how intuitively a user can learn the system's functions and navigate the platform with minimal difficulty. An organisation that integrates TAM principles into a broader usability protocol can benefit from measuring both the application's tangible functional value and users' subjective experiences. Recent extensions of TAM, such as the Unified Theory of Acceptance and Use of Technology (UTAUT2), underscore the significance of motivation and habit formation for sustained use (Marangunić & Granić, 2015). Implementing the TAM framework within the eCONDEV+ system provides practical guidance for the organisation to track usability metrics, which can then support continued organisational adoption. Generally, high PEOU scores are expected to correlate with overall satisfaction, indicating that users' expectations match the system's capabilities.

2.2 Usability Heuristics and Human-Computer Interactions

The ten usability heuristics developed by Jakob Nielsen in 1994 (Nielsen, 1994) serve as essential design guidelines for creating user-friendly interfaces that mitigate user errors. These four design elements include visibility of system status, user control, design consistency, and error prevention and use of only essential elements. Previous studies (Longo, 2018; Masood et al., 2014) show that following these design principles leads to greater user satisfaction and improved task performance. An interactive, user-friendly interface generally promotes seamless engagement with a platform. In event management, users' emotional response is central to the event experience (Jang et al., 2021). Positive experiences, such as genuine enjoyment or emotional satisfaction, ultimately drive people to adopt and engage with digital services (Capasa et al., 2022).

The system's user interface provides clear, comprehensive status information. This matters because it provides instant feedback, helping users make important decisions about the system's operation. The evaluation of the eCONDEV+ system design used heuristic indicators to assess the design against three criteria: layout clarity, operational consistency, and responsiveness of system feedback.

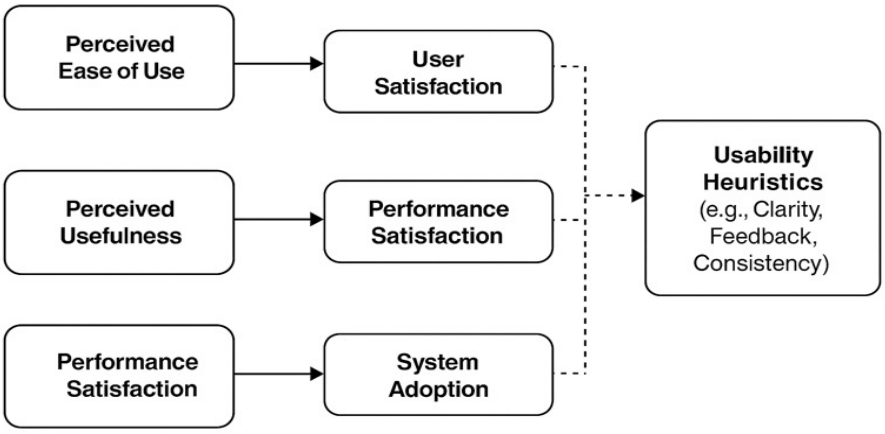

Figure 1 *Conceptual Framework for eCONDEV+ Usability and Performance Evaluation*
Source: Author (2026)

2.3 Usability and Performance Benchmarking in Web Applications

The ISO 9241-11:2018 framework explains usability benchmarks in three main areas: effectiveness, efficiency, and user satisfaction. Educational or administrative information systems that score highly in these areas are usually interpreted as offering a better, smoother user experience, which serves as a primary signal of overall software quality (Al-Emran et al., 2016; Vlachogianni & Tselios, 2022). However, performance evaluation generally shifts the focus from how users feel to how the system performs, primarily examining responsiveness, reliability, and even architectural stability as data loads fluctuate (Batubara et al., 2024).

Many contemporary studies highlight an important factor in academic information systems: the system's responsiveness often shapes and dictates the user's cognitive and emotional experience (Ismail et al., 2019; Dorobăț et al., 2019). Users may perceive platforms with low latency and high uptime as professional and trustworthy. This technical stability provides a direct, solid basis for users' trust. Moreover, it supports broader user adoption and higher user satisfaction.

3. METHODOLOGY

This study uses a descriptive quantitative research design to evaluate users' experiences with the eCONDEV+ platform's technical performance and usability. The data were gathered via an online questionnaire distributed to a target group with direct experience of using the system during the most recent International e-Content Development Competition (eCONDEV). The demographic details were then mapped to the Likert-scale responses across the seven key dimensions. This approach provides a structured framework for evaluating both back-end functionality and users' actual experiences.

3.1 Research Design

The study employed a descriptive quantitative research design to examine users' perceptions of the usability and performance of the eCONDEV+ system. The researchers collected data through an online questionnaire, which they administered to the respondents who had used the platform during the most recent International e-Content Development Competition (eCONDEV).

