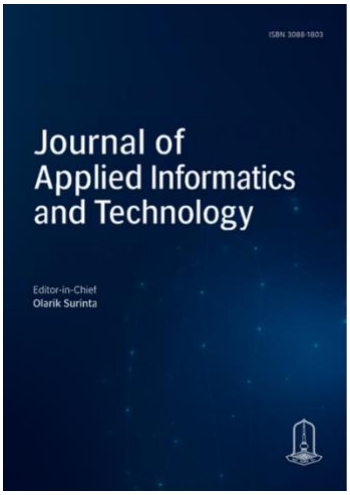
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Development of an Electronic Invitation System with QR Codes for University Event Management: An Applied Case Study

Prattana Thoopsamut

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REVIEW ARTICLE

Development of an Electronic Invitation System with QR Codes for University Event Management: An Applied Case Study

Prattana Thoopsamut[1,*]

[1]Academic Enhancement Department, Office of the President, King Mongkut's University of Technology North Bangkok, Bangkok 10800, Thailand

* Corresponding author: Prattana Thoopsamut (prattana.t@op.kmutnb.ac.th)

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Abstract

Traditional invitation and participant management processes for university events often rely on manual document preparation and spreadsheet-based workflows, leading to operational inefficiencies, data redundancy, and difficulties in managing multi-session structures. This study aims to design, develop, and evaluate a web-based electronic invitation system integrated with QR code technology for university event management. The proposed system supports multi-session scheduling, bilingual (Thai–English) electronic invitations, personalized QR code generation, and flexible participant data management via manual entry and spreadsheet import. Adopting a Research and Development (R&D) methodology, the system was implemented during an actual university event and evaluated by 21 purposively selected users, including university executives and administrative staff. Data were collected using a structured five-point Likert-scale questionnaire and analyzed using descriptive statistics (mean and standard deviation) based on the DeLone and McLean Information Systems Success Model and the ISO/IEC 25010:2023 software product quality model. The results indicated a high level of user satisfaction (Mean = 4.87), reduced administrative workload, and improved accuracy in participant management. These findings demonstrate that the proposed system effectively enhances university event management and provides a practical framework for developing QR code-based electronic invitation systems in higher education institutions.

1. Introduction

Universities routinely organize academic conferences, workshops, training programs, and ceremonial events that require systematic invitation and participant management. Despite ongoing digital transformation initiatives, many institutional invitation processes still depend on manual document preparation, spreadsheet-based data handling, and paper-based attendance tracking, which may lead to operational inefficiencies, data inconsistencies, and limited coordination flexibility (Laudon & Laudon, 2020). These limitations become increasingly critical when events involve multiple sessions, large participant groups, and bilingual communication requirements.

Advances in information systems and web technologies have enabled the development of digital platforms that integrate data management and administrative workflows (Pressman & Maxim, 2020). In educational contexts, QR code technology has been applied to support digital information access, information sharing, data tracking, and technology-mediated interactions. QR code-based attendance systems in higher education have been found to reduce attendance-processing time and achieve high levels of perceived usefulness and user acceptance (Tan et al., 2023). At the university-event level, a QR code-based registration data management system developed for MSU Open House was reported to simplify registration procedures, support participant identification, and improve the efficiency of participant data management (Nuengudom, 2023). A quantitative analysis of literature indexed in the Web of Science database subsequently examined the growing use of QR code applications in education and identified a relatively limited number of studies addressing emerging QR code innovations (Krajnik & Demeter, 2024). Recent research has also proposed a web-based visitor management system that integrates QR code-based registration with automated visitor verification, monitoring, and intelligent analytics to support more efficient and secure visitor administration (Chitirala et al.,

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2026). Other recent studies have extended QR code applications to centralized event management platforms incorporating digital registration, QR code-based tickets, attendance tracking, feedback collection, winner announcements, automated certificate generation, and event record storage (Tejaswi et al., 2026). Similarly, a web- and cloud-based college event tracking system has been developed to support event notifications, online registration, QR code-based attendance recording, automated digital certificate generation, and reporting on registrations, attendance, and event history (Madhumitha et al., 2026).

However, these studies primarily focus on the educational applications of QR codes, attendance verification, or event registration rather than providing an integrated solution that supports bilingual electronic invitations, configurable participant allocation across multiple event sessions, and centralized event coordination within university environments. Consequently, a research gap remains in the development of a comprehensive electronic invitation system that addresses the operational requirements of higher education institutions, particularly for events involving multiple sessions and multilingual participants.

