International Journal of Information Engineering and Science

E-ISSN: 3048-1953
P-ISSN: 3048-1902

Research Article

Design of Mortality Data Processing Information System to Support Accuracy of Mortality Reporting at Hermina Arcamanik Hospital

Dita Alfiani Widi Saputri [1]*, Yuda Syahidin [2], Sali Setiatin [3]

[1] Politeknik Piksi Ganesha, Indonesia ; e-mail : ditaalf05@gmail.com
[2] Politeknik Piksi Ganesha, Indonesia ; e-mail : yudasy@gmail.com
[3] Politeknik Piksi Ganesha, Indonesia ; e-mail : salisetiatin@gmail.com

* Corresponding Author : Dita Alfiani Widi Saputri

Abstract: Technology that develops very rapidly brings many changes, especially in the development of medical records in hospitals that are increasing. Electronic medical records bring many benefits, one of which is improving the quality of services in hospitals. The medical records used at Hermina Arcamanik Hospital are mostly electronic-based, including reporting. However, problems were found in the medical record installation, namely, there were several reports that had not been managed optimally. This is because reporting still uses google spreadsheets which requires data to be moved manually one by one, so it takes a long time, and the quality of reporting becomes less accurate. A real example of this problem can be seen in the process of reporting patient Mortalitys. Meanwhile, accurate and systematic reporting of Mortality data is essential in supporting decision-making in hospitals. Therefore, the design of a patient Mortality reporting information system is urgently needed to make time efficient and improve the quality of reports. The method used in designing this system is extreme programming and web-based. The results of this information system design are able to shorten the time to make Mortality reports and can produce accurate data.

Keywords: Information Systems; Mortality Data; Mortality Reporting

1. Introduction

Currently, technology is experiencing rapid progress, and we have entered the era of industry 4.0, where technology has a crucial role in various sectors [1]. One of the developments in information technology has entered the health sector, especially in the medical world. Developments in the health sector have progressed very rapidly so that many new discoveries have been obtained with the help of information technology, both in hospital management, treatment processes, and research and development of health science itself [2]. The hospital management information system implemented in a hospital needs to provide ease of operation and must be able to overcome patient service problems in the hospital [3]. Hospital information systems also serve as an important source for patient data and connect with external institutions such as health offices and other health services that frequently participate in data exchange [4].

Based on Law Number 11 of the Republic of Indonesia of 2008 concerning Article 5 Paragraph (1) of the ITE, information in electronic format and/or documents in electronic format along with their printed results can be accepted as valid evidence. The source of information and data in medical records are official records of the services provided to patients, and healthcare providers reserve the right to retain such information. However, patients have the right to know the diagnosis, procedure or treatment carried out, as well as the results of laboratory tests that have been carried out [5].

The Ministry of Health of the Republic of Indonesia issued an electronic medical record regulation contained in the Minister of Health Regulation No. 24 of 2022 concerning Medical Records. The regulation supports technological transformation in the health sector, in accordance with the 6th pillar, namely Health Transformation. This policy is also a revision of the Regulation of the Minister of Health Number 269 of 2008, which is adjusted to the

Received: March 10, 2025
Revised: April 15, 2025
Accepted: May 02, 2025
Published: May 07, 2025
Curr. Ver.: May 07, 2025

Copyright: © 2025 by the authors. Submitted for possible open access publication under the terms and conditions of the Creative Commons Attribution (CC BY SA) license (https://creativecommons.org/licenses/by-sa/4.0/)

development of science and technology, service needs, and regulations in the health sector in Indonesia. Through this regulation, it is hoped that health service facilities can improve the management of medical records that were previously not optimal. One of the main aspects emphasized in Permenkes Number 24 of 2022 is the obligation to implement Electronic Medical Records (EMR). This policy aims to ensure that the management of medical records is carried out systematically through information systems so that it can improve the quality of health services, maintain data security and confidentiality, and also support digitalization in medical records [6].

