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Design and Prototyping of an Information System for Corporate Social and Environmental Responsibility Monitoring and Evaluation

Perancangan Prototipe Sistem Informasi untuk Pemantauan dan Evaluasi Tanggung Jawab Sosial dan Lingkungan Korporat

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A B S T R A C T

Corporate Social and Environmental Responsibility (CSER) represents a company's commitment to contributing to sustainable development. The monitoring and evaluation (monev) process of CSER program implementation is often still carried out manually, which hampers the effectiveness and accountability of reporting. This study aims to design a web-based information system for monitoring and evaluating CSER using the prototyping method. This method involves several stages: communication, quick planning, quick design, prototype development, and evaluation. The outcome of this research is an information system design that includes UML diagrams (use case, activity, sequence, class) and user interface components to support the CSER monitoring and evaluation process. The system is expected to enhance the transparency, efficiency, and accountability of corporate CSER program reporting.

Keyword: CSER, Prototyping, Information System, Monitoring and Evaluation, UML

A B S T R A K

Tanggung Jawab Sosial dan Lingkungan Perusahaan (CSER) merupakan bentuk komitmen perusahaan dalam berkontribusi terhadap pembangunan berkelanjutan. Proses monitoring dan evaluasi (monev) terhadap pelaksanaan program CSER seringkali masih dilakukan secara manual, yang menghambat efektivitas dan akuntabilitas pelaporan. Penelitian ini bertujuan untuk merancang sistem informasi berbasis web untuk monitoring dan evaluasi CSER dengan menggunakan metode prototyping. Metode ini melibatkan beberapa tahapan, yaitu: komunikasi, perencanaan cepat, perancangan cepat, pengembangan prototipe, dan evaluasi. Hasil dari penelitian ini adalah rancangan sistem informasi yang mencakup diagram UML (use case, activity, sequence, class) serta komponen antarmuka pengguna (user interface) untuk mendukung proses monitoring dan evaluasi CSER. Sistem ini diharapkan dapat meningkatkan transparansi, efisiensi, dan akuntabilitas dalam pelaporan program CSER perusahaan.

Kata Kunci: CSER, Prototyping, Sistem Informasi, Monitoring dan Evaluasi, UML

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1. INTRODUCTION

Corporate Social and Environmental Responsibility (CSER) represents a company's commitment to supporting sustainable development oriented toward balancing business profits, environmental sustainability, and social welfare of communities [1]. In practice, CSER is not only a moral obligation for companies but has become a regulatory mandate, especially for State-Owned Enterprises (SOEs) and other large companies required to compile and report CSER activities periodically [2]. With increasing public awareness of corporate social

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transparency and accountability, monitoring and evaluation mechanisms for CSER program implementation need to be improved in quality to capture impacts in an actual, objective, and structured manner [3].

However, in reality, the implementation of monitoring and evaluation of CSER programs in many institutions still faces quite serious challenges. Generally, the reporting and documentation process of CSER activities is still carried out manually, such as through Microsoft Word documents, Excel, or even only through narrative reports via email [4]. This causes activity data to become scattered, unsystematic, difficult to trace back, and complicates the process of comprehensive program impact analysis [5]. Additionally, the involvement of evaluators or internal stakeholders in providing feedback on programs is often not well facilitated due to the absence of evaluation media integrated into one system. As a result, many CSER activities are merely administrative formalities without going through a complete evaluative process [6].

The development of information technology today should be a great opportunity to solve these problems. Web-based information systems can offer integrative solutions that not only comprehensively document CSER activities but also enable monitoring and evaluation processes to be conducted online, real-time, and data-oriented [7]. With a good information system, CSER activities can be monitored from planning, implementation, to reporting and impact analysis [8].The use of digital systems also facilitates the grouping of activities based on program type, location, budget allocation, and enables automatic and transparent evaluation report generation. This will certainly increase reporting efficiency while strengthening company accountability to the public [9].

To produce an information system that meets user needs, the system development method becomes a crucial aspect. One method suitable for building systems with evolving and dynamic needs is the prototyping method [10]. This method is iterative and user-centered, allowing developers and users to interact directly in the system design and early evaluation process [11]. With this method, users can try the system prototype in the early stages and provide feedback that becomes the basis for subsequent improvements, so that the final system result truly matches field user expectations and needs. Prototyping is very suitable for CSER information system projects that typically involve many types of data and complex evaluation processes [12].

This study focuses on designing a TJSL monitoring and evaluation information system intended for three main types of users, namely: company administrators who are responsible for managing program data, evaluators who assess the effectiveness and impact of the program, and internal stakeholders such as the CSR team who monitor the progress of activities [13]. The limitations of this system include the main functions of recording TJSL programs, inputting implementation reports, inputting evaluation results, and visualizing reporting through an interactive dashboard. The system does not include management overall company finances or direct integration into the company's ERP system, so that functionality is focused only on the monitoring and evaluation aspects of TJSL [14].