This study proposes the development and evaluation of a web-based electronic invitation system integrated with QR code technology specifically designed for university event management. The study adopts a Research and Development (R&D) methodology and evaluates the proposed system using the DeLone and McLean Information Systems Success Model (DeLone & McLean, 2003) together with the ISO/IEC 25010:2023 software product quality model (ISO/IEC, 2023). The objectives of this research are to (1) design and develop a web-based electronic invitation system integrated with QR code technology, (2) deploy and evaluate the proposed system during an actual university event, and (3) assess its effectiveness in improving operational efficiency and user satisfaction. In addition to providing a practical solution for university event management, this study contributes an applied framework for integrating multi-session event management, bilingual electronic invitation generation, and QR code-based participation confirmation. The proposed framework may also serve as a practical reference for the development and implementation of electronic invitation systems in other higher education institutions.

2. Related work

Previous studies on event management systems have highlighted the benefits of digital solutions in reducing administrative workload and improving data accuracy. Web-based event management platforms have been applied in various contexts, including academic conferences, exhibitions, and training programs. QR code technology has been widely adopted for attendance tracking due to its low cost, ease of generation, and compatibility with mobile devices.

QR code-based attendance systems have been developed to automate attendance recording, reduce paperwork and manual errors, and enable real-time reporting in university settings (Narangammana & Shamila, 2025). In event management contexts, QR code-based check-in has been proposed to streamline participant identification and entry processing while supporting digital attendance records (Collins, 2025). Machine-learning-based event management systems have also been proposed to support optimized scheduling and participant behavior tracking (Krithika & Subhasri, 2025). Despite these advancements, existing systems primarily focus on event registration and attendance verification, while limited attention has been given to integrating bilingual electronic invitations, configurable multi-session participant allocation, and centralized participant management within a unified web-based platform specifically designed for university environments. This study addresses these limitations by developing an integrated electronic invitation system that combines bilingual invitation generation, participant management, QR code generation, and reporting within a single web-based platform.

Design and development research provides a systematic approach to analyzing practical problems and designing, developing, and evaluating products or systems intended to address those problems (Richey & Klein, 2005). Accordingly, this study organized its research process into four sequential phases: requirement gathering and analysis, system design and architecture, system development and implementation, and system evaluation. The proposed system was evaluated using the DeLone and McLean Information Systems Success Model (DeLone & McLean, 2003) together with the ISO/IEC 25010:2023 software product quality model (International Organization for Standardization/International Electrotechnical Commission [ISO/IEC], 2023).

Table 1. Comparison between Existing University Event Management Systems and the Proposed System

Feature	Existing University Event Management Systems	Proposed System
QR Code-Based Invitation and Response Management	✓	✓
QR code-based participation response	✓	✓
Bilingual (Thai–English) electronic invitations	Not commonly supported	✓
Multi-session event management	Not commonly supported	✓
Real-time response recording	✓	✓
Configurable multi-session participant allocation	Not commonly supported	✓
Integration with university event workflows	Limited	✓

Table 1 compares the functional characteristics of existing university event management systems reported in previous studies with those of the proposed system.

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Existing systems generally support QR code-based invitation and response management as well as participation confirmation. However, bilingual electronic invitation generation, configurable multi-session event management, configurable participant allocation, and integrated university event workflows are not commonly supported. To the best of the authors' knowledge, no previous study has integrated these capabilities within a unified web-based platform specifically designed for university event management. The proposed system addresses these limitations by integrating these features into a single platform and evaluating its effectiveness using the DeLone and McLean Information Systems Success Model together with the ISO/IEC 25010:2023 software product quality model.

Accordingly, the proposed system provides a practical framework for university event management by integrating bilingual electronic invitation generation, configurable multi-session event management, configurable participant allocation, QR code-based invitation and response management, and centralized event workflows within a unified web-based platform. This integrated approach improves the efficiency of event administration and provides a practical reference for the development of similar systems in other higher education institutions.

3. Research Methodology

This study employed a Research and Development (R&D) approach organized into four sequential phases: (1) requirement gathering and analysis, (2) system design, (3) system development and implementation, and (4) system evaluation. The four phases were defined according to the development activities and operational context of the proposed system. This approach is consistent with design and development research, which emphasizes the systematic analysis, design, development, and evaluation of products and systems (Richey & Klein, 2005).

During the first phase, user requirements were collected and analyzed to identify the operational needs of university event management. The findings served as the foundation for defining the system scope and functional specifications. Based on these requirements, the system architecture, database schema, and user interface were designed to ensure usability, scalability, and efficient data processing. The proposed system was subsequently implemented as a web-based application and deployed during an actual university event. Finally, the system was evaluated in a real operational environment using the DeLone and McLean Information Systems Success Model together with the ISO/IEC 25010:2023 software product quality model to assess its effectiveness and user satisfaction.

