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Design And Implementation Of The Latulip Integrated Service Pos Information System Using The Gulud Regression Method

Ria Irawati[1], Rohmat Nur Ibrahim[2], Adi Suwarno[3], Berry Lesmana[4], Dewi Fawziawati[5]
STMIK Mardira Indonesia, Bandung [1,2,3,4,5]
Email: riairawati0709@gmail.com[1], rohmat.nur.ibrahim@stmik-mi.ac.id[2], adisuwarno@stmik-mi.ac.id[3], berry@stmik-mi.ac.id[4], dewifawziawati@stmik-mi.ac.id[5]

Abstract

The Latulip Integrated Service Post is essential for overseeing maternity and child health within the community. An integrated information system has been designed utilising the rolling regression method to improve the efficiency and efficacy of data management and facilitate superior decision-making. This system is designed to oversee critical components of the integrated service post, encompassing child data, maternal data, immunization schedules, child development monitoring, activity schedules, and health articles.

The system offers easily accessible and interactive capabilities through three primary stakeholders: parents, community health workers, and administrators. The rolling regression technique is utilised to examine and forecast child development using existing historical data. This analysis enables the system to provide more precise recommendations regarding children's health needs and to monitor their development consistently. The deployment of this method has demonstrated efficacy in enhancing the quality of information provided to users and aiding community health professionals in making more informed decisions about health interventions. The findings demonstrate that the Latulip Integrated Service Post information system can proficiently integrate diverse data, deliver reliable analysis, and provide substantial support for the operations of the integrated service post. Consequently, this system is anticipated to function as a prototype for the creation of more integrated service information systems across diverse geographies.

Keywords : *Information Systems, Gulud Regression, Child Growth and Development Monitoring*

INTRODUCTION

The Latulip Integrated Service Post is essential for overseeing maternity and child health within the community. An integrated information system has been designed utilising the rolling regression method to improve the efficiency and efficacy of data management and facilitate superior decision-making. (Salam & Mufti, 2022) This system is engineered to oversee critical components of the integrated service post, including child data, mother data, immunisation timelines, child development monitoring, activity schedules, and health articles.

The system offers accessible and interactive features through three primary stakeholders: parents, community health workers, and administrators. (Din et al., 2023; Rizal et al., 2023) The rolling regression technique is utilised to examine and forecast child development using existing historical data. This analysis enables the system to provide more precise recommendations regarding children's health needs and consistently monitor their development. (Aprilya & Yulef Dian, 2025) The application of this strategy has demonstrated efficacy in enhancing the quality of information provided to users and aiding community health professionals in making more informed decisions

about health interventions. (Fachri et al., 2023) The findings demonstrate that the Latulip Integrated Service Post information system can efficiently integrate diverse data, deliver reliable analysis, and provide substantial support for the operations of the integrated service post. Consequently, this system is anticipated to function as a prototype for the development of other integrated service information systems across diverse geographies.

Infants represent the initial phase of human existence, and their health is a vital element that requires close monitoring, as it significantly influences their future growth. Consequently, it is imperative to protect their health at the earliest opportunity, especially during the critical period from birth to 5 years, when a child's growth and development are most rapid. Thus, computer media support is crucial for community services, particularly for Integrated Service Posts, referred to as Pos Pelayanan Terpadu. The implementation of a web-based support application enables the effective and efficient processing of data concerning infants and service post members.

The Integrated Service Post is responsible for the monthly monitoring of newborns' health issues. This health monitoring entails the ongoing assessment of growth and nutritional status. Community health professionals frequently face difficulties in data retrieval due to their reliance on handwritten documents, which hinders access for other personnel. The manual documentation of monitoring reports creates an undue burden of paperwork for the coordinator of the Integrated Service Post, and the manual registration method complicates the enrollment process for parents.

Information Systems

An information system comprises a collection of diverse information technology components that collaborate to generate information, enhancing communication within an organization or group. (Farmani et al., 2021)

An information system comprises various interrelated components designed to fulfil a specific objective.

Integrated Service Post

Integrated service posts represent a Community-Based Health Effort that is managed, executed, and implemented by, for, and in collaboration with the community, aiming to enhance health development initiatives and empower communities, thereby improving access to essential health and social services and expediting the reduction of maternal and infant mortality rates. (Tarigan et al., 2021)

Integrated service posts represent a collaborative methodology in healthcare. Integrated service posts are overseen by integrated service post cadres, who are trained by midwives at community health centres (Putra et al., 2022).

