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DITERIMA PADA JULI, 2025

JURNAL PEMANFAATAN TEKNOLOGI UNTUK MASYARAKAT (JAPATUM)
VOL. 4, ISSUE. 3, SEPTEMBER, 2025. HAL. 1-8
ISSN. 2460-9056 | 10.59328/JAPATUM.2025.4.1.72

Digital Teaching Schedule Development Through Community Engagement at SMAN 24

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Abstract

The development of a teaching scheduling system at SMAN 24 Bandung aims to enhance the efficiency and effectiveness of time management and educational resource allocation. SMAN 24 Bandung has faced challenges with manual scheduling, which often leads to schedule conflicts, misalignment with curriculum requirements, and suboptimal use of resources. This technology-based scheduling system is designed to automate the scheduling process, reduce the potential for errors, and allow for real-time schedule adjustments. The proposed solution includes the development of a flexible system, training for users (teachers and administrative staff), phased implementation, and continuous monitoring and evaluation. Intensive training and user empowerment ensure optimal system utilization, while ongoing monitoring and evaluation are conducted to assess effectiveness and make adjustments as needed. With this development, SMAN 24 Bandung is expected to create a more structured, efficient, and adaptive learning environment, thereby contributing to improved educational quality and student academic achievement.

Kata kunci: Community Service, Teaching Scheduler, School Management, Educational Technology

1. INTRODUCTION

The teaching-schedule system is a vital element of school operations, including at SMAN 24 Bandung. Reliance on manual scheduling frequently leads to clashes in teachers' timetables, misalignment with curriculum requirements, and sub-optimal use of rooms and resources (Ramos, Smith, & Taylor, 2020). Introducing a computerised scheduling system can minimise human error, speed up real-time adjustments, and improve time-management efficiency (Martínez & Juárez, 2019; Zhao & Zhang, 2018). In addition, digital flexibility enables the school to respond swiftly to unexpected events—such as teacher absences or extra activities—without disrupting instruction in progress (García, Fernández, & Martín, 2021). Linking the scheduler to the school information database also allows teachers, students, and administrators to access up-to-date timetables with ease (Kim & Lee, 2020). Strategically, this approach is consonant with modern, data-driven educational management that seeks to raise the quality of academic services (Smith, 2017).

Beyond technical gains, developing such a scheduler empowers curriculum stakeholders at SMAN 24 Bandung. First, optimised lesson-time allocation—aligned with curriculum standards—makes learning more systematic (Zhao & Zhang, 2018). Second, an efficient timetable grants teachers ample room to prepare materials, craft creative instructional strategies, and pursue professional development (Ramos et al., 2020). Third, careful planning of school assets—classrooms, laboratories, support facilities—reduces timetable conflicts and boosts utilisation (García et al., 2021). Cross-stakeholder collaboration involving teachers, administrative staff, students, and external partners is critical. Their engagement in design, training, and periodic evaluation keeps the system responsive to real needs (Martínez & Juárez, 2019). Consequently, the new scheduling system has strong potential to enhance educational management quality, positively influence student achievement, and raise overall operational efficiency.

2. METHODOLOGY

2.1. Community Service Solution

To enhance operational efficiency and teaching effectiveness at SMAN 24 Bandung, the proposed solution focuses on the development of a computer-based teaching scheduling system. The components of this solution are as follows:

2.1.1 Development of a Teaching Scheduling System

The development of a teaching scheduling system is aimed at addressing the diverse needs of all stakeholders within the school. One of the core features of this system is its scheduling flexibility, which allows it to adapt to dynamic changes such as examinations, extracurricular activities, and unexpected teacher absences. This adaptability ensures that updates can be made swiftly without disrupting the overall operation of school activities (García, Fernández, & Martín, 2021; Zhao & Zhang, 2018). In addition, the system is designed to integrate seamlessly with the school's existing information technology infrastructure. This integration facilitates easy and efficient access to scheduling information for teachers, students, and administrators alike (Kim & Lee, 2020).

2.1.2 Training for Teachers and Administrative Staff

To ensure effective use of the system, structured training will be provided to all relevant users. The training will begin with an introduction to the system, covering its key functionalities and the benefits it offers to school operations (Martínez & Juárez, 2019). Following this, users will engage in practical simulations that mirror real scheduling scenarios, allowing them to gain hands-on experience and build confidence in using the system. Additionally, technical support will be made available throughout the training and implementation phases to address any issues that may arise, ensuring that users can operate the system smoothly and independently (Mioduser, Nachmias, Lahav, & Oren, 2000).

