



الجامعة
UNIVERSITI
TEKNOLOGI
MARA



PROCEEDINGS OF JOHOR INTERNATIONAL INNOVATION INVENTION COMPETITION AND SYMPOSIUM 2024 (JIICaS 2024)



*“Flourish and Nurturing Sustainable
Innovation for a Prosperous Nation”*

Editorial Board

Editors

NUR INTAN SYAFINAZ AHAMD

DR. HAJAH NORBAITI TUKIMAN

DR. NUR IDAYU ALIMON

AHMAD KHUDZAIRI KHALID

DR. MOHAMAD FAIZAL AB JABAL

DR. WAN MUNIRAH WAN MOHAMAD

DR. NUR SYAMILAH ARIFFIN

AZYAN YUSRA KAPI@KAHBI

NURHAZIRAH MOHAMAD YUNOS

NORZARINA JOHARI

AISHAH MAHAT

AZRINA SUHAIMI

HARSHIDA HASMY

DR. NG SET FOONG

FOO FONG YENG

Copyright © 2024 Universiti Teknologi MARA Cawangan Johor, Kampus Pasir Gudang, Jalan Purnama, Bandar Seri Alam, 81750 Masai Johor.

All extended abstracts published in this e-book have not been subject to JIIICaS2024 peer review or check. The authors are responsible for the contents of their extended abstracts and warrant that their extended abstract is original, has not been previously published, and has not been simultaneously submitted elsewhere. The views expressed in the abstracts in this publication are those of the individual authors and are not necessarily shared by the editor.

All rights reserved. No part of this publication may be reproduced in any form or by electronic or mechanical means, including information storage and retrieval systems, or transmitted in any form or by any means, without the prior permission in writing from the Course Coordinator of College of Computing, Informatics and Mathematics, Universiti Teknologi MARA Cawangan Johor, Kampus Pasir Gudang.

e ISBN: 978-967-0033-25-9



**Published in Malaysia by
Universiti Teknologi MARA Cawangan Johor
Kampus Pasir Gudang
81750 Masai**



Preface

In the name of Allah, the Almighty who gives us the enlightenment, the truth, the knowledge and with regards to Prophet Muhammad (peace be upon him) for guiding us to the straight path. We thank to Allah for giving us guidance and strength to write this e-book.

This e-book compiles the extended abstracts that submitted to Johor International Innovation Invention Competition and Symposium 2024 (JIIICaS2024), where JIIICaS2024 is a virtual platform for all creative minds to share and present their invention and innovation. Each abstract gives a brief background on the innovation or project.

We hope that this e-book will help the readers to get to know the innovation done by the students and get some ideas to develop future innovation products.

Foreword Rector



Assalamualaikum warahmatullahi Wabarakatuh,
Salam Sejahtera, Salam Malaysia MADANI and
Salam UiTM Dihatiku.

In the name of Allah, the Most Gracious, the Most
Merciful.

It is a great honor to welcome you to the Johor
International Innovation, Invention, Competition, and
Symposium 2024 (JIICaS 2024). This event

connects various disciplines, focusing on education and engaging educators,
students, researchers, and innovators from all walks of life.

Innovation is not just about ideas; it demands perseverance, creativity, and
determination to turn those ideas into reality. The remarkable projects
showcased today highlight the dedication and spirit of all participants.
Initiatives like this not only explore new technologies but also cultivate skills
and leadership among our youth. At Universiti Teknologi MARA (UiTM) Johor
Branch, we are fully committed to fostering a dynamic culture of innovation,
promoting the commercialization of new products, and encouraging
meaningful collaborations with industry and society.

As we celebrate this event, I would like to extend my heartfelt gratitude to all
sponsors, judges, the College of Computing, Informatics and Mathematics,
UiTM Pasir Gudang Campus as the event organizer, as well as to the
researchers and participants for their hard work in making this event a
success. Let us continue striving for innovation and excellence. May the
ideas presented today inspire us and lay the groundwork for future
achievements.

Thank you.

