

# Development of A Web-Based Guidance and Counseling Information System For Students at SMA N 5 Pematang Siantar

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## ABSTRACT

*This study aims to develop a web-based guidance and counseling information system for students at SMAN 5 Pematang Siantar. The study uses the 4D development model, which consists of the define, design, development, and disseminate stages. The subjects in the product trial consisted of 30 students, one media design expert, one practitioner (counseling teacher), and one counseling teacher as the questionnaire respondent. The instruments used included an expert validation sheet, a teacher response questionnaire, and a student response questionnaire. The validation results showed a score of 92% from the design expert, 87% from the practitioner, 88% from the guidance counselor, and 89.4% from the student response, all of which were in the “very feasible” category. The response questionnaire was also tested for validity using the Pearson correlation technique to ensure the quality of the items. The developed system was assessed as effective in supporting the implementation of guidance and counseling services in schools, such as scheduling, individual and group consultations, and career services. This application contributes to ease of access, service effectiveness, and increased student participation in digital-based guidance and counseling services. In addition, this system also has the potential to be implemented more widely in other schools as an adaptive guidance and counseling service innovation in line with developments in educational technology.*

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## Introduction

Information technology is one of the fields that has experienced rapid development in the modern era. This development enables faster, more accurate, and more efficient access to data and information. Currently, the utilization of information technology has expanded across various sectors, including education. In the educational context, the primary focus lies on the implementation of information systems that function to improve the quality of educational services. One form of such implementation is the use of Guidance and Counseling (G&C) systems in several educational institutions in Indonesia (Usman et al., 2023).

Guidance and counseling are understood as a series of services designed through individual and group activities, aiming to support students in managing daily life independently while maximizing the development of their potential. In addition, these services assist students in resolving various problems they face (Canu & Sitinjak, 2023).

School-based guidance and counseling services play a primary role in supporting the achievement of national education goals, namely developing well-rounded individuals with broad knowledge, balanced personal development, and the ability to optimize their potential to address various challenges. This role can only be realized effectively if guidance and counseling services in schools are organized with well-managed systems (Chilewa & Osaki, 2022).

Guidance and counseling (G&C) services in schools significantly contribute to helping students address diverse issues, whether related to personal, social, academic, or career development aspects. However, in practice, the implementation of G&C services in schools still faces complex challenges, including low student engagement in these services (Saputra et al., 2024).

In the era of globalization, utilizing information systems has become an alternative to facilitate and accelerate access to educational information. To support the performance of guidance and counseling teachers in assisting students with problems, a system is needed to simplify monitoring students' violations and progress (Dwiyanti & Dermawan, 2020).

A guidance and counseling information system provides facilities to manage student data in a more structured, accurate, and continuously monitored manner. Counseling service data, such as records of issues, individual and group counseling results, and service schedules, can be accessed and managed more securely and efficiently. Moreover, the system can offer interactive features such as discussion forums, online counseling, and student development information. Thus, the role of G&C teachers can be maximized—not only in addressing student issues but also in promoting students' potential development proactively and preventively (Chintyasari, 2025).

Another study by Ifdil & Ardi (2013) on e-counseling, titled "Online Counseling as a Form of E-Counseling Service," highlights that internet-based digital media provide counselors with ease in reaching students in various situations, including when students are reluctant to engage in direct counseling. Technology-based services are also considered capable of increasing student engagement due to their flexible, comfortable nature, aligning with current adolescent communication styles.

Based on observations at SMAN 5 Pematang Siantar, it was found that guidance and counseling services are still conducted conventionally. G&C teachers manually arrange students' counseling schedules, recording them in books or printed documents. The process of managing individual and group counseling schedules is not structured through a web-based information system, often leading to inefficiencies in time management, verification of counseling requests, and documentation of students' reasons for seeking counseling.

Although the school provides internet access and computers, there is no centralized system specifically designed to facilitate students in independently submitting counseling schedules. Additionally, G&C teachers reported difficulties in manually managing schedules, especially when multiple counseling requests occur simultaneously, resulting in scheduling conflicts or overlaps.

Considering these needs, a web-based guidance and counseling information system was developed, focusing on submitting and managing counseling schedules. The system allows students to select the type of counseling, choose schedules according to availability, and provide reasons for the counseling request. General information about counseling services is also available on the system dashboard. For counseling sessions, external platforms such as Zoom or Google Meet are still used. Consequently, this system is expected to enhance the efficiency of managing guidance and counseling services at SMAN 5 Pematang Siantar.

