E-BOOK OF EXTENDED ABSTRACT

THE 14TH INTERNATIONAL INVENTION, INNOVATION & DESIGN COMPETITION 2025

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SMART SPACE: A BOOKING SOLUTION FOR ARCHITECTURE SCHOOLS

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ABSTRACT

In architecture education, the effective use of learning spaces such as studios, critique areas, and seminar rooms are essential to support design-based pedagogy. However, managing these spaces manually—previously done via shared Google Sheets—has proven inefficient, prone to errors, and lacking transparency. To address these issues, this innovation project introduces the Smart Booking System, a digital solution specifically designed for the planning and coordination of room usage within an architectural school setting. The main objectives of this project are to replace the outdated manual system with a user-friendly digital platform, support staff in managing studio learning environments more efficiently, and enhance programme-level planning by integrating bookings with academic schedules. Developed using a low-code platform, the system was shaped through a user-centered design process based on feedback from lecturers and administrative staff. Key features include a visual booking calendar, real-time room availability, and automated booking confirmations. The system was piloted early 2025 with participation from studio coordinators and programme heads. Early findings show that it has improved spatial planning, reduced booking conflicts, and allowed better organisation of student activities such as critique sessions and presentations. Staff are now able to allocate spaces and partitions more effectively based on class size and event type. Overall, the Smart Booking System offers a practical, scalable solution for digital space management in architectural education. It contributes to improved academic coordination, supports student engagement, and aligns with the broader institutional goals of digital transformation and efficient resource management.

Keywords: smart booking, architecture education, space management, user-centered design

1. INTRODUCTION

In architecture education, the use of institutional spaces for critique sessions, design tutorials, reviews, and seminars are an essential pedagogical practice. These academic activities often require specific spatial setups, flexible scheduling, and coordination among multiple stakeholders, including students, lecturers, and administrative staff. However, managing such spatial demands using manual methods can be highly problematic. Traditionally, the architecture school has relied on shared Google Sheets for room bookings and event scheduling. While this system provides basic visibility, it is not built to handle complex academic needs, resulting in frequent double bookings, missed updates, and lack of accountability. These issues hinder efficient space utilisation and often disrupt planned academic activities, particularly during peak periods such as design reviews or examination weeks. Inefficient space management is a common issue in higher education institutions, with challenges such as limited space availability and underutilised spaces (Tawil et al., 2014; Valks, B. 2021).

Recognising these limitations, this innovation project introduces a Smart Booking System specifically tailored for the needs of architecture education. The system integrates user-centered design principles with digital automation to facilitate real-time room availability, reservation tracking, and scheduling

transparency. More than just a digital calendar, the system supports programmed-level planning, synchronises with academic timetables, and includes features for reporting and analytics. This smart system is developed to assist staff and lecturers in booking and managing their studio learning areas and environments more effectively. It is designed to empower academic staff with greater control and clarity over the use of teaching spaces, ensuring that the learning environment is well-organised, conducive, and appropriately allocated to meet pedagogical needs. The system has been implemented since early 2025 as a proactive solution to address ongoing issues in space management, particularly in coordinating studio areas for students. In multi-university collaborations, effective spatial coordination, particularly in task division and knowledge transfer, is crucial for project success, yet the involvement of more institutions often reduces these coordination activities, leading to poorer outcomes due to the increased complexity of managing spatial and institutional differences (Cummings & Kiesler, 2007).

By streamlining room management and minimising human error, the Smart Booking System offers a sustainable and scalable solution that enhances the operational efficiency of architectural education environments. This paper outlines the development process, user testing, and potential institutional impact of the system within the context of evolving digital practices in higher education.

2. METHODOLOGY

The development of the Smart Booking System followed a user-centered design approach, focusing on the real needs and daily routines of academic staff within the architecture school. The process began with a situational analysis and feedback gathering from lecturers and administrative staff who regularly managed space bookings. Common issues—such as double bookings, unclear room status, and miscommunication—were identified as key pain points. Based on these findings, the system was designed using a low-code development platform to allow for rapid prototyping and flexibility. The interface was tailored to be intuitive and accessible, with features such as a visual booking calendar, room availability indicators, and instant confirmation notifications. The system was piloted in early 2025, involving selected studio coordinators and programme heads. During this trial phase, usage data and user feedback were collected to refine system features and improve usability. Continuous support and training were also provided to ensure smooth adoption among staff members. Figure 1 below shows the initial prototype interface of the Smart Booking System, highlighting its core functions and user-friendly layout.