3.1 Requirement Gathering and Analysis

The first phase of the research focused on requirement gathering and analysis. User requirements were collected through interviews and discussions with university event organizers responsible for planning and coordinating institutional events.

The requirement analysis revealed that university events are often organized by multiple committees, each responsible for inviting different categories of participants, such as university executives, distinguished experts, international guests, retirees, and other stakeholder groups. Because invitation lists were managed independently by each committee, duplicate participant records frequently occurred when an individual belonged to multiple participant groups or held more than one organizational role. In addition, participation responses were collected separately by each committee, making it difficult to monitor participation status in real time and resulting in delays in summarizing confirmed participants.

Furthermore, some university events consist of multiple sessions conducted at different times, with each session involving different groups of invited participants. Managing invitation lists and participation responses separately for each session increased administrative complexity, duplicated effort, and the risk of inconsistent participant information. These operational challenges highlighted the need for a centralized invitation management system capable of supporting configurable multi-session event management, participant allocation, duplicate record prevention, and integrated participation response management.

Based on these findings, the system scope and functional requirements were defined, including event management, configurable multi-session scheduling, bilingual electronic invitation generation, QR code-based participation confirmation, participant data import from spreadsheet files, participation response management, and report generation. Non-functional requirements emphasized usability, scalability, security, maintainability, and compatibility with standard web browsers to support practical deployment within the university environment.

3.2 System Design and Architecture

The proposed system adopts a three-tier architecture to support modular system development and centralized data management. The overall system architecture is illustrated in Figure 1.

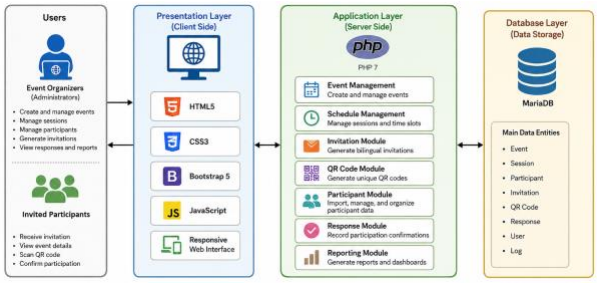


Figure 1. Overall System Architecture of the Proposed Electronic Invitation System

Figure 1 illustrates the overall architecture of the proposed electronic invitation system based on a three-

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tier architecture consisting of the presentation, application, and database layers. The presentation layer provides a responsive web interface developed using HTML5, CSS3, Bootstrap 5, and JavaScript, enabling event organizers and invited participants to access the system through standard web browsers without additional software installation. The application layer was implemented using PHP 7 and Apache, providing the core business modules for event management, configurable multi-session scheduling, bilingual electronic invitation generation, participant management, QR code generation, participation confirmation, and report generation. The database layer employs MariaDB to centrally manage event information, schedules, participant records, invitations, QR codes, user accounts, and participation responses. QR code generation is supported by the PHP QR Code Library, while participant data can be imported from spreadsheet files using the PhpSpreadsheet library. These technologies were selected for their compatibility with the university's existing server environment, ease of deployment, and reliable support for web-based application development. The three-tier architecture enables efficient communication between system components while providing scalability, maintainability, and practical deployment for university event management.