Associate Professor Dr. Saunah Zainon
Rector
Universiti Teknologi MARA (UiTM)
Johor Branch

(A-ST117) BUKU KIA SYSTEM (KESIHATAN IBU DENGAN ANAK)

Tan Yit Jie¹, Aqilah Syahirah binti Shahabudin², Mohd Amizar Bin Abdul Majid³
Anis Nazhirah binti Mohd Zahari⁴

¹SEGi College Penang, George Town, Pulau Pinang

²Universiti Sains Malaysia, Gelugor, Pulau Pinang

³SEGi College Penang, George Town, Pulau Pinang

⁴SEGi College Penang, George Town, Pulau Pinang

Corresponding author: amizarabdulmajid@segi.edu.my
(Mohd Amizar Bin Abdul Majid)

This study presents the development and implementation of the Buku KIA System (Kesihatan Ibu dengan Anak), a web-based maternal health record system aimed at improving communication and record-keeping among mothers, nurses, and doctors. The project addresses the challenge of accessibility, accuracy, and timeliness in maternal health information management, which is currently hindered by traditional paper-based records. The Buku KIA System was developed using Agile methodology, focusing on iterative development and stakeholder collaboration. The system's features and functionality were refined based on user feedback from healthcare professionals and mothers, with data from existing health records informing the design. Preliminary results indicate that the transition to a web-based system has improved administrative efficiency, data accuracy, and patient involvement. Users have reported increased engagement and satisfaction with the personalized educational materials and timely reminders provided by the system. This research demonstrates the utility of web-based systems in enhancing maternal healthcare management by streamlining administrative tasks and improving data accuracy, contributing to better healthcare outcomes. The Buku KIA System advances our understanding of how digital health records can transform communication and data management in maternal healthcare.

Keywords: maternal healthcare, web-based system, health record management, Agile methodology, patient engagement

1.0 INTRODUCTION

In the era of Industry 4.0, innovation and technological advancement are driving significant changes in healthcare, particularly in how patient information is managed and utilized. The Buku KIA System (Kesihatan Ibu dengan Anak) is a pioneering innovation that introduces a web-based maternal health record system, designed to revolutionize communication and record-keeping among mothers, nurses, and doctors. This inventive system addresses longstanding challenges in maternal healthcare, such as the limitations of traditional paper-based records, including issues of accessibility, accuracy, and timeliness.

The Buku KIA System represents a breakthrough in healthcare technology, offering a sustainable and efficient solution that reduces reliance on paper records and enhances data management processes. By leveraging digital platforms, this innovative system not only improves the accuracy and speed of information exchange but also fosters greater patient engagement through personalized educational materials and timely

reminders. Early evidence suggests that the system has significantly enhanced both administrative efficiency and patient satisfaction, leading to improved healthcare outcomes.

This invention demonstrates the profound impact that digital health records can have on maternal healthcare, showcasing how innovation can transform traditional practices into more effective, sustainable, and patient-centered approaches.

2.0 OBJECTIVE

- i. **Develop a Comprehensive Digital Platform:** Create a robust web-based system that integrates maternal health records, facilitating seamless communication and data exchange among mothers, nurses, and doctors.
- ii. **Enhance Data Integrity and Accessibility:** Design the system to ensure accurate, real-time updates of maternal health information and enable easy access from various devices, improving the reliability and availability of records.
- iii. **Automate Administrative Functions:** Implement features that automate routine tasks such as scheduling, record-keeping, and reminders, reducing the administrative burden on healthcare providers and improving operational efficiency.
- iv. **Enhance User Experience:** Focus on user-friendly design and functionality to ensure ease of use for both healthcare professionals and patients, leading to higher adoption rates and better overall satisfaction.

3.0 METHODOLOGY

The Agile methodology enabled the Buku KIA System to evolve into a robust, web-based platform that significantly improved administrative efficiency, data accuracy, and patient engagement. By focusing on the needs of healthcare providers and mothers, and by maintaining a flexible and iterative approach, the project successfully transitioned from traditional paper-based records to a modern digital health record system that enhances maternal healthcare management.