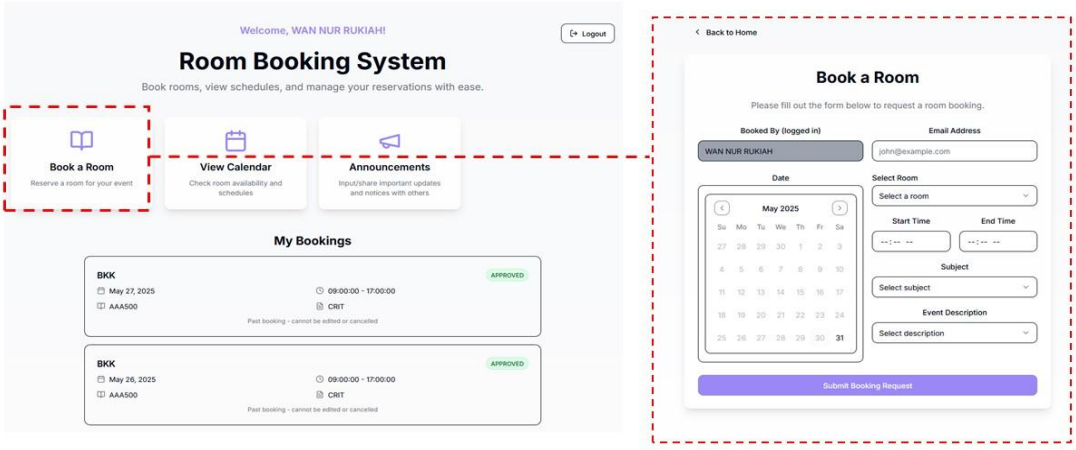

Figure 1 Prototype Smart Booking System

3. FINDINGS

The implementation of the Smart Booking System has shown positive outcomes in the daily operations of the architecture school. The system has been widely adopted by academic staff, who reported that it significantly simplified the process of managing room and studio bookings. With the visual calendar and real-time updates, staff can now plan critique sessions, tutorials, and student presentations more efficiently. One of the key improvements is the ability to organise space usage based on class size and activity type. For example, staff can reserve specific areas with appropriate partitions and display panels to accommodate student pin-up sessions according to studio capacity. The system is also accessible through a website interface optimised for mobile phones, making it easy for users to book and manage spaces anytime, anywhere. Staff have found the tools to be user-friendly, with a clear interface that allows for quick learning and seamless navigation. This level of control has improved scheduling clarity and enhanced the overall learning environment by ensuring that space is used effectively and purposefully. Additionally, the system has reduced booking conflicts and improved communication among staff, leading to more streamlined planning, especially during peak academic periods.

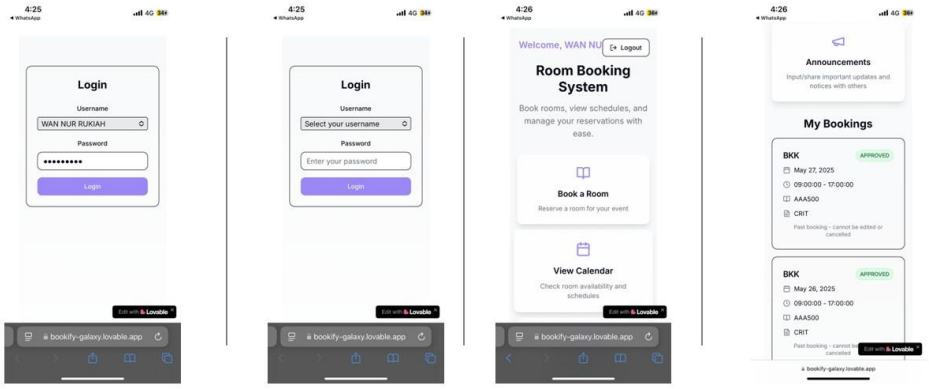

Figure 2 The Smart Booking System prototype is accessible via a mobile-friendly website.

4. CONCLUSION

The Smart Booking System represents a significant step forward in improving spatial management within architectural education. By replacing the inefficient manual booking process with a user-centered digital solution, the system empowers academic staff to plan, reserve, and manage studio spaces with greater ease and accuracy. Its successful pilot implementation has demonstrated improved coordination, better use of teaching spaces, and enhanced support for student-centered activities such as critiques and presentations. The system is also mobile-friendly, allowing staff to make and manage bookings conveniently using their smartphones, which increases accessibility and flexibility. Beyond solving operational issues, the system promotes a culture of planning and accountability, aligning with the broader goals of digital transformation in higher education. This innovation not only addresses current needs but also offers scalability for future institutional growth and interdisciplinary collaboration across programmes.

REFERENCES

Cummings, J. N., & Kiesler, S. (2007). Coordination costs and project outcomes in multi-university collaborations. *Research policy*, *36*(10), 1620-1634.

Tawil, N. M., Saidin, N. E., Mohamad, N., & Musa, A. R. (2014). Cost development of space utilization in Malaysia's public universities. *International of Civil Engineering and Technology*, *9*(12), 1068-1072.

Valks, B. (2021). Smart campus tools: Technologies to support campus users and campus managers. *A+BE| Architecture and the Built Environment*, (18), 1-456.

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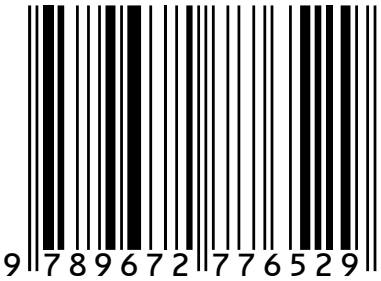

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