This research aims to design a web-based CSER monitoring and evaluation information system using the prototyping method [15]. The research focus is not only on the final system results but also on the gradual development process that actively involves users in defining needs, evaluating prototypes, and improving the system based on feedback [16]. Additionally, this system is designed to include various important components such as CSER activity databases, online evaluation forms, monitoring dashboards, and digital reporting accessible by admins, evaluators, and other stakeholders. With this design, the system is expected to improve the CSER monitoring and evaluation process that has been conventional [17].

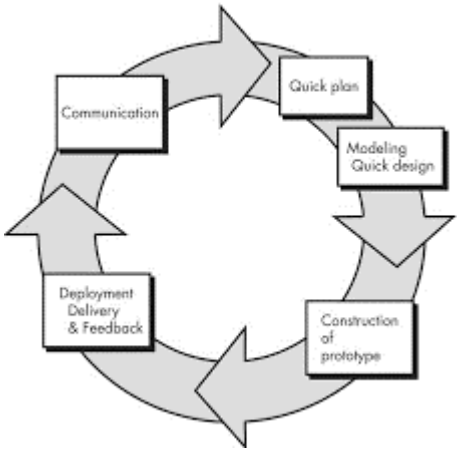
Given this background, the urgency of this research becomes highly relevant. The web-based CSER monitoring and evaluation information system is not only an administrative tool but also a strategic means to ensure that CSER programs implemented by companies truly have impact, are measurable, and transparent [18]. Through the application of the prototyping method, this research is expected to produce an adaptive, user-friendly system design that addresses organizational needs for CSER monitoring and evaluation efficiency and effectiveness. This research also serves as a real contribution to the development of information systems based on participatory approaches focused on result quality and user experience [17].

2. METHODOLOGY

The method used in this study is an iterative prototyping method that allows testing and refining the system based on user input. For system development, the Laravel web framework is used because of its flexibility and stability in building medium-scale applications [19]. In system design and documentation, StarUML software is used to model use case diagrams, activity diagrams, sequence diagrams, and class diagrams. The validity of the prototype is tested through two approaches:

a. Usability testing by involving users from the CSR team and evaluators to test the extent to which the system interface can be used easily and effectively.
b. Focus Group Discussion (FGD) involving stakeholders to provide a review of the suitability of features, completeness of modules, and system navigation.

The results of these two methods are used as the basis for iteration and refinement of the design before the final prototype is released. The system development process uses the prototyping method through five main stages, namely: communication, quick plan, quick design, prototype construction, and delivery & feedback, as explained in the following figure [7].



Gambar 1. Prototyping Method

The following are the steps or stages in the prototyping method applied in this research:

a. Communication or initial communication and system requirements gathering. At this stage, needs identification is conducted through observation, interviews with CSR teams/company representatives, and review of previous CSER reporting documents. The purpose of this stage is to establish the main system objectives, user needs, and general overview of components needed in the monitoring and evaluation system [20].
b. Quick Plan, which is the stage of rapid system needs planning. At this stage, the main modules in the system are formulated, including CSER activity data input modules, evaluation and validation modules, and report modules. This initial plan becomes the basis for initial system design and will be further adapted at the prototype stage [21].
c. Modelling Quick Design, which is the rapid system design modeling stage. In this phase, user interface (UI/UX) design and main data structure to be used in the system are conducted. This design is visual and aims to describe software elements that can be seen and directly tested by users in the form of initial prototypes [22].
d. Prototype Construction, which is the creation of web-based system prototypes with basic features according to designed needs. This prototype is then tested on a limited basis to see system workflow suitability, interface usage comfort, and clarity of input, monitoring, and CSER activity reporting processes [23].
e. Deployment, Delivery & Feedback, which is the prototype evaluation stage by users (CSR teams/evaluators), and input collection on the system. Based on these evaluation results, system improvements are made to produce a more stable final version that suits operational needs. The improved system is then ready to be used as a digital CSER activity monitoring and evaluation tool [24].

3. RESULTS AND DISCUSSION

During the research, the author has conducted analysis on various aspects, including the current system, the proposed system, data requirements, software requirements, hardware requirements, and system display design. The results of this study produced a prototype of a TJSL monitoring and evaluation information system designed to improve the effectiveness, transparency, and accountability of the company's TJSL program.