Gulud Regression Method

Integrated service posts represent a Community-Based Health Effort that is managed, executed, and implemented by, for, and in collaboration with the community, aiming to enhance health development initiatives and empower communities, thereby improving access to essential health and social services and expediting the reduction of maternal and infant mortality rates. (Bonarate et al., 2025)

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integrated service post cadres, who are trained by midwives at community health centres (Arief Sutisna & Triyanto, 2022).

This work aims to construct an Integrated Postal Service Information System utilising the Gulud Regression Method.

METHOD

Research methods

This study employs the descriptive method for data gathering, utilising numerous techniques to get data and information. The researcher initially gathers data through direct observation of the Latulip Integrated Service Post. Secondly, information is collected via direct question-and-answer sessions with the community health professionals at the Latulip Integrated Service Post. Finally, the researcher conducts a literature review to ensure that the study is grounded in relevant foundations related to the topic or topics under investigation. This literature study enhances the gathered data with citations from journals, articles, and books.

System Development Methods

The subsequent section delineates the phases of the Waterfall model within the system. Initially, in the Requirements Analysis and Definition phase, system services, constraints, and objectives are determined through user consultations, subsequently articulated in depth to form the system specifications. Subsequently, during the System and Software Design phase, the specifications for both hardware and software are established through the development of a comprehensive system architecture. This phase entails recognising and illustrating the abstractions of the fundamental software system and its interconnections.

In the Implementation and Unit Testing phase, the software design is executed as a collection of programmes or programme units, with testing aimed at confirming that each unit adheres to its specifications. The Integration and System Testing phase ensues, wherein individual programme parts are amalgamated and evaluated as a cohesive system to verify compliance with software requirements. Upon completion of this testing, the software may be handed to the customer. The Operation and Maintenance phase typically constitutes the most prolonged step, since the system is deployed and utilised in a practical environment.

RESULT AND DISCUSSION

SYSTEM ANALYSIS

A. Analysis of the Running System

The following is an analysis of the system currently running at the Latulip integrated service post:

Figure 1. Ongoing Business Process

B. System Requirements Analysis

The analysis of system requirements constitutes the preliminary phase in creating an integrated postal service information system. Requirements analysis is categorised into four components: input requirements analysis, output requirements analysis, functional requirements analysis, and non-functional system requirements analysis.

C. Gulud Regression Method Analysis

This method aims to predict the ideal and prospective weight of children based on their age. The forecasts utilise widely accepted algorithms to estimate a child's optimal weight, acknowledging that growth can vary considerably and is affected by numerous factors.

The formulas employed are contingent upon the child's age:

1. Infants Aged 0-11 Months: Ideal Weight = (Age (months) + 9) / 2. The formula is straightforward: the child's age in months is increased by 9, and the resultant sum is subsequently divided by 2.
2. Children Aged 1-6 Years: Ideal Weight = 2 × (Age in Years) + 8. For older children, the formula is adjusted: the child's age in years is multiplied by 2, followed by the addition of 8.

Examples and Interpretations:

Let us take the example of a child who is 18 months old:

- Age in years: 18 / 12 = 1.5 years
- Since 1.5> 1, we use the formula for children aged 1 to 6 years. The optimal weight is: 2 * 1.5 + 8 = 11 kg.
- Predicted weight (in 1 month): 2 * ((18 + 1) / 12) + 8 = 11.17 kg (rounded).

This means that, based on the formula, the optimal weight for a 18-month-old child is approximately 11 kg, and the

predicted weight in one month is around 11.17 kg.

SYSTEM DESIGN

1. Use Case Diagram

The suggested use case diagram for the Latulip integrated service post is as follows:

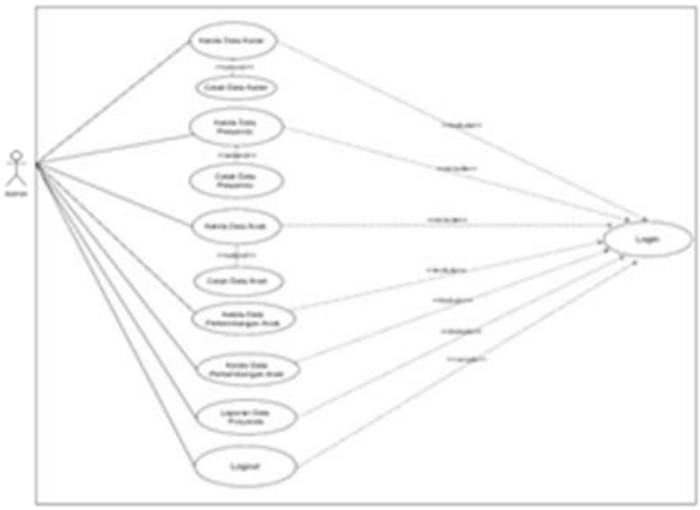


Figure 2. Admin Use Case Diagram

2. Class Diagram

The following is a class diagram for the Latulip Integrated Service Post:

Figure 3. Class Diagram

SYSTEM IMPLEMENTATION

A. Program Interface View

The programme interface is the manifestation of the programme

generated based on the design outcomes established during the system design phase.