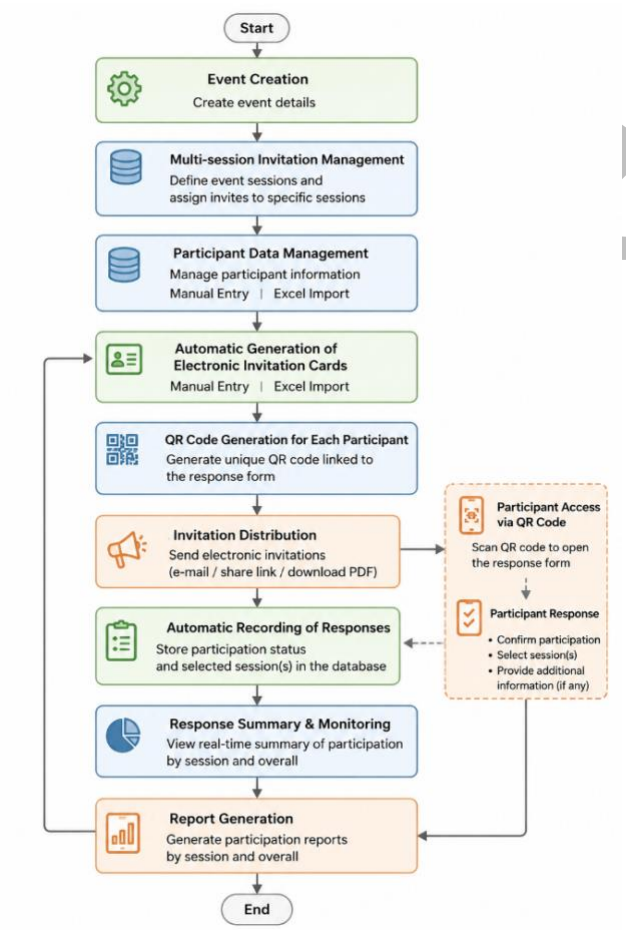


Figure 2. System workflow of the electronic invitation system

Figure 2 illustrates the operational workflow of the proposed electronic invitation system. The process begins with event creation, where organizers define event information, configure multi-session schedules, and prepare bilingual invitation content in Thai and English. Participant information is then entered manually or imported from spreadsheet files, after which participants can be assigned to one or more event sessions according to the event requirements.

Based on the configured event information and participant records, the system automatically generates personalized electronic invitations together with unique QR codes for each invitee. Authorized organizers access the administrative functions through institutional authentication, while invitees can conveniently access the web-based participation confirmation page by scanning their personalized QR codes.

After accessing the confirmation page, invitees review the event information, select their participation status, and choose the session(s) they wish to attend. The submitted responses are recorded automatically in the centralized database and immediately reflected in the participant management module. This enables organizers to monitor participation responses in real time, review confirmation statistics by participant group and event session, and generate summary reports automatically without manual data compilation.

The workflow integrates invitation preparation, participant management, participation response management, and reporting within a unified web-based platform, thereby reducing repetitive administrative tasks, improving data consistency, and supporting efficient management of university events involving multiple participant groups and event sessions.

3.3 System development and Implementation

The proposed system was implemented as a web-based application and deployed on the university server for actual event management. Authorized organizers can create events, configure bilingual event information and multi-session schedules, manage participant lists, and import participant data from spreadsheet files. The system automatically generates personalized electronic invitations with unique QR codes for each invitee.

Upon receiving the invitation, invitees can scan the QR code to access the web-based confirmation page, review the event information, confirm their participation, and select their preferred session. The submitted responses are automatically recorded in the centralized database, enabling organizers to monitor participation status and generate summary reports by event session. The integrated web-based platform improves administrative efficiency, reduces manual processing, and enhances university event management.

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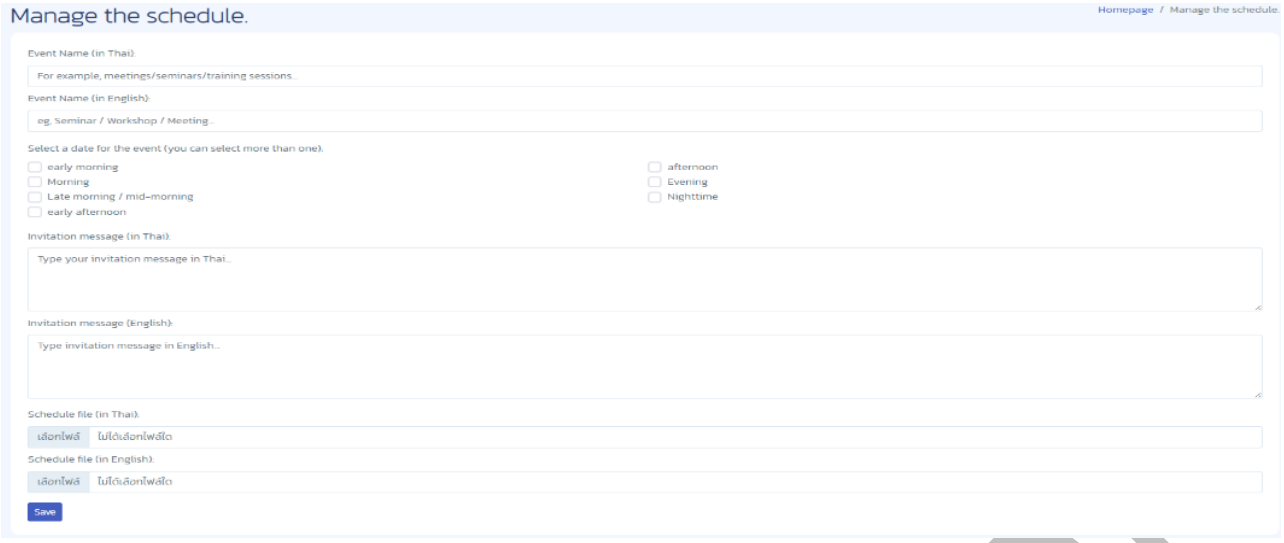


Figure 3. Event Schedule Management Interface

Figure 3 presents the event schedule management interface, which enables administrators to configure essential event information through a centralized web-based platform. The interface allows users to define event names in both Thai and English, supporting bilingual communication for domestic and international participants. Administrators can create flexible multi-session schedules by selecting one or more time periods, such as early morning, morning, late morning, afternoon, evening, and nighttime, enabling the system to accommodate events consisting of multiple sessions within a single activity.