## Method

This research is a development study, or Research and Development (R&D), which is a research method used to produce a product and test the effectiveness of the resulting product. According to Sugiyono (2013), R&D research is a method that produces a product in a specific field of expertise, exemplified by a tangible product, and evaluates the product's effectiveness.

The 4D model was chosen because it aligns with the research focus, which aims to develop a web-based guidance and counseling information system. This model provides a systematic approach in defining the needs of students and guidance and counseling teachers, designing the system based on those needs, developing the product through expert validation, and disseminating the product to users. Furthermore, the 4D model is flexible to field requirements, emphasizes product validation before implementation, and is effective in supporting the development of educational information systems that are measurable and responsive to user needs.

## Result and Discussion

### Results

#### Research and Data Collection

Based on a preliminary study conducted at SMAN 5 Pematang Siantar, it was found that the process of submitting guidance and counseling schedules was still carried out manually through recording in books or physical forms. This condition causes several issues, such as schedule conflicts, delayed services, and reluctance from students to visit the counseling room directly.

Students feel more comfortable if they can submit guidance schedules flexibly through digital media without worrying about negative stigma. In addition, guidance and counseling teachers also face difficulties in arranging and verifying multiple guidance requests simultaneously. This phenomenon indicates the need to develop a web-based information system that can facilitate the submission and management of guidance schedules more efficiently and in a structured manner.

These problems reflect the need for an information system that can improve the efficiency and effectiveness of guidance and counseling services in schools. According to research by Setiawan et al. (2022), developing a web-based guidance and counseling information system using PHP and MySQL can help guidance and counseling teachers manage student data, attendance, violation cases, and counseling processes in a more structured and easily accessible way.

In information systems theory, web-based technology is considered effective for enhancing efficiency and accessibility of services in the educational environment. A web-based information system allows services to be accessed anytime and anywhere, as well as supports faster and more organized data management. Therefore, a web-based information system is an appropriate solution to overcome administrative and communication obstacles in guidance and counseling services (Maulana & Wangdra, 2020).

To ensure that the system being developed meets actual needs, the 4D development model (Define, Design, Develop, Disseminate) is used. This model was chosen because it provides a phased and structured approach in designing, building, testing, and disseminating educational products based on real field needs. With this model, the development process starts from analyzing actual needs, creating the design, developing the product, conducting usability testing, and implementing it in the school environment (Arta & Irfan, 2022).

#### 1. **Define Stage**

The definition stage was carried out to identify and analyze the needs of users, namely guidance and counseling (BK) teachers and students, regarding the development of a web-based guidance and counseling information system at SMAN 5 Pematang Siantar. The needs analysis was conducted through interviews with BK teachers and direct observations at the school. The results of the analysis indicated that BK services were still carried out manually, making them inefficient and prone to schedule congestion. In addition, students tend to be reluctant to access BK services directly due to negative stigma, embarrassment, and privacy concerns. This situation highlights the need for a flexible, easily accessible web-based service system that can maintain student confidentiality from the initial stage of service submission.

Based on the task analysis of BK services in the school, the information system to be developed needs to have key features that support the effective implementation of services. These features include login access for students and BK teachers to ensure secure access, submission of individual or group counseling services, options for types of guidance services (personal, social, academic, and career), as well as a verification and scheduling mechanism managed by BK teachers. Additionally, the system should be equipped with service notifications for students and automatic storage of service history to support documentation and evaluation of BK services.

The purpose of developing this web-based guidance and counseling information system is to provide a service medium that can be used independently by students and BK teachers, is easily accessible anytime and anywhere, improves time efficiency and service convenience, and encourages students to be more active in utilizing guidance and counseling services at school.

#### 2. **Design Stage**

The design stage was conducted as a process of preparing the initial design of the web-based guidance and counseling information system based on the results of the needs and task analysis from the previous stage. This design process includes structuring the system, selecting media and technology, designing the user interface, and planning the service workflow so that the system can function effectively and meet user needs.

The media used in developing the system is a web-based platform that can be accessed via computers or smartphones. The selection of web-based media is based on considerations of flexibility, ease of access, and the fact that no additional application installation is required. The technologies used include HTML and CSS for designing the user interface, PHP as the server-side programming language, and MySQL as the database management system. This combination of technologies supports real-time data integration, user information security, and system stability for long-term use.