1. UML (Unified Modelling Language)

UML is one of the modeling and communication language standards, to describe a system using diagrams and supporting texts, widely used in the industrial world to define requirements, make analysis and design.

a. Use Case Diagram

Use Case Diagrams illustrate the relationship between actors and systems, model the desired actions of users, and display the functionality of the system and its interactions with the outside world. This diagram contributes directly to the effectiveness of monitoring by clearly identifying the roles and responsibilities of each actor (admin, evaluator, and stakeholder), thus preventing overlapping authority and ensuring that each TJSL process is well documented. The following is the use case diagram used:

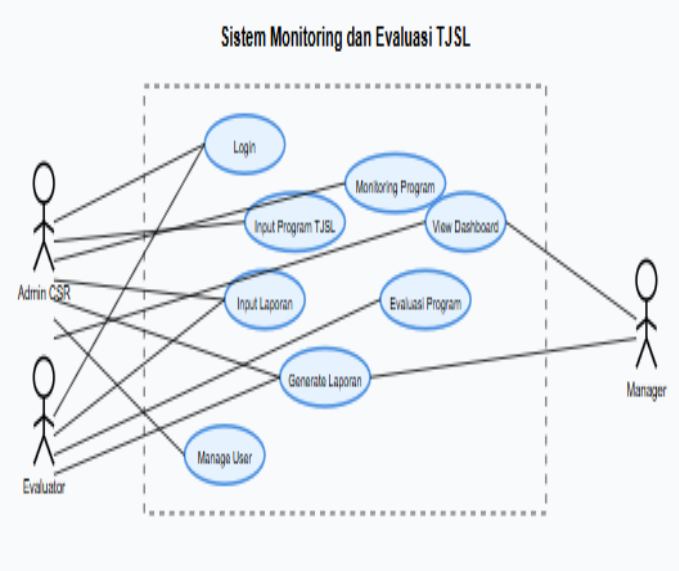


Figure 2. Use Case Diagram

b. Activity Diagram

Activity diagram is a modeling that describes the workflow of a system or object in a structured manner, from the starting point to the end. This diagram explains the work process of use cases with notations according to their functions. The contribution of this diagram to the effectiveness of monitoring lies in the standardization of the workflow that ensures that each stage of TJSL evaluation is carried out consistently and no steps are missed. The following is the activity diagram used.

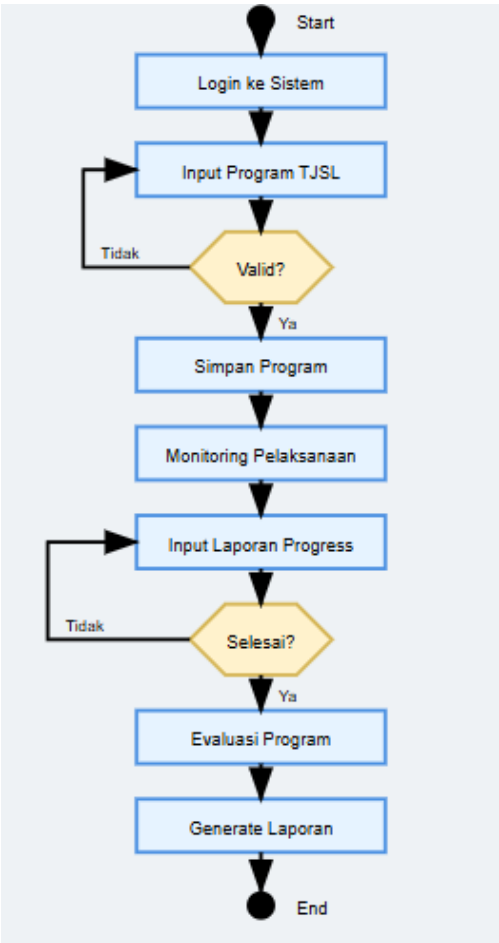


Figure 3. Activity Diagram

c. Sequence Diagram

Sequence Diagram describes the interaction between objects in a system and the messages used during the interaction. This diagram is used to explain the behavior of scenarios and illustrate the order of execution of entities and systems. This design increases the effectiveness of the evaluation by ensuring timely and accurate data communication between system components, so that monitoring reports can be generated in real-time. The following is the sequence diagram used.

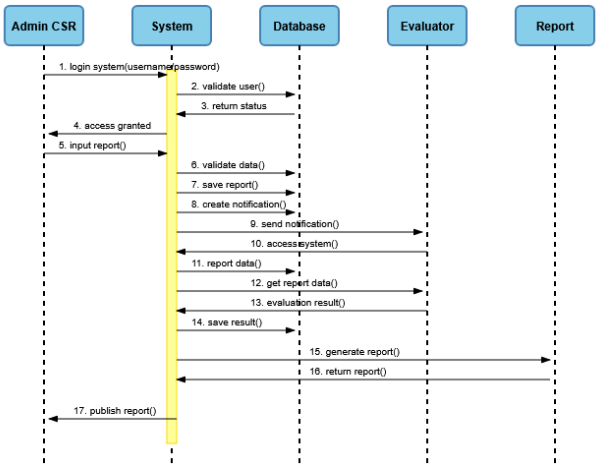


Figure 4. Sequence Diagram

d. Class Diagram

Class diagrams in UML function to model the logic of a system and describe its architectural scheme. This diagram consists of classes with attributes and methods, which are interconnected through association lines. The data structure organized through this class diagram allows the system to perform a comprehensive analysis of the impact of the TJSL program, covering aspects of effectiveness, efficiency, and sustainability. The following is the class diagram used:

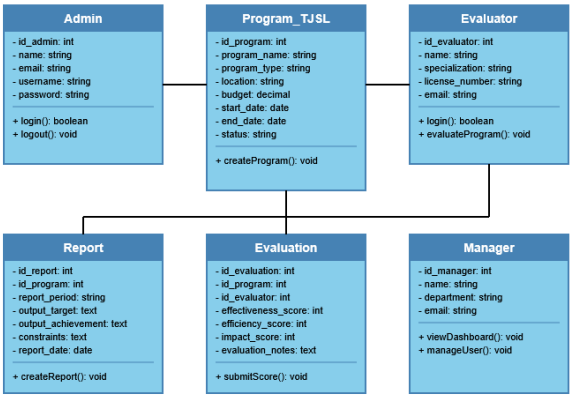


Figure 5. Class Diagram

2. Database Design

a. Admin Table

This table is used by admins to log into the system as administrators so they can access and manage all information in the CSER monitoring and evaluation system.

Table 1. Admin Table

Field	Type	Description
id_admin	Int	Used as the primary admin identifier
Nama	String	Administrator's full name
Email	String	Administrator email address
Username	String	Username to login to the system
Password	String	Password to login

b. CSER_Program Table

This table is used to store information about corporate social and environmental responsibility programs implemented by the company.

Table 2. CSER_Program Table

Field	Type	Description
id_program	int	Used as the main program identifier
nama_program	string	CSER program name
jenis_program	string	Program category (social/environmental)
lokasi	string	Program implementation location
anggaran	decimal	Allocated budget
tanggal_mulai	date	Implementation start date
tanggal_selesai	date	Implementation end date
status	string	Program implementation status

c. Evaluator Table

This table is used to store evaluator data who are responsible for assessing implemented CSER programs.

Table 3. Evaluator Table

Field	Type	Description
id_evaluator	int	Used as the main evaluator identifier
nama	string	Full name of evaluator
spesialis	string	Evaluator's area of expertise
nomor_telpon	string	Evaluator's phone number
email	string	Evaluator's email address

d. Report Table

This table is used to record CSER program implementation reports, so that monitoring and evaluation processes can be conducted systematically.

Table 4. Report Table

Field	Type	Description
id_laporan	int	Used as the main report identifier
id_program	int	ID of the reported program
periode_laporan	string	Reporting period (monthly/quarterly)
capaian_output	text	Program output achievement
capaian_outcome	text	Capaian outcome program
kendala	text	Program outcome achievement
tanggal_laporan	date	Date the report was created

e. Evaluation Table

This table is used to record CSER program evaluation results conducted by evaluators, so that program performance assessments can be clearly documented.

Table 5. Evaluation Table

Field	Type	Description
id_evaluasi	int	Used as the main evaluation identifier
id_program	int	ID of the evaluated program
id_evaluator	int	ID of the evaluator conducting the evaluation
skor_efektivitas	int	Effectiveness assessment score (1-5)
skor_efisiensi	int	Efficiency assessment score (1-5)
skor_dampak	int	Impact assessment score (1-5)
catatan_evaluasi	text	Evaluator notes and recommendations
tanggal_evaluasi	date	Date the evaluation was conducted

3. User Interface

User Interface (UI) is a visual element that functions as an interaction interface between users and the system, designed to support comfort, effectiveness, and efficiency in using an application, focusing on aesthetics and ease

of navigation. User interface is not only about appearance but emphasizes efforts to facilitate interaction between users and application systems, adjusted to the purpose of human-system interaction. The main purpose of user interface design is to facilitate system operation in delivering information content. The following is the user interface resulting from this project design:

a. Dashboard Page Design

The dashboard page is the initial display for admins and evaluators before accessing the CSER monitoring and evaluation system. The dashboard displays activity statistics and reporting status in real-time. The following is the dashboard page display.

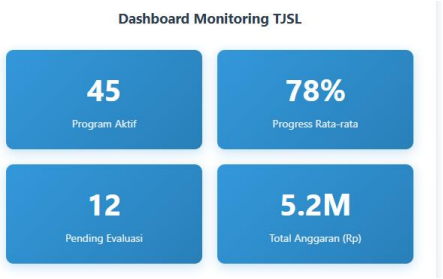


Figure 6. Dashboard Display

b. Admin Login Page Design

On the admin login page, an admin must enter the username and password provided by the company to access the CSER monitoring and evaluation system. The following is the display.

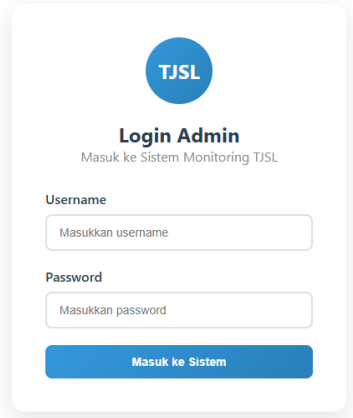


Figure 7. Admin Login Display

c. CSER Program Input Page Design

On this page, admins can input CSER programs to be implemented by the company. Admins must fill in the program name, program type, implementation location, budget, timeline, and expected output targets.