In addition, the interface provides dedicated fields for entering invitation messages in both Thai and English, ensuring that personalized electronic invitations can be generated according to the recipient's preferred language. Organizers may also upload schedule documents separately in Thai and English, allowing participants to access detailed event agendas together with their electronic invitations. By centralizing event information, schedule configuration, multilingual content management, and document upload within a single interface, the system reduces repetitive administrative tasks, improves data consistency, and facilitates efficient management of complex university events involving diverse participant groups.

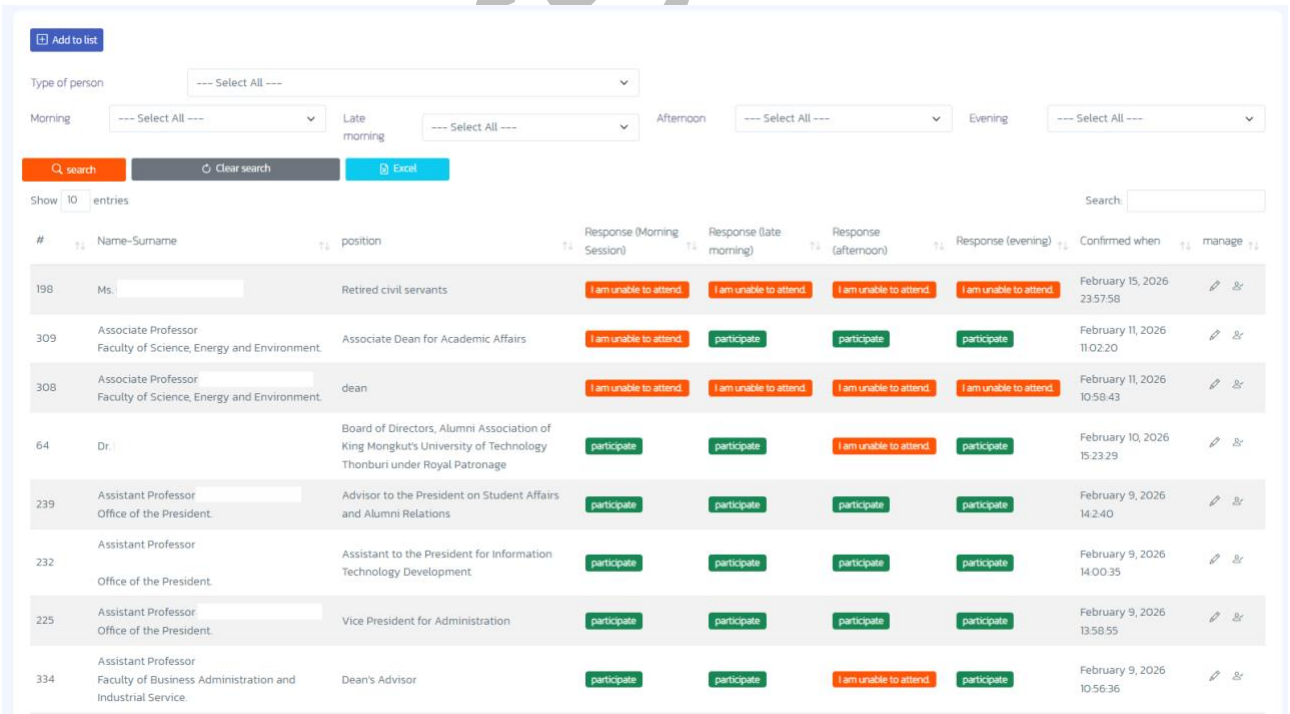


Figure 4. Participant Response Monitoring Dashboard

Figure 4 shows the participant response dashboard, which displays real-time participant confirmations for each session. The dashboard enables filtering by participant type and session period, providing organizers with an overview of participation status and confirmation timestamps.