2.1.3 Monitoring and Evaluation

Continuous monitoring is essential to ensure that the system functions effectively and continues to evolve in line with user needs. As part of this process, regular feedback will be collected from users to evaluate the system's usability and overall effectiveness in supporting teaching and administrative activities (Bransford, Brown, & Cocking, 2000). In parallel, systematic performance reviews will be conducted to assess the functionality of the system and to identify potential areas

for improvement, ensuring that the system remains responsive and aligned with the school's educational goals (Smith, 2017).

2.1.4 Capacity Building for System Management

To ensure the long-term sustainability of the system, capacity development measures will be implemented as part of the overall strategy. A dedicated maintenance team consisting of trained IT personnel, teachers, and administrative staff will be established to manage, monitor, and troubleshoot the system on an ongoing basis (Fullan, 2007). In addition, comprehensive documentation and user manuals will be developed to support daily operations and serve as a reference for training new users, thereby maintaining continuity and consistency in system usage over time (Hew & Cheung, 2013).

2.2 Method and Steps

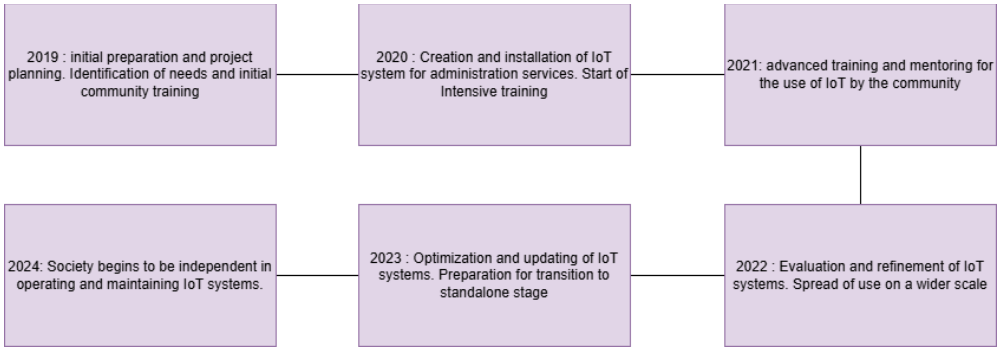

Figure 1. Community Service roadmap

The development of the teaching scheduling system at SMAN 24 Bandung was carried out as part of a community service initiative aimed at improving time management and resource allocation in the school environment. This program adopted a comprehensive and participatory methodology that consisted of several structured phases.

The first phase involved identification and needs analysis, which was conducted through direct observation, interviews, and surveys with teachers and administrators. This stage aimed to uncover problems related to manual scheduling and to gather specific user needs, such as curriculum alignment, teacher availability, and classroom utilization (Zhao & Zhang, 2018).

The second phase was planning and system design. A detailed development plan was created outlining project objectives, milestones, methods, and timelines, incorporating input from key stakeholders including school staff and IT experts. A prototype of the system was then developed, including user interface layouts, scheduling logic, and key features such as conflict resolution mechanisms and dynamic updating capabilities (Martínez & Juárez, 2019).

The third phase consisted of system development and testing. The prototype was transformed into a fully functional application, followed by alpha testing. A limited pilot trial was conducted at SMAN 24 Bandung to collect real-time feedback from users. This feedback informed necessary refinements to enhance system usability and reliability (Ramos, Smith, & Taylor, 2020).

In the implementation and training phase, the system was gradually introduced, starting with selected subjects or grade levels before expanding to the entire school. Intensive training sessions were delivered to teachers, students, and administrative staff, covering both basic operations and advanced features. This step ensured that users could adopt the system smoothly and that technical issues could be promptly addressed (Mioduser, Nachmias, Lahav, & Oren, 2000).

The fifth phase involved monitoring and evaluation, in which continuous assessment was conducted to ensure that the system functioned according to expectations. Usage data was analyzed to measure success indicators such as reduced scheduling conflicts, improved resource utilization, and increased user satisfaction (Bransford, Brown, & Cocking, 2000; Smith, 2017).