1. Login Interface View

Figure 4. Login Interface Display

2. Admin Dashboard Interface View

Figure 5. Admin Dashboard Interface View

3. Integrated service Post Cadre Interface Display

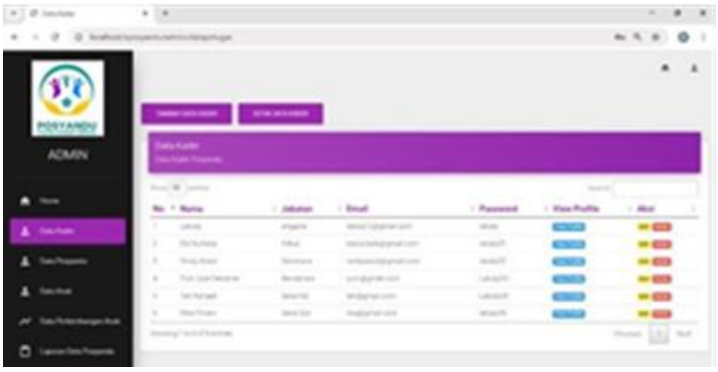


Figure 6. Integrated service Post Cadre Interface Display

4. Parent Interface View

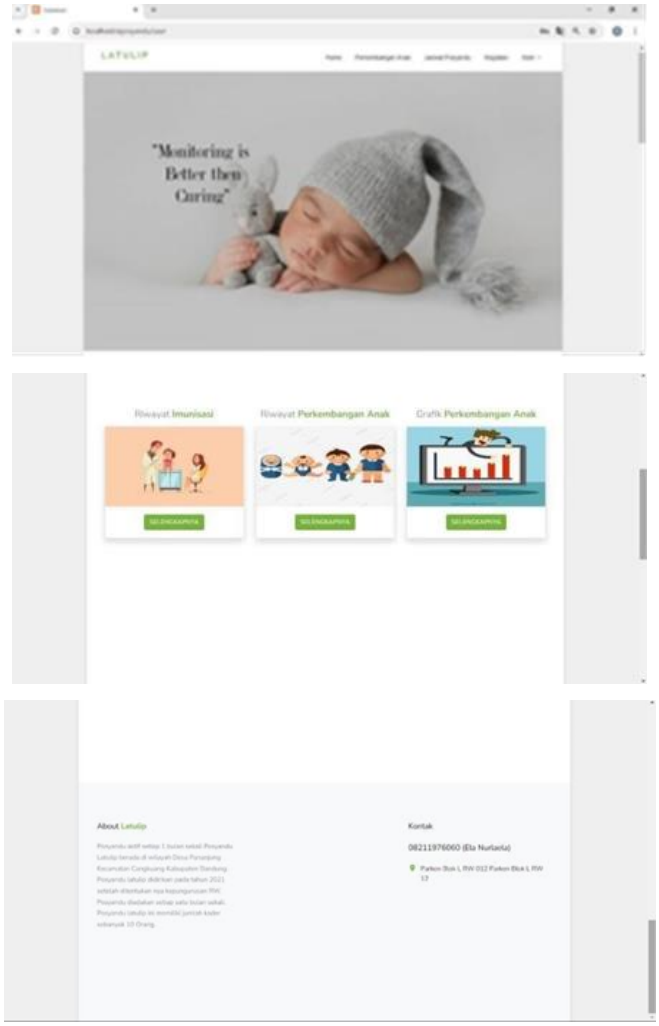


Figure 7. Parent Interface View

5. Integrated service Postal Data Interface View

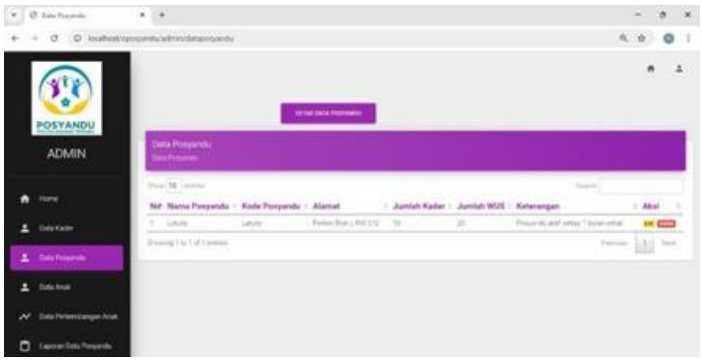


Figure 8. Integrated service Postal Data Interface View

6. Child Data Interface View

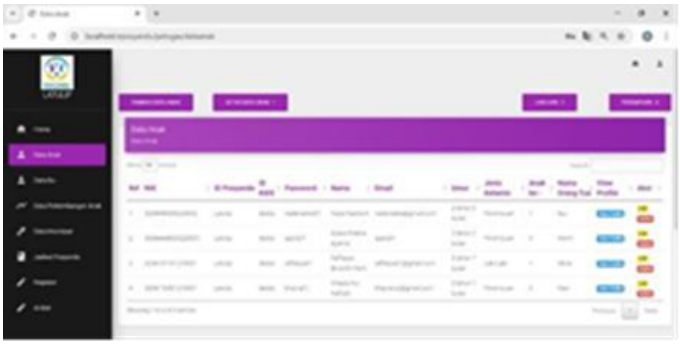


Figure 9. Child Data Interface View

7. Mother Interface View