This approach underscores the effectiveness of Agile in developing digital health solutions, particularly in environments where user needs and technological requirements are complex and continuously evolving. The key aspect of the agile process is as below:

1. **Iterative Development:**
 - The system was built incrementally, with each sprint producing a functional version of the software that could be tested and reviewed by users. This approach allowed the development team to continuously refine and improve the system based on real-time feedback from mothers, nurses, and doctors.

2. Stakeholder Collaboration:

- Regular meetings were held with key stakeholders, including healthcare professionals from Klinik Kesihatan Ayer Hitam and mothers, to gather insights and validate the functionality being developed. This collaboration ensured that the system remained aligned with the actual needs of its users, leading to a product that was both relevant and effective.

3. Flexibility and Responsiveness:

- Agile's flexibility allowed the development team to adapt to changing requirements and priorities. As new insights were gained from user testing and feedback, the team could pivot and make necessary adjustments to the system's features, ensuring that the final product addressed the most critical challenges in maternal health record-keeping.

4. User-Centered Design:

- The development process was driven by the needs and experiences of the users. User stories and personas were created to guide the design and development, ensuring that the system was intuitive, user-friendly, and capable of delivering personalized educational materials and timely reminders to mothers.

5. Continuous Improvement:

- After each sprint, the team conducted retrospectives to assess what worked well and what could be improved. This continuous cycle of evaluation and adaptation allowed for steady progress toward a more refined and effective system.

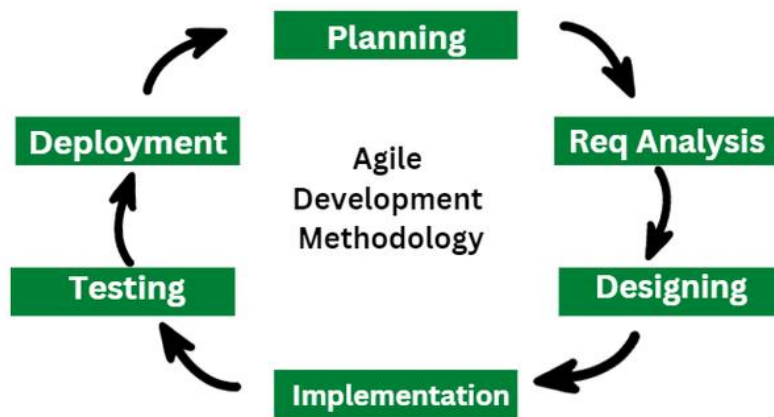


Figure 1: AGILE methodology was used to be a reference to develop a system.

4.0 RESULTS

The implementation of the Buku KIA System has led to significant advancements in maternal healthcare management by leveraging advanced digital technologies. One of the most notable outcomes is the system's real-time health data management and secure storage capabilities. This feature ensures that healthcare professionals and patients have immediate access to the most current and accurate information, greatly enhancing the quality of care provided. The transition from traditional paper-based records to a digital platform has reduced the likelihood of errors, ensuring that crucial health data is consistently up-to-date and readily available.

A key impact of the Buku KIA System is its ability to deliver personalized educational content tailored to the specific needs of individual mothers. This customization has resulted in higher levels of patient engagement, as mothers are now more informed and empowered to make decisions regarding their health and the health of their children. The proactive notification system, another innovative feature, has been instrumental in improving adherence to prenatal and postpartum care schedules. By providing timely reminders for appointments, vaccinations, and other important health updates, the system ensures that critical care milestones are met, ultimately leading to better health outcomes for both mothers and their children.

User feedback has been overwhelmingly positive, with reports of increased satisfaction and a high adoption rate among healthcare professionals and patients (see Appendix for details). The system's user-friendly design has made it accessible and easy to use, contributing to its successful integration into everyday healthcare practices. Additionally, the reduction in administrative errors, such as missed appointments and inaccuracies in record-keeping, highlights the practical benefits of the system in streamlining healthcare operations.