Figure 5. QR Code Generation and Electronic Invitation Example

Figure 5 illustrates automatically generated QR codes associated with individual participants. Each QR code uniquely identifies an invited participant and provides direct access to the web-based participation confirmation form. The QR code enables invited participants to conveniently confirm their participation and allows organizers to monitor confirmation status accurately through the centralized management system.

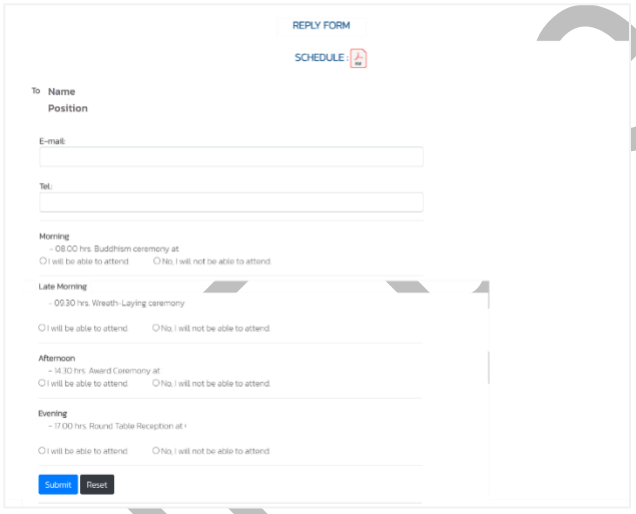


Figure 6. Web-based reply form allowing invited participants to confirm participation for multiple event sessions through a personalized electronic invitation.

The reply form interface shown in Figure 6 allows invited participants to confirm their attendance for each session of the event. The form presents event details and enables session-based participation selection without requiring user authentication, thereby improving usability and response efficiency.

The system interfaces and workflows shown in Figures 2–6 demonstrate the practical implementation of the proposed electronic invitation system. The integration of scheduling management, participant response tracking, and QR code-based participation response supports efficient event operations and reduces administrative workload.

3.4 System Evaluation

The proposed system was deployed during an actual university event. System evaluation involved 21 actual users, comprising university executives and administrative staff who were selected using purposive sampling because they were directly involved in the event and had practical experience using the proposed system. The administrative staff used the system throughout the event preparation process to create events, manage participant information, generate bilingual electronic invitations, and monitor participation responses. University executives and administrative staff evaluated the system based on their practical experience using the administrative functions throughout the event preparation process. This combination of users enabled the evaluation to reflect both operational and end-user perspectives under actual deployment conditions.

Data were collected using a structured five-point Likert-scale questionnaire developed based on the DeLone and McLean Information Systems Success Model (DeLone & McLean, 2003) together with the ISO/IEC 25010:2023 software product quality model (ISO/IEC, 2023). The questionnaire included evaluation items covering system quality, information quality, system use, user satisfaction, and net benefits, while the system quality dimension was developed with reference to the quality characteristics defined in ISO/IEC 25010:2023.

Table 2. System Evaluation Indicators

Evaluation Dimension	Model Reference	Indicator	Assessment Criteria
System Quality	ISO/IEC 25010	Usability	Ease of use, clarity of interface (Likert scale)
System Quality	ISO/IEC 25010	Functional suitability	Accuracy of invitation and QR code generation
System Quality	ISO/IEC 25010	Reliability	System availability during event operation
Information Quality	D&M IS Success Model	Accuracy	Correctness of participant and schedule data
Information Quality	D&M IS Success Model	Completeness	Coverage of multi-session schedules
System Use	D&M IS Success Model	Actual use	Frequency of system usage by users
User Satisfaction	D&M IS Success Model	Satisfaction level	Overall satisfaction score (Likert scale)
Net Benefits	D&M IS Success Model	Efficiency improvement	Reduction in preparation time and errors

Table 2 summarizes the evaluation indicators used to assess the proposed electronic invitation system. The evaluation framework combines the DeLone and McLean Information Systems Success Model with the ISO/IEC 25010 software quality model to ensure a comprehensive assessment of both software quality and information system effectiveness. The indicators cover five evaluation dimensions, namely system quality, information quality, system use, user satisfaction, and net benefits. Each indicator was measured using a structured five-point Likert-scale questionnaire designed to evaluate the practical performance and user perception of the proposed system during actual deployment.