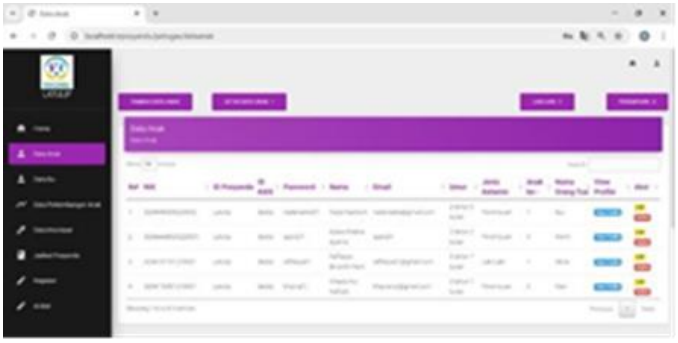


Figure 10. Mother Interface View

8. Child Development Data Interface

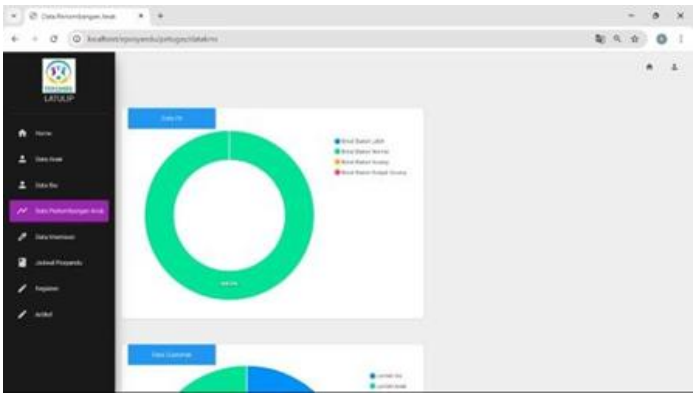


Figure 11. Child Development Data Interface

9. Immunization Data interface view

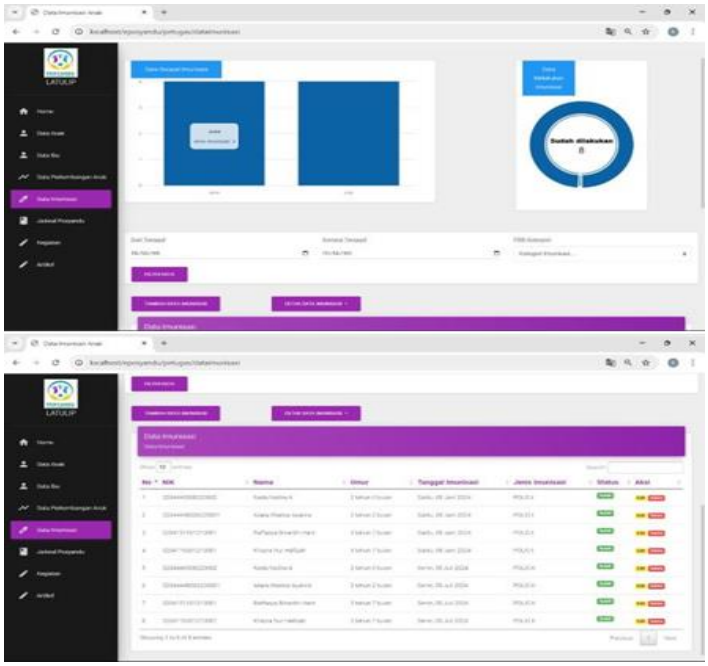


Figure 12. Immunization Data interface view

10. Integrated Service Post Schedule Data Interface Display

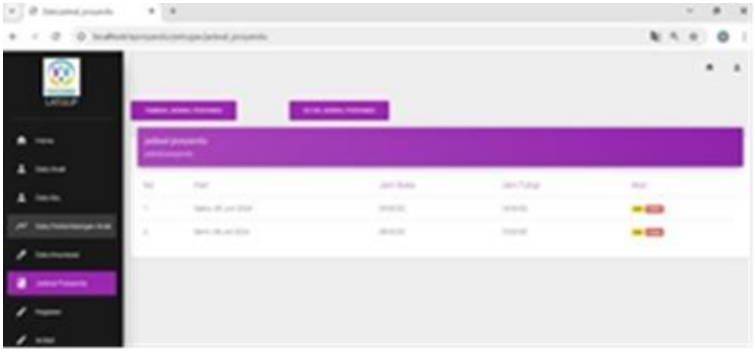


Figure 13. Integrated Service Post Schedule Data Interface Display

11. Activity Interface View

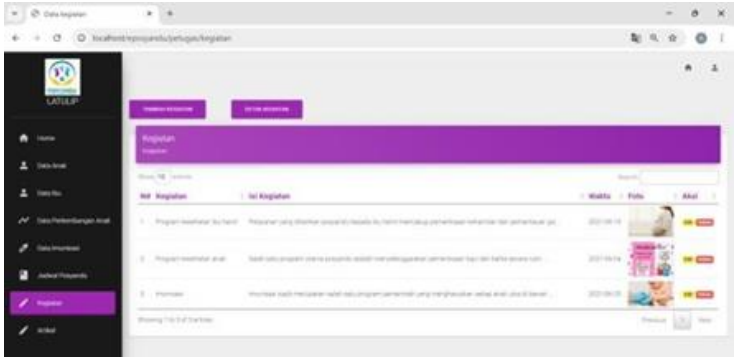


Figure 14. Activity Interface View

12. Article Interface View

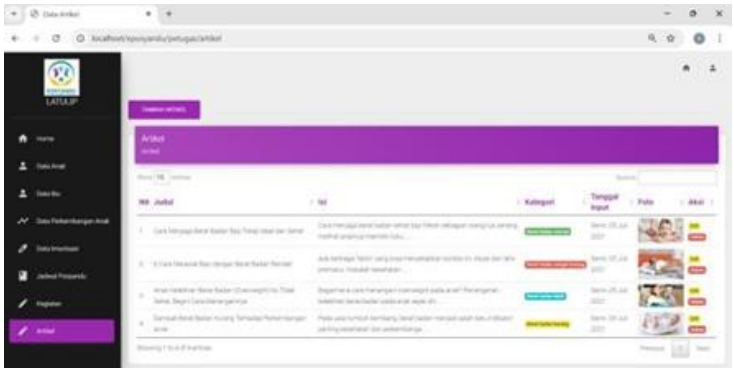
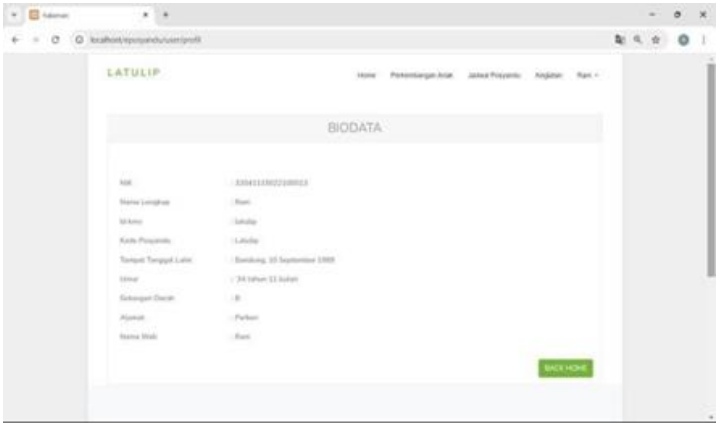