Medical records have an important role in ensuring the consistency of management processes, as well as the responsibility of ensuring the protection of medical information privacy [7]. Hospitals are prohibited by law from releasing any medical information within a patient's records to individuals not entitled to see it. Hospitals also have a duty to ensure that records are not lost, defaced or falsified, and that the information in them is not used and disclosed without consent [8]. Every individual has the right to get clear and complete information about their health condition, in accordance with Law Number 17 of 2023 concerning Health. These rules emphasize the importance of ensuring patients' right to receive honest, detailed, and easy-to-understand information about their state of health, the medical procedures to be performed, as well as the potential risks that may arise from such actions [9].

Hospital reports serve as a means of communication within the organization that presents information quickly and accurately. In general, hospital reports are divided into two categories, namely external reports and internal reports. Internal reports include various records or documentation of activities carried out by hospital management. In this case, medical record management has an important role in ensuring well-organized administration to support optimal healthcare delivery [10].

Mortality reports are one of the important indicators to assess success in the health field. It can be used as a source to see the number of patients who died from a particular disease. Therefore, this report can be used to compare the mortality rate of patients each year based on the mortality certificate and the code of cause of mortality [11].

Based on literature reviews, observations, and interviews using descriptive analysis conducted, researchers found that the problem of reporting mortality at Hermina Arcamanik Hospital was not effective. Patient data collected by nurses will be submitted to the medical record officer for processing. Data collection from nurses is transferred one by one to the report format in Google Sheets. This results in inaccurate data, delays in reporting, and difficulties when analyzing information. These things can result in data not being reliable to make decisions. Therefore, in this case study, the researcher designed an information system to improve the accuracy and efficiency in reporting Mortalitys. With this system, it is hoped that the process of recording and reporting Mortalitys can be carried out in a more systematic way, minimizing errors, and supporting better data management for Hermina Arcamanik Hospital.

2. Research Methods

The research method used by the researcher is a qualitative method. According to (Merriam, 2009) the qualitative method is a process of observing something to study it, understand it deeper, and give meaning to the phenomenon by describing and understanding the context [12].

Some of the data collection techniques carried out by the researchers are:

Observation

The researcher made direct observations of the research object and the system used in processing Mortality data at the medical record installation of Hermina Arcamanik Hospital.

Interview

An interview is an interaction between two or more people that occurs between the researcher and the respondent with the intention of obtaining data [12]. The researcher conducted an interview with the head of the medical record installation at Hermina Arcamanik Hospital to collect data.

The researcher designed the system using the extreme programming method. Extreme Programming is a way to create software that is fast, effective, secure, changeable, predictable, and science-based [13].

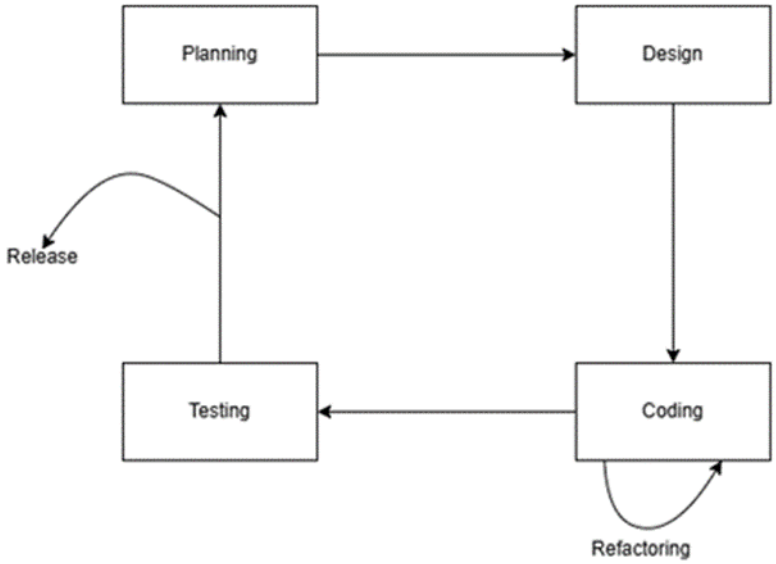

Figure 1. Extreme programming methods

The research using the extreme programming method consists of four stages, namely:

1) Planning
   Planning is the first step in the extreme programming method which includes problem solving, analysis of basic system needs, and timing for the implementation of system design [14].
2) Design
   This design stage is a design process by conducting system modeling activities that include several diagrams such as use case diagrams and class diagrams (Zen Alandra, 2023). Extreme Programming also supports a change in the code structure called refactoring. In this process, the software system is changed by rewriting the code and making it simpler, but the end result remains the same [15].
3) Coding
   In the coding stage of extreme programming, it starts with creating a series of unit tests. Then developers focus on implementing it [16].
4) Testing
   The testing stage is The step of testing the system is implemented at the coding stage to find errors that appear in the created system, as well as conducting checks to ensure that the system has met the needs of the user [14].

3. Results and Discussion

Results

After observing the existing problem, namely the Mortality report of patients who are still using google spreadsheat. The process currently carried out is less effective because the officers have to manually transfer data one by one into the report format at the Hermina Arcamanik Hospital and this also allows many errors to occur if the officers do not move the data carefully so that the data is inaccurate.

Discussion

Planning

1) Problem identification

Based on the problems found while carrying out field work practice activities, it was found that he still uses a semi-manual operating system in managing Mortality data, namely using google spreadsheets.

2) Needs Analysis

After knowing the problems that exist at Hermina Arcamanik Hospital, the needs of the problem can be defined so that functional and non-functional needs are met.

Functional Needs Analysis:

a) The system provides an integrated form of data on deceased patients.
b) The system provides a database in one system so as to facilitate the flow of data in data requests.
c) The system needs to make report data containing the mortality index and Mortality data that will be given later to those in need.

Non-Functional Needs Analysis:

a) There are two types of administrators, namely nurses who can only input data on deceased patients and medical recorders and directors who can only manage Mortality data in the system.

Design

The researcher designed the system using the extreme programming method. Extreme Programming (XP) is a way to create software that is fast, effective, secure, changeable, predictable, and science-based [12]. This method also makes it easier for users to use this system later.

1) Flowmap

The flowmap in figure 2 is made to illustrate a series of stages of processing patient Mortality data. The process begins when the nurse inputs the data of the deceased patient into the system. Once the data is stored, the medical record officer will process it further to produce a structured and accurate Mortality report. The Mortality report that has been prepared will be reported to the hospital director.

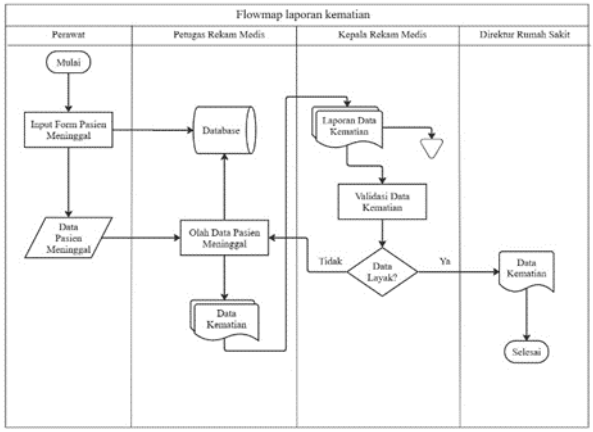

Figure 2. Mortality Data Processing System Flowmap

The image depicts the process of the information system of the Mortality report running and explains the relationship between the system and its environment.