Table 3. Summary of System Evaluation Results

Dimension	Item Code	Evaluation Item	Mean	S.D.	Interpretation
System Quality	SQ1	The system is easy to learn and use	4.86	0.35	Excellent
	SQ2	The system supports multi-session event management effectively	4.81	0.39	Excellent
	SQ3	QR code generation functions reliably	4.90	0.29	Excellent
	SQ4	Excel data import is convenient and accurate	4.71	0.45	Excellent
	SQ5	The system supports bilingual invitation generation effectively	4.81	0.39	Excellent
	Average		**4.82**	**0.38**	**Excellent**
Information Quality	IQ1	Participant information generated by the system is accurate	4.90	0.29	Excellent
	IQ2	Event details in invitations are complete	4.86	0.35	Excellent
	IQ3	Invitation content is consistent with assigned sessions	4.86	0.35	Excellent
	IQ4	Information presented in invitations is clear	4.90	0.29	Excellent
	Average		**4.88**	**0.32**	**Excellent**
System Use	SU1	The system was actively used during event preparation	5.00	0.00	Excellent
	SU2	The system replaced traditional manual invitation processes	4.86	0.35	Excellent
	SU3	The system was used throughout the entire workflow	4.76	0.42	Excellent
	Average		**4.87**	**0.33**	**Excellent**
User Satisfaction	US1	Overall satisfaction with system performance	4.95	0.21	Excellent
	US2	The system meets expectations for invitation management	4.76	0.42	Excellent
	US3	Confidence in using the system for future events	4.95	0.21	Excellent
	Average		**4.88**	**0.31**	**Excellent**
Net Benefits	NB1	Reduction in invitation preparation time	4.86	0.34	Excellent
	NB2	Reduction in participant data errors	4.90	0.29	Excellent
	NB3	Improvement in overall event management efficiency	4.95	0.21	Excellent
	NB4	Reduction in paper-based documentation	4.95	0.21	Excellent
	NB5	Support for digital transformation initiatives	4.90	0.29	Excellent
	Average		**4.91**	**0.28**	**Excellent**
Overall Satisfaction		Overall system satisfaction	**4.87**	**0.33**	**Excellent**

Table 3 presents the user evaluation results. The overall mean score was 4.87 with a standard deviation of 0.33, indicating an excellent level of user satisfaction. All five evaluation dimensions received mean scores above 4.80. Net Benefits achieved the highest mean score (4.91), followed by Information Quality and User Satisfaction (both 4.88), while System Use (4.87) and System Quality (4.82) also received excellent evaluations. These findings

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indicate strong user acceptance and substantial operational benefits in supporting university event management. For interpretation purposes, mean scores greater than 4.50 were classified as excellent.

The high satisfaction scores can be attributed to the system's deployment among experienced university executives and administrative staff who were directly involved in organizing the event and had practical experience using the system throughout the invitation management process. Their familiarity with institutional workflows enabled them to evaluate the system under actual operational conditions, providing a realistic assessment of its usability, functionality, and effectiveness.

Furthermore, the high level of user satisfaction observed in this study is consistent with the DeLone and McLean Information Systems Success Model, which suggests that high system quality, information quality, and effective system use contribute to greater user satisfaction and organizational benefits (DeLone & McLean, 2003). The findings are also consistent with previous studies reporting that web-based information systems can improve operational efficiency, reduce administrative workload, and enhance user satisfaction in organizational environments.

4. Discussion

The evaluation results can also be interpreted through the DeLone and McLean Information Systems Success Model. System Quality was reflected in the users' positive perceptions of ease of use, reliability, bilingual invitation generation, and multi-session management. Information Quality was demonstrated by the accuracy, completeness, and clarity of participant and event information generated by the system. System Use was evidenced by the successful adoption of the system throughout the invitation preparation and participation response management process during the actual university event. User Satisfaction received the highest evaluation score, indicating strong user acceptance and confidence in using the system for future events. Finally, Net Benefits were reflected in reduced administrative workload, improved data consistency, faster invitation management, and more efficient coordination of university events.

Table 4. Comparison of Administrative Workflow Before and After System Implementation

Administrative Task	Before Implementation	After Implementation	Impact
Invitation preparation	Manual document editing	Automatic generation	Reduced preparation time
Participant management	Multiple spreadsheets	Centralized database	Improved data consistency
QR code generation	-	Automatic generation	Enabled QR code-based participation confirmation
Participation confirmation	Manual tracking	System-based confirmation	Real-time monitoring
Report generation	Manual compilation	Automatic reports	Faster report preparation

Table 4 compares the administrative workflow before and after implementation of the proposed electronic invitation system. Before implementation, invitation preparation, participant management, participation confirmation, and report preparation relied on manual document processing, multiple software applications, and separate spreadsheet files, while QR code generation was not supported. This fragmented workflow increased duplicate or inconsistent participant information, made participation responses difficult to monitor, and required considerable manual effort.