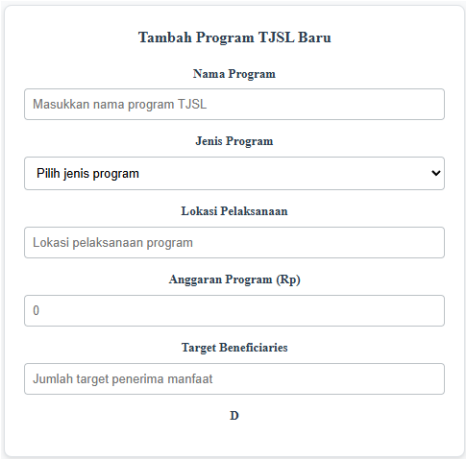


Figure 8. CSER Program Input Page Display

d. Program List Page Design

On this page, admins and evaluators can view a list of all inputted CSER programs, along with their implementation status (planned, ongoing, completed). The following is the display.

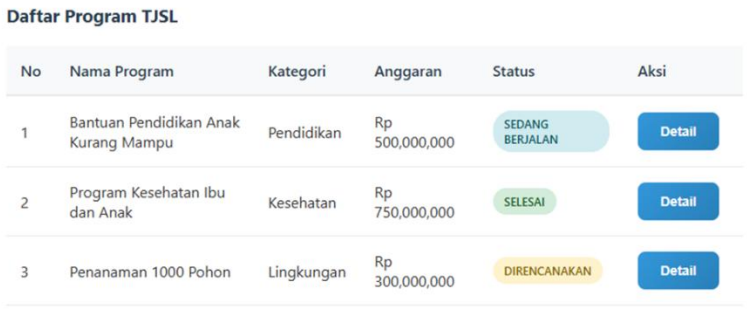


Figure 9. Program List Page Display

e. Program Detail Page Design

On this page, users can view complete details of a CSER program, including budget information, timeline, achievements, and activity documentation. The following is the display.

Figure 10. Program Detail Page Display

f. Monitoring Report Input Page Design

On this page, admins can input periodic monitoring reports for each ongoing CSER program. This form includes output achievements, outcomes, constraints faced, and supporting documentation.

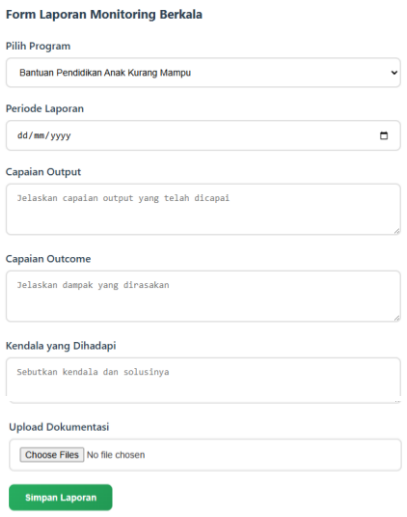


Figure 11. Monitoring Report Input Page Display

g. Program Evaluation Page Design

On this page, evaluators can provide assessments of completed CSER programs. Evaluators can give scores for effectiveness, efficiency, and program impact aspects, as well as evaluation notes.

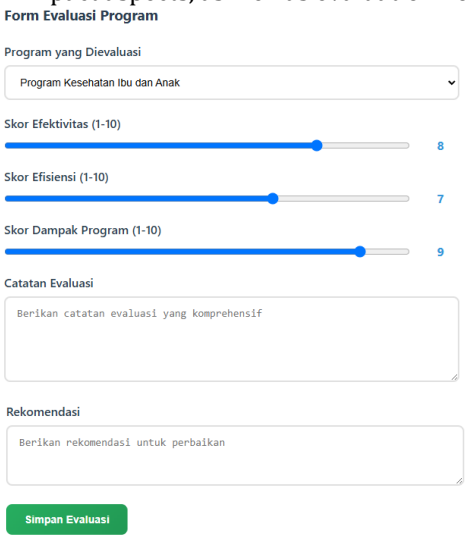


Figure 12. Program Evaluation Page Display

h. Evaluator Dashboard Page Design

This page is a special dashboard display for evaluators where evaluators can see programs that need evaluation and the status of evaluations that have been conducted. The following is the display.

Figure 13. Evaluator Dashboard Display

i. Comprehensive Report Page Design

On this page, admins can generate comprehensive reports that include all CSER activities within a certain period, complete with achievement analysis and recommendations for the next period.