The final phase focused on dissemination and continuous development. The outcomes of the implementation were shared with internal and external stakeholders through reports and presentations. This phase also included planning for system upgrades, including feature expansion, better integration, and enhanced security measures to meet evolving educational needs (Hew & Cheung, 2013; Fullan, 2007).

3. RESULT AND DISCUSSION

3.1 Implementation Outcomes

Figure 2. Visitation

The implementation of the teaching scheduling system at SMAN 24 Bandung produced significant outcomes aligned with the objectives of the community service program. One of the primary achievements was the successful development and deployment of the scheduling application. The application was introduced in a phased manner to allow for gradual adoption and necessary adjustments, with feedback loops integrated into each phase.

The application was also publicly disseminated through multiple media, including a publication in the *Humanity Journal*, updates on the KK CITI web portal, and an informative video on the KK CITI YouTube channel. These dissemination efforts

ensured transparency and broadened awareness of the system's development process and benefits within and beyond the school community

3.2 Community Service Activity Results

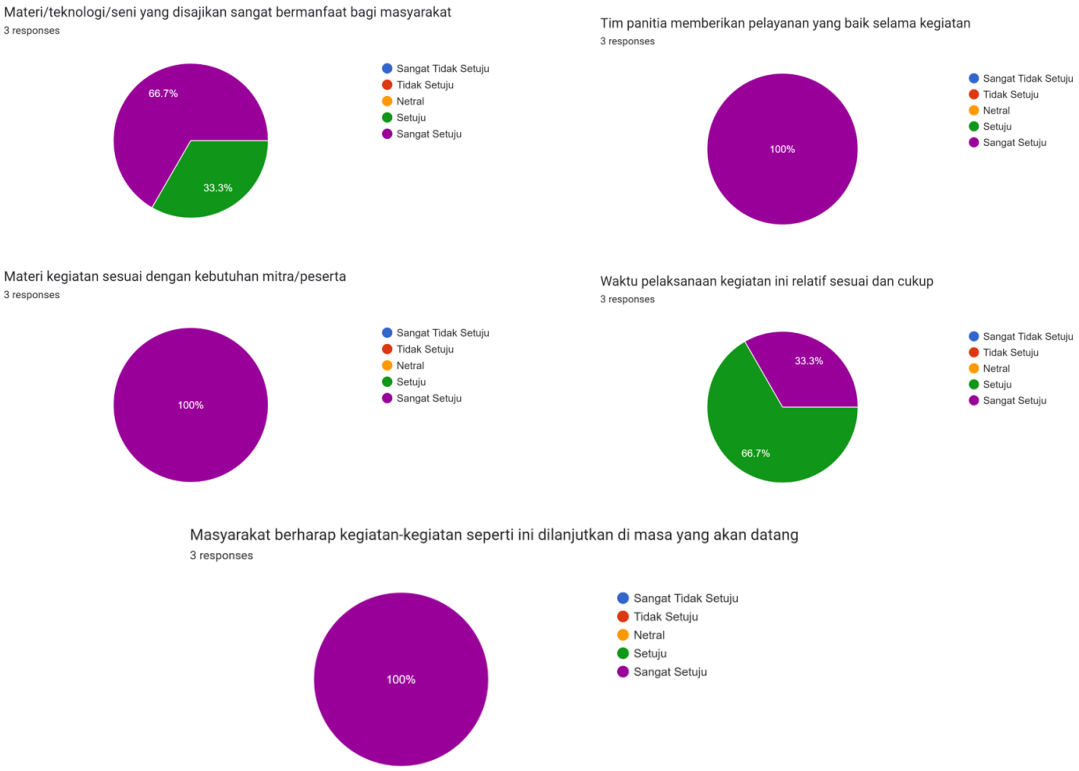

Figure 3. Survey Output 1

The system was well received by the users. A structured feedback survey revealed that 100% of respondents agreed that the activity content was relevant to their needs, with 66.67% finding the delivery time suitable and the rest agreeing it was relatively acceptable. Moreover, 100% of the respondents stated that the service team provided excellent support during the implementation, and all participants hoped that similar programs would continue in the future.

This positive reception indicates the effectiveness of the program in addressing actual problems faced by the school, especially those related to time management, conflict resolution in scheduling, and administrative inefficiency.