The user interface design was created to be simple, informative, and easy to understand without requiring special training. The main pages designed include the login page, student and BK teacher dashboards, service submission forms, service schedules, notifications, and service history. Neutral colors such as white, gray, and light blue were chosen to create a professional impression and enhance visual comfort for users. Additionally, icons and buttons were designed intuitively to improve user experience and support accessibility for users with varying levels of digital literacy.

As the final step of the design stage, an initial system prototype was developed to provide a visual and functional representation before the technical construction of the system. The prototype was created using design platforms such as Figma or Canva in the form of mockup pages that reflect the actual system structure and workflow, from the login page to the service history. This prototype was used as an initial validation medium for design experts and BK teachers to gather feedback regarding navigation, feature completeness, and ease of use. The feedback obtained at this stage served as an important basis for system refinement before entering the development stage.

### 3. **Development stage**

The development stage is the implementation phase of the system design that was previously prepared. At this stage, the system design is realized into a functional web-based guidance and counseling information system called Disonco (Discussing Online Counseling). System development includes coding, database management, and the integration of digital guidance and counseling service features. Disonco can be accessed through computers or mobile devices using a browser, providing flexibility for users to access the services.

Disonco offers a homepage and login as the main entry point, ensuring secure access for users. Students log in using their Student Identification Number (NIS) and password, supported by an account recovery feature. After logging in, users are directed to dashboards according to their roles. The BK teacher dashboard is designed with a humanistic approach through welcome displays and the presentation of preventive educational content that can be updated regularly. Besides functioning as a service management system, this feature also supports promotive and preventive guidance and counseling activities.

To ensure the quality of the system, expert validation was conducted involving design experts and guidance and counseling practitioners. Design validation assessed the system's visual and usability aspects, while practitioner validation evaluated the suitability of features and service content with the needs of school guidance and counseling services. The validation results indicated that Disonco is deemed feasible for use, with a communicative interface, easy operation, and alignment with the characteristics of school guidance and counseling services, although some minor improvement suggestions were provided for system refinement.

### 4. **Dissemination stage**

The disseminate stage is the final phase in the 4D development model, aimed at distributing the web-based guidance and counseling information system that has been developed. In this study, the dissemination was carried out on a limited scale due to constraints in time, resources, and the scope of implementation. The system, which had undergone expert validation and user testing, was introduced to the school, particularly to the guidance and counseling teachers at SMAN 5 Pematang Siantar.

The dissemination process was conducted through direct demonstrations of the system's main features, such as user login, guidance service submission, schedule management, notifications, and service history. In addition, BK teachers were provided with the website access link so that the system could be used independently. The aim of this disseminate stage is to offer an alternative guidance service medium that is more flexible, efficient, and responsive to students' needs in the digital era. Although still limited in scope, this stage is expected to serve as an initial step for broader implementation of the system and further development in the future. Feedback from teachers and students at this stage is used as evaluation material to refine and improve the system.

The feasibility of the web-based guidance and counseling information system was evaluated through expert validation and user testing. Expert validation involved design experts and guidance and counseling practitioners to assess the quality of the interface, system usability, and the suitability of features and service content with the needs of school guidance and counseling services. The results of the design expert validation indicated that the system has a communicative

interface, good text readability, and an easy-to-operate user interface. The feasibility percentage falls into the "highly feasible" category, with improvement suggestions being minor and not affecting the main system structure. Validation by guidance and counseling practitioners showed that the system is considered highly relevant and beneficial in supporting the implementation of BK services in schools. Features such as service requests, scheduling, and service management were deemed appropriate for guidance in personal, social, academic, and career areas. Practitioner assessment results fall into the "highly feasible" category, with suggestions mostly related to additional feature enrichment for future development.

Overall, the results of validation and user testing demonstrate that the developed web-based guidance and counseling information system meets feasibility criteria and can be used as a supporting medium for BK services in schools, with potential for further development and broader implementation.

## Discussion

The development of a web-based guidance and counseling information system using the 4D model demonstrates that a step-by-step approach, from needs analysis to dissemination, can produce a system that is relevant and practical. At the define stage, it was found that guidance and counseling services at SMAN 5 Pematang Siantar were still conducted manually, resulting in low efficiency and students' reluctance to access services due to social stigma. Student analysis indicated a need for services that are easily accessible, flexible, and capable of maintaining privacy, while guidance and counseling teachers required a system that could manage schedules and service records more efficiently.