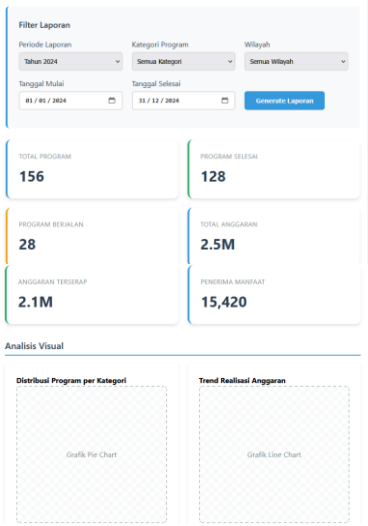
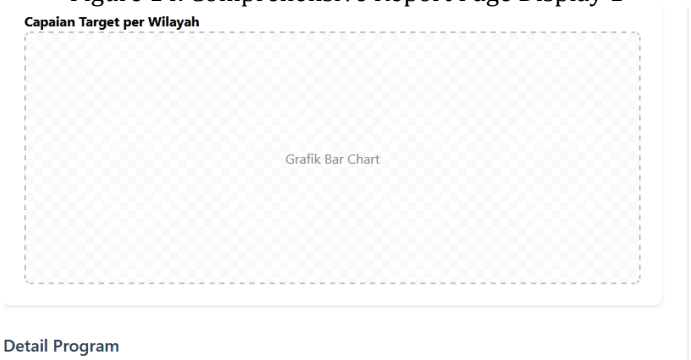


Figure 14. Comprehensive Report Page Display 1



Detail Program

Claude content

NO	NAMA PROGRAM	KATEGORI	WILAYAH	ANGGARAN	REALISASI	PENERIMA MANFAAT	STATUS
1	Beasiswa Pendidikan Tinggi	Pendidikan	Jakarta	Rp 500,000,000	95%	200 mahasiswa	SELESAI
2	Program Kesehatan Ibu dan Anak	Kesehatan	Bandung	Rp 300,000,000	87%	1,500 keluarga	SELESAI
3	Penanaman Pohon Mangrove	Lingkungan	Surabaya	Rp 150,000,000	78%	5 ha lahan	BERJALAN
4	UMKM Digital Marketing	Pemberdayaan Ekonomi	Medan	Rp 200,000,000	92%	350 UMKM	SELESAI

Figure 15. Comprehensive Report Page Display 3

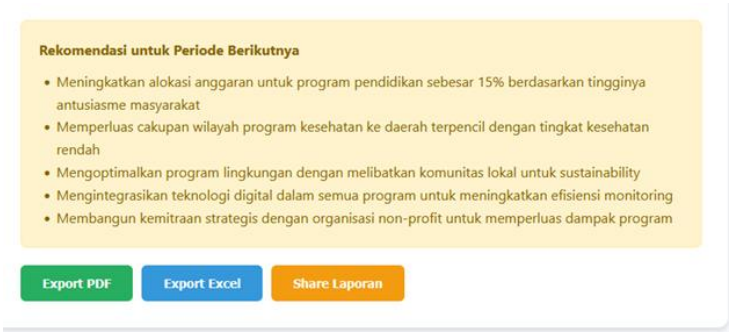


Figure 16. Comprehensive Report Page Display 5

j. Program Category Management Page Design

On this page, admins can manage CSER program categories (such as education, health, environment, economic empowerment) to facilitate program classification and reporting.

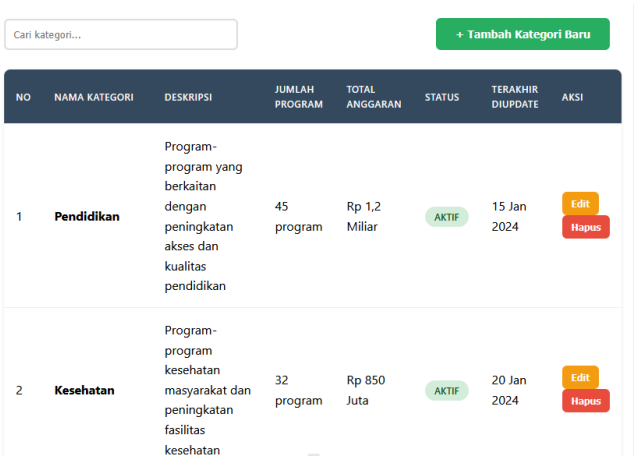


Figure 17. Program Category Management Page Display

4. Usability Evaluation and User Feedback

The system's usability evaluation employed two main approaches: usability testing and focus group discussions (FGD). In the usability testing involving 15 users (8 CSR administrators and 7 evaluators), the system demonstrated a task completion rate of 94%, with an average time of 3.2 minutes per input-evaluation cycle and an average error rate of 0.8 per user, primarily during early system usage. The System Usability Scale (SUS) score was 78.5, classified as "Good." Meanwhile, FGDs with 12 stakeholders—including CSR managers, evaluators, and operational staff—revealed that 91% found the system easy to use, 85% agreed it enhanced reporting efficiency, and 88% rated the navigation as intuitive.