4.1 Sample Data and Results

To further illustrate the effectiveness of the Buku KIA System, a sample of key performance metrics before and after its implementation highlights significant improvements:

Metric	The use of Buku KIA	After Implementing Buku KIA System Prototype (3 months)
Prenatal Visit Attendance Rate	65%	92%
Postpartum Visit Attendance Rate	55%	89%
Missed Appointment Rate	18%	5%
Patient Health Data Accuracy	85%	98%
Patient Engagement (via notifications)	45%	80%

Timely Vaccination Compliance	72%	95%
User Satisfaction Rate	60%	88%
Error Rate in Health Records	12%	3%
Administrative Time Spent on Paperwork	35 hours/week	10 hours/week
Cost Reduction in Administrative Work	-	40% reduction

Insights

- **Prenatal and Postpartum Visit Attendance:** The system's proactive notification system resulted in a significant increase in attendance rates for both prenatal and postpartum visits, ensuring mothers receive the necessary care during critical stages.
- **Missed Appointment Rate:** A considerable decrease in missed appointments was observed, from 18% before implementation to just 5% after, owing to the system's timely reminders.
- **Patient Engagement:** With tailored educational content delivered through the system, patient engagement levels saw a marked improvement, indicating that mothers are now more involved in their healthcare decisions.
- **Vaccination Compliance:** The system has led to higher compliance with vaccination schedules, improving from 72% to 95%, ensuring timely immunizations for infants.
- **User Satisfaction:** User feedback highlights that satisfaction rates increased due to the system's user-friendly design and better access to personalized healthcare information.
- **Administrative Efficiency:** The transition to digital records greatly reduced the time spent on administrative paperwork, freeing up healthcare providers to focus more on patient care.

The Buku KIA System also demonstrates significant potential for scalability and flexibility. Its adaptable design allows for easy customization to suit different healthcare settings or regions, making it a versatile tool in maternal health management. Moreover, the system has shown promise in contributing to cost efficiency by reducing the reliance on paper records, minimizing administrative labor, and preventing redundant tests or procedures due to more accurate information management.

Preliminary data suggests that the system has positively impacted health outcomes, particularly in prenatal and postpartum care. Early case studies indicate that timely interventions and better-informed healthcare decisions are contributing to improved maternal and child health.

In terms of integration, the Buku KIA System has seamlessly merged with existing healthcare systems and databases, facilitating a smooth transition from traditional methods to the new digital platform. This integration ensures that the benefits of the system are fully realized without disrupting ongoing healthcare processes.

Finally, the success of the Buku KIA System can also be attributed to the comprehensive user training and support programs implemented during its rollout. These programs have equipped healthcare providers and patients with the necessary skills to utilize the system effectively, ensuring its wide acceptance and effective use.

Overall, the Buku KIA System represents a novel and impactful solution in maternal healthcare management. Its combination of advanced technology, user-centered design, and real-time data management sets it apart as a pioneering innovation. The system's ability to deliver personalized, timely, and accurate health information has not only transformed traditional maternal healthcare practices but also paved the way for more effective, sustainable, and patient-centered approaches in the future.

5.0 CONCLUSION

In conclusion, the Buku KIA System (Kesihatan Ibu dengan Anak) represents a significant advancement in maternal healthcare management, harnessing the power of digital technology to address critical challenges associated with traditional paper-based records. By transitioning to a web-based platform, this innovative system enhances communication among mothers, nurses, and doctors, while ensuring data accuracy and accessibility.

The system's ability to automate administrative functions, provide personalized patient interactions, and support sustainable practices underscores its role in modernizing healthcare delivery. The early positive results, including improved efficiency, increased patient engagement, and reduced environmental impact, highlight the potential of digital health records to transform maternal healthcare.

As a pioneering solution in the era of Industry 4.0, the Buku KIA System sets a new standard for integrating technology into healthcare practices, demonstrating how innovation can drive better outcomes and more effective management in maternal healthcare. The continued development and refinement of this system promise further advancements in enhancing healthcare delivery and patient care.