2) Diagram Context

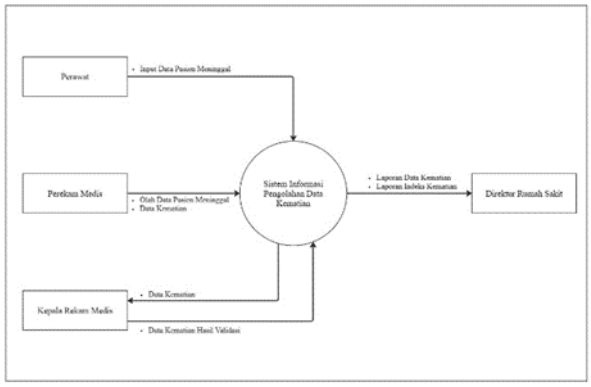

Figure 3. Mortality Data Processing System Context Diagram

A flow to find out how this system works, so that users will understand the flow in using the system later.

3) Data Flow Diagram (DFD)

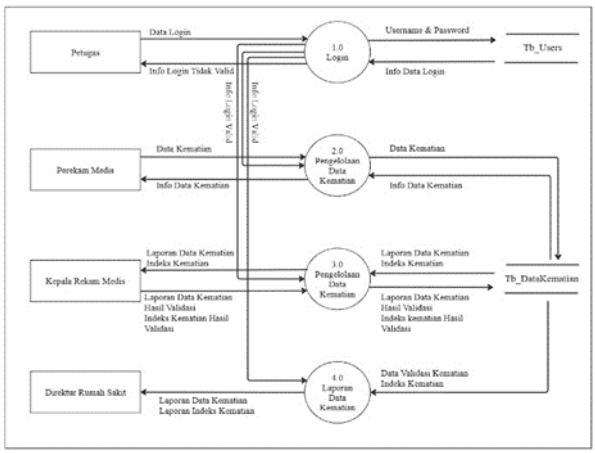

Figure 4. DFD Mortality Data Processing System

DFD (Data Flow Diagram) is a more detailed depiction or description of a context diagram that has been created. This table is an explanation of a DFD in the 4th figure:

Table 1. Description of DFD Mortality Data Processing System

No.	DFD	Information
1.	Login	Officers who will input are required to log in to be able to use the system.
2.	Data Processing	Officers who have access will collect patient Mortality data, Mortality index input, and data validation.
3.	Mortality Data Report	After the data is processed, the system will create Mortality validation data and also Mortality data reports to be sent to those in need.

4) Entity Relationship Diagram (ERD)

Figure 5. ERD Mortality Data Processing System

Describe the relationships between entities that occur in this system.

Coding

1) Login Form

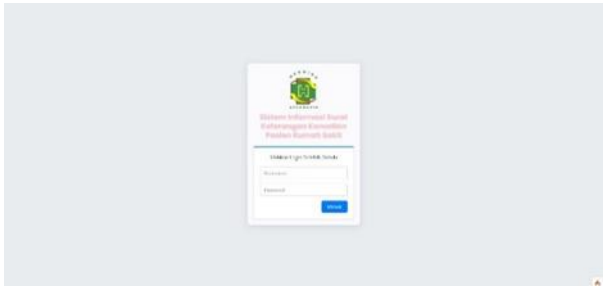

Figure 6. Login Form

This login form is the first step for the officer to steal or validate the data, if the officer has access then he will be able to use this system.

2) Dashboard

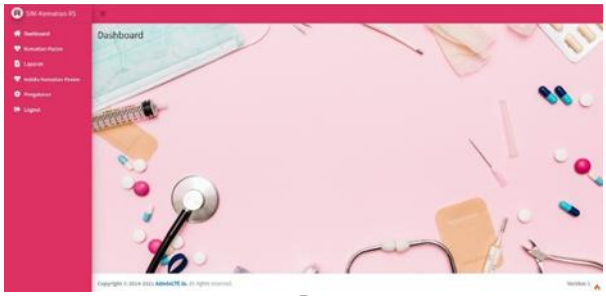

Figure 7. Dashboard

This dashboard is the initial view/interface when successfully logging in at the login form stage. Where this dashboard has several features that can later be used by officers as long as they have access to use these features.