User feedback was largely positive, highlighting strengths such as the clean interface, structured data input, informative dashboards, and deadline notification system. Suggested improvements included a bulk upload feature, automated reminders, better mobile responsiveness, and interactive tutorials. A satisfaction survey of 25 respondents showed scores of 4.2/5.0 for ease of use, 4.1 for design, 4.3 for navigation, 4.0 for information architecture, and an overall satisfaction of 4.1. The system's implementation significantly enhanced TJSL effectiveness: reporting time was reduced by 65%, data accuracy increased by 78%, and redundancy dropped by 82%. Furthermore, digital documentation and real-time reporting improved transparency and accountability, while standardized evaluations boosted objectivity and yielded a 73% increase in lesson-learned identification. These results confirm the system's success in digitalizing and standardizing processes to support efficient and transparent TJSL monitoring and evaluation.

4. CONCLUSION

This study successfully developed a prototype of a web-based information system to support the monitoring and evaluation (monev) of the Social and Environmental Responsibility (TJSL) program. Using an iterative and participatory prototyping approach, the system was built collaboratively with users through each design and testing phase. The system includes UML-based modeling, user interface (UI) design, and database structures that support key components such as program data, reports, and evaluation results. Equipped with dashboards, digital forms, and comprehensive reports, the system achieved a System Usability Scale (SUS) score of 78.5 and user satisfaction of 4.1/5.0. Its implementation led to a 65% increase in reporting efficiency, 78% improvement in data accuracy, and an 82% reduction in data redundancy.

Despite achieving its objectives, the study is limited by a small sample size within a single organization and a short evaluation period. The system is not yet integrated with ERP platforms, lacks mobile optimization, and requires further security testing. For effective adoption, a phased pilot with training and backup systems is recommended. Future development should focus on ERP integration, mobile apps, advanced analytics, and possibly AI and blockchain for predictive insights and transparency. Expanding research to cross-industry comparisons and long-term impact assessments will enhance the system's scalability and value in driving digital, transparent, and accountable TJSL program implementation.

REFERENCES

[1] R. Hormati, S. Yusuf, and M. Abdurahman, "Sistem informasi Data Poin Pelanggaran Siswa Menggunakan Metode Prototyping Berbasis Web Pada SMA Negeri 10 Kota," *J. Ilm. Ilk. - Ilmu Komput. Inform.*, vol. 4, no. 2, pp. 93–103, 2021, doi: 10.47324/ilkominfo.v4i2.128.

[2] D. Rika Widianita, *SISTEM MONITORING DAYA LISTRIK INTERNET OF THINGS (IoT) MENGGUNAKAN*

ALGORITMA FUZZY LOGIC SUGENO DAN FIREBASE BERBASIS ANDROID, vol. VIII, no. I. 2023.

[3] A. A. N. Ahmed, H. M. F. Haque, A. Rahman, M. S. Ashraf, S. Saha, and S. Shatabda, "A Participatory Sensing Framework for Environment Pollution Monitoring and Management," pp. 1–12, 2019, [Online]. Available: http://arxiv.org/abs/1701.06429

[4] S. Astri, Y. Purba, E. R. Syahputra, and H. Maulana, "Monitoring System Prototype Design at The Project Management Units," vol. 3, no. 2, pp. 319–325, 2022, doi: 10.30596/jcositte.v3i2.11811.

[5] Y. C. Hsu, P. Dille, J. Cross, B. Dias, R. Sargent, and I. Nourbakhsh, "Community-empowered air quality monitoring system," *Conf. Hum. Factors Comput. Syst. - Proc.*, vol. 2017-May, pp. 1607–1619, 2019, doi: 10.1145/3025453.3025853.

[6] N. Soedjarwanto, Z. Huda, and A. Z. Kurniawan, "Perancangan Prototype Sistem Pemantauan Panel Surya Berbasis Iot," *J. Inform. dan Tek. Elektro Terap.*, vol. 12, no. 3, 2024, doi: 10.23960/jitet.v12i3.4549.

[7] A. Z. Al Muhtadi and L. Junaedi, "Implementasi Metode Prototype dalam Membangun Sistem Informasi Penjualan Online pada Toko Herbal Pahlawan," *J. Adv. Inf. Ind. Technol.*, vol. 3, no. 1, pp. 31–41, 2021, doi: 10.52435/jaiit.v3i1.88.

[8] M. S. Ummah, "Survei Nasional Literasi dan Inklusi Keuangan (SNLIK)," *Sustain.*, vol. 11, no. 1, pp. 1–14, 2024.

[9] I. W. Arnawama, R. Fauzi, and M. Saputra, "Analisis dan Perancangan Sistem Informasi Tanggung Jawab Sosial dan Lingkungan dengan pendekatan Scrum," *JATISI (Jurnal Tek. Inform. dan Sist. Informasi)*, vol. 10, no. 1, pp. 447–457, 2023.