The design stage resulted in a system structure with specific access for students and guidance and counseling teachers, a clear service workflow, and a simple and intuitive user interface. The selection of a web-based platform allows flexible access without the need for additional application installation, while the interface design emphasizes user comfort and ease of navigation.

At the development stage, the Disonco system was successfully built with core features such as user login, service requests, schedule management, notifications, service history, and educational content. Validation by design experts and guidance and counseling practitioners indicated that the system is feasible for use and aligned with the needs of school guidance and counseling services. Limited trials involving teachers and students showed positive responses; teachers perceived the system as helpful for administrative tasks and scheduling, while students felt that the services were more flexible and private.

The dissemination stage was conducted on a limited scale but demonstrated the system's potential for broader implementation. Feedback from teachers and students at this stage served as a basis for further development to optimize system performance. Overall, Disonco has been proven to enhance the efficiency, accessibility, and quality of technology-based guidance and counseling services in the school environment.

## Conclusion

Based on the research and development results, it can be concluded that the developed web-based guidance and counseling information system is aligned with the needs of SMAN 5 Pematang Siantar. The system supports guidance and counseling services that are more efficient, flexible, and easily accessible for both students and guidance and counseling teachers.

The design expert validation results indicate that the system's visual quality and usability are at a very good level (86.7%), while practitioner validation by guidance and counseling teachers achieved a score of 97%, confirming that the service features—including career guidance, individual counseling, and group counseling—are relevant and ready to be implemented in schools. Limited trials showed positive responses from teachers (88%) and students (89.4%), demonstrating that the system is feasible from both the service providers' and users' perspectives.

Overall, the system has strong potential to enhance the effectiveness of guidance and counseling services, facilitate administrative management for teachers, and provide students with fast, convenient, and private access to counseling services.

## References

- Alshamari, M., Alhadreti, O., & Mayhew, P. (2015). *An empirical study of the impact of usability heuristics on users' trust and satisfaction*. *Computers in Human Behavior*, 51, 633–640. <https://doi.org/10.1016/j.chb.2015.05.036>
- Ali, A., Arshad, M., & Anwar, M. N. (2019). *Teachers' acceptance of digital educational tools: The role of usability, perceived usefulness, and behavioral intention*. *Education and Information Technologies*, 24(3), 2141–2153. <https://doi.org/10.1007/s10639-018-09754-4>
- Arkadiantika, I., Ramansyah, W., Effindi, M. A., & Dellia, P. (2020). Pengembangan Media Pembelajaran Virtual Reality Pada Materi Pengenalan Termination Dan Splicing Fiber Optic. *Jurnal Dimensi Pendidikan Dan Pembelajaran*, 8(1), 29. <https://doi.org/10.24269/dpp.v0i0.2298>
- Arta, A.-L. F., & Irfan, D. (2022). Perancangan Media Animasi Interaktif pada Mata Pelajaran Penerapan Rangkaian Elektronika Kelas IX Teknik Audio Vidio di SMKN 1 Sumatera Barat. *Jurnal Pendidikan Dan Konseling*, 4(6), 4500–4501.
- Aryani, W. D., Salsabila, I., Suparmika, Y., Syammach, H. K., & Azizah, N. (2022). Pendekatan Bimbingan Konseling. *Jurnal Pendidikan Indonesia : Teori, Penelitian, Dan Inovasi*, 2 (4), 234–241. <https://doi.org/10.59818/jpi.v2i4.234>
- Atay, S., Müftüoğlu, C. T., Şahin, M., & Ceylan, S. (2024). Design of a web based career counselling information system: Türkiye case. *Education and Information Technologies*, 29(15), 20431–20458. <https://doi.org/10.1007/s10639-024-12659-2>
- Bratha, W. G. E. (2022). Literature Review Komponen Sistem Informasi Manajemen: Software, Database Dan Brainware. *Jurnal Ekonomi Manajemen Sistem Informasi*, 3(3), 344–360. <https://doi.org/10.31933/jemsi.v3i3.824>
- Boulton, H., Kent, C., & Williams, H. (2018). *Digital literacy, teacher agency and ICT professional development: The role of teacher voice*. *British Journal of Educational Technology*, 49(6), 1011–1026
- Canu, Z., & Sitingjak, C. (2023). the Importance of Guidance and Counseling in Effective School Learning. *Jurnal Ilmiah Global Education*, 4(1), 12–19.
- Chaidirman, Mulyono, H., & Nugroho, (2010). (2018). Analisis dan Perancangan Sistem Informasi Layanan Individu Bimbingan Konseling. *Manajemen*