3.3 Indicators of Success and Output Realization

The program achieved all required output indicators, including the production of at least one academic publication, dissemination through mass media, and the creation of a demonstration video. Additional expected outputs include the potential for intellectual property (e.g., copyrights or software licensing), practical training modules, and partnership building for further system development or implementation elsewhere

4. CONCLUSION

The implementation of the computer-based teaching scheduling system at SMAN 24 Bandung produced a number of significant outcomes, reflecting the success of this community engagement program. The scheduling application was successfully deployed in stages, beginning with a limited pilot and followed by full-scale implementation. This gradual rollout allowed users—teachers and administrative staff alike—to adapt at their own pace while providing feedback throughout the process.

Beyond technical development, the project also included broad dissemination of results. The system was publicly presented through multiple platforms, including a scholarly article published in the *Humanity* journal, updates posted on the CITI Research Group's website, and a documentary video shared via YouTube. These dissemination efforts helped extend the program's impact while also promoting transparency and knowledge sharing with wider communities (Hew & Cheung, 2013).

The program was positively received by the school community. According to survey results collected from training participants, 100% of respondents agreed that the training content was relevant to their needs. Additionally, 66.67% considered the delivery time highly appropriate, while the remaining respondents found it reasonably suitable. All participants agreed that the implementation team provided excellent technical support and expressed their hope that similar programs would continue in the future. This strong endorsement shows that the initiative addressed real problems faced by the school—particularly those related to time management, scheduling conflicts, and the efficient use of school resources (Ramos, Smith, & Taylor, 2020).

In terms of deliverables, all key program indicators were successfully met. Major outputs included: (1) publication of a scientific article in a national journal, (2) dissemination through social media and educational videos, and (3) technical training for school personnel. In addition to these, three digital systems were developed as concrete outputs:

- Presensi: an online attendance system designed to simplify and standardize teacher presence tracking.
- Rapat.in: a digital meeting scheduling platform to manage internal coordination and school meetings more efficiently.
- FET Scheduler: a computer-based tool for generating conflict-free teaching schedules.

These systems not only responded to the school's immediate administrative needs but also demonstrated scalable solutions that could be replicated in other educational settings.

Through structured evaluation and reflection, several important lessons emerged. First, involving stakeholders from the early design stage significantly improved the system's relevance and acceptance (Bransford, Brown, & Cocking, 2000). Second, training must be continuous rather than one-off to ensure that users can keep up with system and technology updates (Mioduser, Nachmias, Lahav, & Oren, 2000). Third, incorporating user feedback during testing and implementation greatly contributed to iterative system improvements and contextual adaptation (Fullan, 2007).

Overall, this program not only succeeded in solving technical challenges faced by the school, but also strengthened the institution's capacity to adopt sustainable digital innovations. Through a collaborative, participatory, and needs-based approach, the developed systems hold strong potential for replication and further development in other educational environments.

5. SUGGESTIONS

Based on the outcomes and evaluation of the teaching scheduling system implementation, several suggestions can be put forward to enhance its sustainability, usability, and broader applicability. First, continuous capacity building is essential. While initial training was well received, establishing a long-term training framework is crucial to address staff turnover and ongoing technological changes, ensuring sustained system use and minimizing knowledge gaps (Fullan, 2007). Second, the system should be expanded to include features such as teacher workload analysis, student attendance tracking, and integration with e-learning platforms. These additions would enhance the system's administrative value and educational impact (Hew & Cheung, 2013). Third, implementing a structured user feedback mechanism involving teachers, students, and administrators would improve user engagement and support ongoing system development. This participatory approach ensures that future updates remain aligned with actual needs (Bransford, Brown, & Cocking, 2000). Fourth, the success of this project presents an opportunity to replicate the system in other schools through collaboration with local education authorities. Sharing best practices, training materials, and technical documentation could foster broader adoption and contribute to policy development (Ramos, Smith, & Taylor, 2020). Finally, future initiatives would benefit from formal research and impact evaluations. Longitudinal studies measuring the system's effect on teaching effectiveness, scheduling efficiency, and student outcomes would provide valuable empirical evidence to support continued development and institutional investment (Mioduser, Nachmias, Lahav, & Oren, 2000).

THANK-YOU NOTE

The author would like to thank Telkom University and SMAN 24 Bandung for providing support for the success of this community service.

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