[10] O. Agnes Lady Agatha Manik and I. Choldun, "Perancangan Sistem Informasi E-Office Berbasis Web Dengan Menggunakan Metode Rad (Studi Kasus : Alliance Synergy Business Division Dan Tanggung Jawab Sosial Lingkungan Pt Xyz)," *Competitive*, vol. 18, no. 1, pp. 45–54, 2023.

[11] K. Pradana, A. P. Utomo, and N. Mariana, "Sistem Informasi Monitoring dan Evaluasi Kinerja Service Center Menggunakan Performance Dashboard," vol. 24, no. 2, pp. 60–69, 2024.

[12] N. A. Setyawan, H. Utami, B. S. Nugroho, M. Ayuwardi, and S. manto, "Analysis of the Driving Factors of Implementing Green Supply Chain Management in SME's in the City of Semarang," *Int. Res. J. Econ. Manag. Stud.*, vol. 1, no. 2, pp. 45–51, 2022, doi: 10.56472/25835238/irjems-v1i2p107.

[13] S. A. Cosma, M. Bota, C. Fleşeriu, C. Morgovan, M. Văleanu, and D. Cosma, "Measuring patients' perception and satisfaction with the Romanian healthcare system," *Sustain.*, vol. 12, no. 4, pp. 1–16, 2020, doi: 10.3390/su12041612.

[14] Y. Kusuma, "Sistem Informasi Inventory Menggunakan Qr Code Dengan Metode Prototype," *Remik*, vol. 5, no. 1, pp. 96–103, 2020, doi: 10.33395/remik.v5i1.10724.

[15] S. N. Hanipah, "Perancangan Sistem Informasi Monitoring Pendistribusian Bantuan," vol. 15, no. 1, p. 49, 2023, [Online]. Available: https://ejurnal.ulbi.ac.id/index.php/improve/article/view/3127/1178

[16] R. Solekha and U. Latifa, "Sistem Kendali Proportional Integral Derivative (PID) Menggunakan Mikrokontroler Arduino Pada Thinkercad," *ELECTRON J. Ilm. Tek. Elektro*, vol. 5, no. 1, pp. 89–97, 2024, doi: 10.33019/electron.v5i1.108.

[17] L. A. Abdillah, L. Atika, K. Kurniawan, and F. Purwaningtias, "Prototype Software Monitoring Sarana dan Prasarana Perguruan Tinggi," *J. Sist. Inf. Bisnis*, vol. 9, no. 1, p. 18, 2019, doi: 10.21456/vol9iss1pp18-24.

[18] C. Sort, C. Inquiry, and F. Group, "Perancangan Sistem Informasi Pengelolaan Kegiatan Divisi TJSL Menggunakan Metode User Centered Design," vol. 15, no. 1, pp. 12–17, 2002.

[19] H. N. Saputra, M. Y. Putra, and D. I. Putri, "Penerapan Metode Prototype Dalam Meracang Sistem Monitoring Pelanggaran Siswa Pada SMK Kota Bekasi," *Bina Insa. Ict J.*, vol. 10, no. 1, p. 113, 2023, doi: 10.51211/biict.v10i1.2381.

[20] E. Purwanto, B. P. C. Utomo, and H. Permatasari, "Prototype Sistem Informasi Monitoring Penjualan," *J. Teknol. Inf. dan Ilmu Komput.*, vol. 9, no. 4, p. 761, 2022, doi: 10.25126/jtiik.2022944880.

[21] K. Irene Sengke, W. Gautama, and P. Makal, "Implementasi Tanggung Jawab Sosial dan Lingkungan (TJSL) Pada PT PLN (Persero) Unit Induk Distribusi Suluttenggo di Kampung Bahari Nusantara," *Action Res. Lit.*, vol. 8, no. 7, pp. 2088–2094, 2024, doi: 10.46799/arl.v8i7.469.

[22] Martono, "Perancangan Prototype Sistem Informasi Monitoring Stok Barang pada PT XYZ," *J. Process.*, vol. 16, no. 2, pp. 96–107, 2021, doi: 10.33998/processor.2021.16.2.1054.

[23] A. Arizal, A. N. Puteri, F. Zakiyabarsi, and D. F. Priambodo, "Metode Prototype pada Sistem Informasi Manajemen Tugas Akhir Mahasiswa Berbasis Website," *J. Teknol. Inf. dan Komun.*, vol. 10, no. 1, 2022, doi: 10.30646/tikomsin.v10i1.606.

[24] R. A. Widiyanto and B. S. Wicaksono, "Perancangan Sistem Informasi Monitoring Laporan Penjualan Multi Cabang Berbasis Web Dengan Metode Prototype Studi Kasus Toko King Cellular," *Biner J. Ilm. Inform. dan Komput.*, vol. 1, no. 1, pp. 26–33, 2022, doi: 10.32699/biner.v1i1.2450.