3) Mortality Data

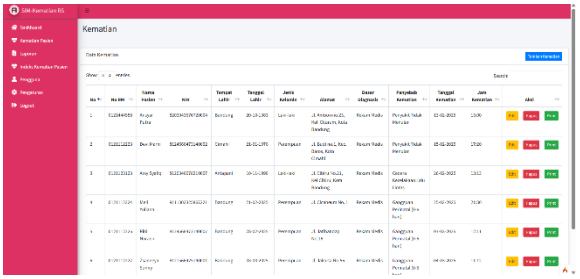

Figure 8. Mortality Data

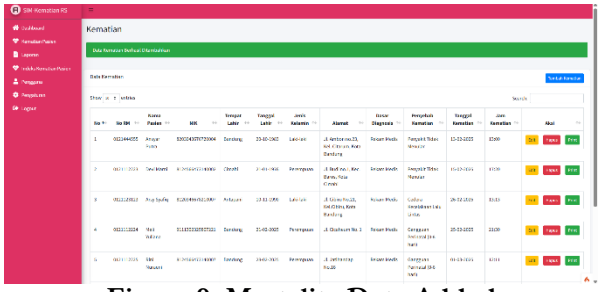

Figure 9. Mortality Data Added

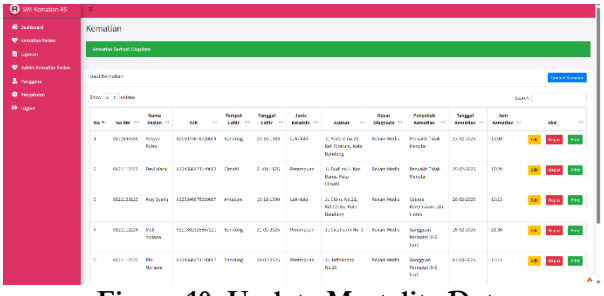

Figure 10. Update Mortality Data

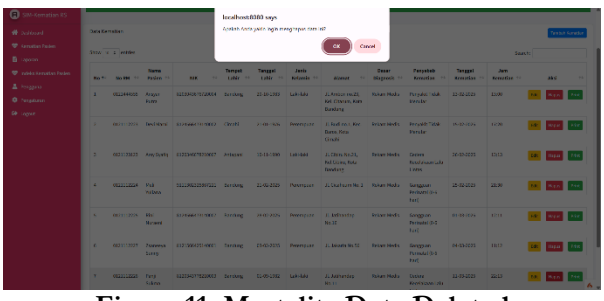

Figure 11. Mortality Data Deleted

In figure 8, this shows the appearance of the mortality data that has been previously inputted, in figures 9, 10, and 11 is the process of adding, updating, and deleting mortality data.

4) Mortality Data Form

Figure 12. Add Dead Patient Data Form

In figure 12 is a view of the Mortality data input in the Mortality data form carried out by the officer who has access.

5) Mortality Index

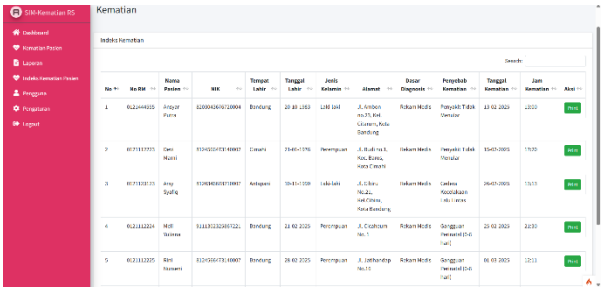

Figure 13. Mortality Index

The display of this mortality index is the result of the process of entering mortality data and also existing mortality data, so that after validation, a mortality index appears that matches the data in the existing database.