Following system implementation, these activities were integrated into a unified web-based platform that supports automatic bilingual electronic invitation generation, centralized participant management, configurable multi-session participant allocation, QR code generation, participation response management, and automatic report generation. The centralized database enables organizers to maintain consistent participant information while eliminating duplicate records and reducing repetitive administrative tasks. In addition, participation responses are recorded and updated automatically, allowing organizers to monitor confirmation status in real time and generate summary reports without manual compilation.

Overall, the proposed system streamlines the university event management workflow by reducing administrative workload, minimizing manual operations, improving data consistency, and enhancing the efficiency of invitation preparation, participant coordination, and reporting. These improvements demonstrate the practical benefits of integrating multiple event management functions into a single web-based platform.

Table 5. Quantitative Comparison of Administrative Performance Before and After System Implementation

Administrative Task	Before Implementation	After Implementation	Performance Improvement
Invitation preparation time (10 invitees)	Approximately 10 minutes	Less than 1 minute	Reduced by more than 90%
Participation response recording	Approximately 1 day	Real-time	Immediate recording
Duplicate invitation records	Occasionally occurred	Not observed	Eliminated

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Table 5 presents a quantitative comparison of administrative performance before and after implementing the proposed electronic invitation system. The results indicate that the time required for invitation preparation was reduced from approximately 10 minutes to less than 1 minute for 10 invitees, representing a reduction of more than 90%. In addition, participation responses were recorded in real time instead of requiring approximately one day for manual processing. The centralized participant management mechanism also eliminated duplicate invitation records, contributing to improved administrative efficiency and greater data consistency throughout the event management process.

The findings are consistent with previous research indicating that QR code-based systems can reduce attendance-processing time, support participant identification, and decrease reliance on manual attendance procedures in higher education and event management contexts (Tan et al., 2023; Collins, 2025). However, this study contributes by providing an applied case study within a university context and by explicitly supporting multi-session invitation management to accommodate complex institutional event structures and specific organizational requirements.

The findings also demonstrate that integrating bilingual electronic invitation generation, configurable multi-session participant management, QR code-based participation confirmation, and centralized reporting within a unified web-based platform can effectively support university event management. Beyond the implementation of a working software system, the proposed framework provides a practical reference that can be adapted by other higher education institutions with similar operational requirements.

4.1 Limitations

Although the proposed system demonstrated high user satisfaction and practical effectiveness, this study has several limitations. First, the system was evaluated with 21 actual users, comprising university executives and administrative staff. Therefore, the findings may not be fully generalizable to other higher education institutions or organizations with different operational contexts and event management requirements. Second, the evaluation focused on user perceptions of system quality, information quality, system use, user satisfaction, and net benefits using descriptive statistical analysis. More comprehensive evaluations, such as comparative studies, longitudinal assessments, or inferential statistical analyses with larger sample sizes, were beyond the scope of this research. Finally, although the proposed system supports institutional user authentication, it has not yet been integrated with other university information systems, such as online registration systems for training, seminars, or academic events, enterprise resource planning (ERP) systems, or mobile application platforms. Future research should investigate such integrations to enable seamless information exchange, minimize duplicate data entry, and further enhance the scalability and practical applicability of the proposed system.

5. Conclusion

This study presented the design, development, and evaluation of a web-based electronic invitation system integrated with QR code technology for university event management. The proposed system successfully improved invitation management efficiency, reduced administrative workload, minimized manual errors, and supported bilingual and multi-session event coordination. The evaluation results demonstrated a high level of user satisfaction across all dimensions of the DeLone and McLean Information Systems Success Model, confirming the practical effectiveness of the proposed system in an actual university event.

Beyond the implementation of a working software system, this study contributes a replicable development framework for electronic invitation management in higher education institutions. The proposed framework integrates requirement gathering and analysis, three-tier web-based system architecture, bilingual electronic invitation generation, configurable multi-session participant management, QR code-based participation confirmation, and systematic evaluation using the DeLone and McLean Information Systems Success Model together with the ISO/IEC 25010:2023 software product quality model. This framework can serve as a practical guideline for designing, implementing, and evaluating electronic invitation systems in other universities and public sector organizations with similar event management requirements.

Future research may extend the proposed framework by integrating institutional registration systems, mobile applications, advanced data analytics, and cross-institutional validation involving larger and more diverse user groups.

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CRediT authorship contribution statement

Prattana Thoopsamut: Conceptualization, Methodology, Software development, System architecture design, Data curation, Formal analysis, Validation, Investigation, Visualization, Project administration, Writing – original draft, Writing – review & editing.

Declaration of Interests

Please select one of these two options.

☒ The author declare that she have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

☐ The author declare the following financial interests/personal relationships which may be considered as potential competing interests:

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