The instrument comprised two sections: (a) demographic information (age, gender, role, and affiliation) and (b) Likert-scale items (1=Strongly Disagree to 5=Strongly Agree) covering seven core usability and performance indicators: ease of use, layout clarity, functionality and responsiveness, consistency of features, process fairness, system stability

and speed, and overall satisfaction. The instrument included two sections: participant demographic information and Likert-scale responses to seven core usability and performance indicators.

3.2 Participants

Thirty respondents took part in the research study, with equal representation from appointed juries, educators, and competition participants. Most participants were between 18 and 64 years old, with most falling between 35 and 54. The gender distribution showed that 60 per cent of participants identified as female, while 40 per cent identified as male. Approximately two-thirds of the participants were from public universities, while the rest were from private institutions and educational agencies. The current eCONDEV+ user base reflects the full range of stakeholder groups, enabling all users to assess its usability based on their distinct administrative and participant roles.

3.3 Data Collection and Analysis

The study used descriptive statistics to calculate means and standard deviations for each item and dimension. The five-point Likert scale interpretation relied on distinct mean thresholds: values exceeding 4.20 signalled a "Very High" level of user agreement, values between 3.40 and 4.19 represented a "High" level, and any values below 3.39 fell into the "Moderate or Low" category. These core usability and performance metrics were analysed through the dual lenses of TAM and standard Usability Heuristics. Because this was an exploratory investigation, the analysis focused on descriptive statistics rather than inferential testing, as the underlying data distribution was normal. The study also relied on academic literature on system evaluation to cross-check and compare results, helping explain user satisfaction and perceived performance.

3.4 Validity and Reliability Considerations

The instrument for this research was adapted from various sources and tailored specifically for eCONDEV+, with assistance from three HCI experts. They reviewed the instrument to confirm its clarity, coverage, and compliance with usability heuristics. The scales demonstrate strong internal consistency, as studies with comparable item structures report Cronbach's α values exceeding 0.85 (Vlachogianni & Tselios, 2022; Salloum et al., 2019). The university's digital-learning division granted ethical approval, and all respondents gave their informed consent. The analysis used anonymised data provided by participants through their voluntary participation.

4. RESULTS

This study aimed to assess the usability and performance of the eCONDEV+ Event Management System from the users' perspective. To achieve this aim, the study used a descriptive quantitative approach to collect data from 30 respondents (n=30). The following sections present the findings and descriptive statistics on the usability dimension, followed by those on the performance dimension.

4.1 Descriptive Findings on Usability Dimension

Descriptive statistical calculations were conducted for seven usability performance dimensions, derived from an analysis of 30 survey respondents. Table 1 shows the average value (M) and standard deviation (SD) for each item. The seven usability indicators yielded an overall average user experience score of $M = 4.77$ ($SD = 0.42$), indicating excellent usability across all user groups (juries, educators, and participants). The system provides a highly intuitive user interface that enables users to complete tasks according to their established requirements, as all system components received high ratings ($M \geq 4.67$).

The statement "The system is easy to use" received the highest overall user rating ($M = 4.83$, $SD = 0.38$). This high score indicates that participants and users alike could navigate the platform with ease, reducing the need for extensive instructional documentation. Such an intuitive user experience aligns with Nielsen's principle of learnability, which upholds radical simplicity in interface design. In terms of system performance, strong user agreement on rapid responsiveness ($M = 4.77$) and operational uptime ($M = 4.73$) shows that the back-end architecture reduced latency and system errors during peak concurrent traffic.

The users rated the item "The design and layout are clear and easy to understand" with a high mean score (M = 4.76). This supports the idea that the interface, visual elements, and structure support easy, intuitive navigation. This aligns with the Visibility of System Status principle in usability heuristics. The items that relate to satisfaction - "Overall, I am satisfied with the system" (M=4.85) and "Mobile-friendly version will increase satisfaction" (M=4.67) – demonstrate that users highly value satisfaction and system usability over system capabilities or access. This is consistent with Perceived Ease of Use (PEOU) in the Technology Acceptance Model (TAM) framework (Venkatesh et al., 2016; Marangunić & Granić, 2015).

The narrow range of the standard deviation (0.36-0.49) reflects a high degree of agreement among users on the interface and operation of the eCONDEV+ platform. This evidence suggests that the eCONDEV+ platform meets the baseline requirements defined by the ISO 9241-11 (2018) framework. Overall, the findings suggest that the eCONDEV+ platform effectively fulfils all requirements for effectiveness, efficiency, and user satisfaction.