Figure 15. Article Interface View

13. Profile Interface View



Figrue 16. Profile Interface View

B. System Testing

The author employs white box testing throughout system testing. The objective of white box testing is to verify that the resultant system conforms to the defined requirements derived from the requirement analysis, to identify and rectify faults or errors within the system, and to minimise errors in software development.

The outcomes of the design employing white box testing are derived by translating the flowchart into a flowgraph, followed by the computation of edges and nodes. This will ascertain the cyclomatic complexity.

Login Page Testing

a. Flowchart and Flowgraph Login

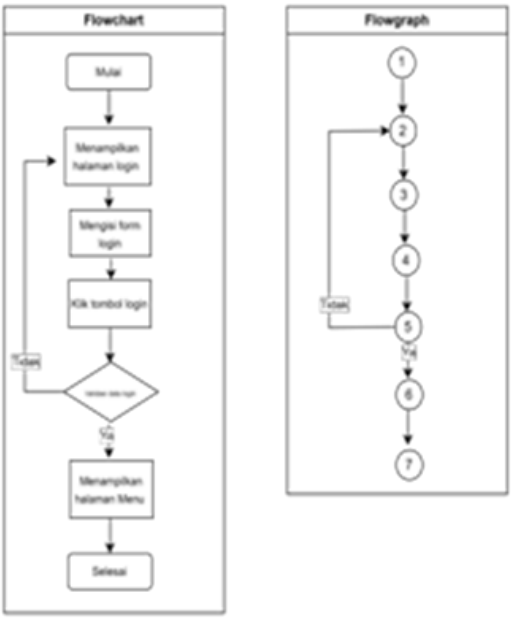


Figure 17. Flowchart and Flowgraph Login

b. Cylomatic Complexity

E = Number of edges (bow) N = Number of nodes (knot)

P = Number of predicate nodes (branching)

The following is the calculation of cyclomatic complexity, including::

Number of regions = 2

CC = C – N + 2

= 7 – 7 + 2

= 2

V (G) = P + 1

= 1 + 1

= 2

So, in the test results above, there are two independent paths, namely:

Path 1 :

1 – 2 – 3 – 4 – 5 – 6 – 7 (successful login scenario)

Path 2 :

1- 2 – 3 – 4 – 5 – 2 – 3 – 4 – 5– 6 – 7 (login scenario failed because username and password fields are incorrect)

CONCLUSION

The research indicates that the Latulip Integrated Service Post Information System, utilising the Gulud regression method, has been effectively planned and executed in alignment with the original research objectives. The information system enables the oversight of children's growth by delivering organised and precise data. This system enables a more objective and quantifiable evaluation of children's growth by incorporating the Gulud regression method. It features an intuitive interface, facilitating access for community health workers and parents to real-time information regarding infant growth.

This study demonstrates that the deployment of this information system markedly enhances the efficiency and efficacy of the child development monitoring process at the Integrated Service Post. The data can be swiftly and effortlessly accessed, allowing health practitioners to ascertain the distinct needs of each child and deliver suitable therapies. Moreover, the method enhances transparency in

reporting to parents, thereby strengthening communication between healthcare staff and parents. This system adequately fulfils the essential criteria for the systematic and structural monitoring of the Integrated Service Post.

Suggestion

Following the design and implementation phase, numerous aspects can be enhanced to optimize the advantages of the Integrated Service Post Information System, utilizing the Gulud regression approach. Future progress necessitates integrating this system with other systems to augment its capabilities. Moreover, enhancing the system's effectiveness through the incorporation of new features can facilitate the more effective monitoring of children's development. Integrating interactive communication tools would enhance engagement between healthcare professionals and parents. Moreover, developing an intuitive interface design will facilitate user interaction with the system. A responsive system accessible via several devices would boost user productivity, hence facilitating more effective monitoring and support for children's development.

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