6) Mortality Reports

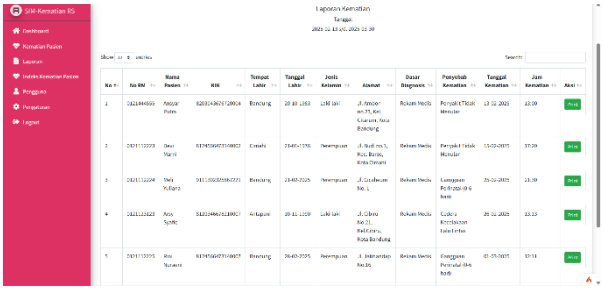

Figure 13. Mortality Reports

This death report is obtained by fulfilling the previous steps, so that this report can be accounted for and can be given to those who need it.

7) Password Change Form

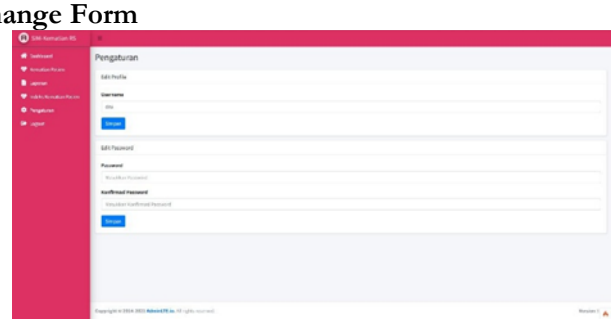

Figure 14. Password Change Form

This form is used to research passwords if administrators forget passwords, so they can help change passwords.

Testing

In this testing process, the aim is to see the successes and errors in the existing system. And it is carried out with a black box testing approach to see if this system is supposed to be as it should be in the planning stage.

Table 2. System Testing With Black Box Testing Approach

Testing	Expected results	Result	Conclusion
Login testing	Enter your username and password	Successfully log in to the dashboard	Success
Testing patient mortality data	Add dead patient data	Data is successfully saved and can be displayed	Success
Mortality index testing	The patient's death data will appear with the cause of death	Mortality index data can be stored and displayed	Success
Testing death reports	When selecting death data by period, patient death data will appear	Death report data is stored and can be displayed	Success

4. Conclusions

According to the findings from the system design created, the method for generating mortality reports at Hermina Arcamanik Hospital is not functioning as effectively as it should. Right now, medical record staff need to manually input data given by nurses into the death report forms, making the task lengthy and likely to cause mistakes in recording or inaccuracies in patient details. To solve these issues, a system for managing death reports has been created using PHP coding and a MySQL database. By putting this system into use, it is hoped that medical record staff will work more effectively, reduce mistakes, and handle patient death information more accurately.

References

[1] H. Fadilah, S. Sophiah, Y. Syahidin, E. Gunawan, and N. Yuniarty, "Perancangan Sistem Informasi Pelepasan Informasi Rekam Medis Rawat Jalan Di Klinik Utama Medika Antapani," *Explore:Jurnal Sistem informasi dan telematika*, vol. 12, no. 2, p. 126, 2021, doi: 10.36448/jsit.v12i2.2064.

[2] M. C. Yuniar *et al.*, "Pengembangan Teknologi dalam Bidang Kesehatan," *Jurnal Teknologi Sistem Informasi dan Aplikasi*, vol. 18, no. 2, pp. 49–52, 2022.

[3] Y. E. Kristanti and R. Q. Ain, "Informasi Manajemen Rumah Sakit," *muhammadiya Public Health Journal*, vol. 1, no. 3, pp. 179–193, 2021.

[4] N. Rahmayanti, U. H. Sa'diyah, R. W. Sudjud, and V. Paramarta, "Penerapan Sistem Informasi Rumah Sakit dalam Meningkatkan Efisiensi Pelayanan di Rumah Sakit," *COMSERVA: Jurnal Penelitian dan Pengabdian Masyarakat*, vol. 3, no. 08, pp. 3094–3101, 2023.