Table 1 *Usability Dimensions.*

Statement	M	SD	Interpretation
The system is easy to use.	4.83	0.38	Very High
The system responds quickly and runs smoothly.	4.72	0.42	Very High
The system features meet my needs.	4.80	0.41	Very High
The system is stable and rarely has errors.	4.73	0.44	Very High
The system's design and layout are clear and easy to understand.	4.76	0.43	Very High
Overall, I am satisfied with the system.	4.85	0.36	Excellent
If I can use this system easily on my smartphone, my satisfaction will increase.	4.67	0.49	Very High
Overall Mean	4.79	0.42	Excellent Usability

4.2 Descriptive Findings on Performance Dimension

The second core factor, which relates to system performance, similarly received a high overall score, averaging M = 4.67 (SD = 0.46), as detailed in Table 2. The metrics in this category reflect how users perceived the system's back-end stability, operational transparency, and workflow efficiency. The high scores for "fair and transparent" judging (M = 4.76) together with effective participant evaluation (M = 4.80) indicate that eCONDEV+ successfully built procedural trust. This, in turn, improved the jury's overall decision-making environment. This directly relates to the Perceived Usefulness (PU) pathway in the Technology Acceptance Model (TAM), thus confirming that a reliable and transparent system architecture is central to building user confidence and promoting long-term adoption.

Administrative features outside the core judging processes also performed well. Users reported that the medal-purchasing process was straightforward (M = 4.60), user-friendly (M = 4.57), and supported by a seamless payment interface (M = 4.53). This consistent performance across different modules suggests a cohesive design that minimises friction. These results align with other contemporary research on enterprise web applications, where structural clarity is directly related to user satisfaction (Darejeh et al., 2024; Longo, 2018; Zaheer, 2024).

The strong agreement with the statement "Overall, I am satisfied with the judging experience" (M=4.83, SD=0.38) suggests that users perceived the competition process as reliable and transparent. This indicates that eCONDEV+ goes beyond mere technical utility – it strengthens confidence among different user groups in digital evaluation frameworks.

The descriptive metrics in Tables 1 and 2 demonstrate that users consistently gave the eCONDEV+ platform high scores in both front-end usability and back-end mechanics. The high mean for usability (M = 4.79, SD = 0.42) and performance (M = 4.67, SD = 0.46) indicates strong consensus among users: the application is intuitive to navigate, architecturally sound, and effective at streamlining event management tasks. These outcomes provide strong empirical evidence that the system meets institutional benchmarks for software reliability and user satisfaction, signalling that eCONDEV+ is suitable for consideration for broader deployment.

Table 2 *Performance Dimensions.*

Statement	M	SD	Interpretation
The process of purchasing an extra medal was easy to understand.	4.60	0.54	Very High
The system for purchasing an extra medal was simple and user-friendly.	4.57	0.56	Very High
The payment process was smooth and convenient.	4.53	0.58	Very High
Overall, I am satisfied with the process of purchasing an extra medal.	4.63	0.51	Very High
The judging process in this system is fair and transparent.	4.76	0.43	Very High
The system helps me evaluate participants more effectively.	4.80	0.41	Very High
Overall, I am satisfied with the judging experience using this system.	4.83	0.38	Excellent
Overall Performance Mean	4.67	0.46	Excellent Performance

5. CONCLUSION

This study evaluated the eCONDEV+ Event Management System by analysing quantitative feedback from 30 active users, including educators, juries, and general participants. The empirical data revealed high usability scores across all seven evaluated dimensions (M = 4.79, SD = 0.42), underscoring the platform's capacity to deliver a transparent, highly responsive, and user-friendly experience. To contextualise these findings, the research combined the Technology Acceptance Model (TAM) with established usability heuristics. The high scores for ease of use and perceived utility show that the eCONDEV+ platform meets both essential engineering standards and user expectations, highlighting strong potential for durable, sustainable adoption within institutional workflows.

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8. AUTHORS' CONTRIBUTIONS

Azlan Abdul Aziz: Conceptualisation, Methodology, Formal Analysis, Validation, Investigation, Data Curation, Writing (Review & Editing), Project Administration; Mohd Noor Ismawi Ismail: Conceptualisation, Software, Formal Analysis, Resources, Data Curation, Writing (Original Draft), Visualisation.

9. CONFLICT OF INTEREST DECLARATION

We certify that the article is the Authors' and Co-Authors' original work. The article has not received prior publication and is not under consideration for publication elsewhere. This manuscript has not been submitted for publication, nor has it been published in whole or in part elsewhere. We attest that all Authors have contributed significantly to the work, the validity and legitimacy of the data, and the interpretation of the data for submission to IJELHE.

10. DECLARATION OF GENERATIVE AI IN THE WRITING PROCESS

During the preparation of this work, the authors used CHATGPT minimally to shorten some selected sentences. After using this tool, the authors reviewed and edited the content as needed and took full responsibility for the publication's content.

11. DATA AVAILABILITY/SUPPLEMENTARY MATERIALS

The datasets used and analysed during the current study are available from the corresponding author on reasonable request.

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