[5] D. A. Meirina, S. Farlinda, F. Erawantini, M. Yunus, J. Kesehatan, and P. N. Jember, "Perancangan dan Pembuatan Rekam Medis Elektronik Berbasis Web Dengan Memanfaatkan QR Code Di Puskesmas Karya Maju Kabupaten Musi Banyuasin," vol. 3, no. 3, pp. 190–202, 2022.

[6] Neng Sari Rubiyanti, "Penerapan Rekam Medis Elektronik di Rumah Sakit di Indonesia: Kajian Yuridis," *ALADALAH: Jurnal Politik, Sosial, Hukum dan Humaniora*, vol. 1, no. 1, pp. 179–187, 2023, doi: 10.59246/aladalah.v1i1.163.
[7] M. R. Fauzi, R. M. Fauzia, and S. Setiatin, "Kerahasiaan dan Keamanan Rekam Medis di Rumah Sakit Hermina Arca Manik," *Politeknik Piksi Ganesha, Bandung, Cendekia: Jurnal Ilmiah Indonesia*, vol. 9, no. 1, pp. 1161–1169, 2021.
[8] I. Narendra *et al.*, "Tinjauan Pelepasan Informasi Medis Dalam Menjamin Aspek Hukum Kerahasiaan Rekam Medis Di Rumah Sakit Umum Rajawali Citra," vol. 1, no. 3, pp. 85–95, 2020.
[9] O. S. Riyanto and E. T. R. Ratnawati, "Hak Atas Informasi Kesehatan Dan Perlindungan Hukum Bagi Dokter: Implikasi Ham Dalam Komunikasi Dokter-Pasien," *Juris Humanity: Jurnal Riset dan Kajian Hukum Hak Asasi Manusia*, vol. 3, no. 1, pp. 78–88, 2024.
[10] A. Ferdianto, N. Kamila, and R. I. Nugraha, "Tinjauan Proses Pembuatan Laporan Internal Rekam Medis Di Rumah Sakit Umum Anna Medika Madura," *Jurnal Informasi Kesehatan Indonesia (JIKI)*, vol. 7, no. 2, p. 130, 2022, doi: 10.31290/jiki.v7i2.2994.
[11] D. Mardiawati, L. Handayuni, and E. Meisesdyanti, "Pelaksanaan Analisa Pelaporan Mortalitas Pasien Rawat Inap Di Pelayanan Kesehatan RSUD Dr. M. Zein Painan," *Detikproperti*, vol. 5, no. 2, pp. 119–121, 2023.
[12] M. Waruwu, "Pendekatan Penelitian Kualitatif: Konsep, Prosedur, Kelebihan dan Peran di Bidang Pendidikan," *Afeksi: Jurnal Penelitian dan Evaluasi Pendidikan*, vol. 5, no. 2, pp. 198–211, 2024, doi: 10.59698/afeksi.v5i2.236.
[13] A. R. Pratama, I. Ma, and Y. R. Ramadhan, "Rancang Bangun Aplikasi Tracking Kendaraan Menggunakan Metode Extreme Programming Pada PT ABM Berbasis Mobile," vol. 8, no. 6, pp. 11074–11079, 2024.
[14] I. B. G. Sarasvananda, I. Wiguna, and ..., "Pendekatan Metode Extreme Programming untuk Pengembangan Sistem Informasi Manajemen Surat Menyurat pada LPIK STIKI," *Jurnal Informatika …*, vol. 6, no. 2, pp. 258–267, 2021.
[15] A. Rusman, K. Ramanda, and R. Syaleha, "Sistem Informasi Pendaftaran Pasien Rawat Jalan Secara Online Menggunakan Metode Extreme Programming," *Swabumi*, vol. 9, no. 2, pp. 128–135, 2021, doi: 10.31294/swabumi.v9i2.10730.
[16] P. A. Zen Alandra, "Perancangan Sistem Informasi Surat Keterangan Kematian Berbasis Web Di RSU Nurhayati Garut," *Jurnal Teknik Informatika dan Sistem Informasi* , vol. 10, no. 1, pp. 459–460, 2023.