Informatics and Software Engineering
p-ISSN/e-ISSN: 2988-2818/2988-2222
Homepage: https://sanscientific.com/journal/index.php/ise
1**(2) 44-50 (2023)**
DOI: 10.58777/ise.v1i2.93

Research Article

KAI Commuter Employee Development Application Using The Waterfall Method

Angga Riski Ramadan[1*], Agus Junaidi[2], Mochammad Abdul Azis[3]
[1,2,3] Information Technology, Universitas Bina Sarana Informatika, Jakarta

Received: September 18, 2023; Accepted: October 19, 2023

Abstract
The KAI Commuter Employee Development application is a solution to support employee development in the PT environment. Indonesian Commuter Train. The development method used in this project is the Waterfall Method, which is a sequential approach consisting of clear phases, including planning, analysis, design, development, testing, and implementation. This application aims to increase effectiveness and efficiency in the management and development of employees in the company. With features such as performance tracking, training, employee evaluation, and creating personal development plans, this application provides a powerful tool for management to monitor and improve the potential of their employees. The development process using the Waterfall Method allows developers to carefully detail requirements before starting the stage implementation. This ensures the application can meet predefined requirements well throughout the development cycle. In addition, this model allows for more structured progress monitoring and enables more efficient project management. By adopting the KAI Commuter Employee Development application and implementing the Waterfall Method, companies can develop their employees, increase productivity, and optimize resources for their humans.

Keywords: KAI Commuter Employee Development, PT. Indonesian Commuter Train, Waterfall.

Aplikasi KAI Commuter Employee Development adalah sebuah solusi yang dikembangkan untuk mendukung pengembangan karyawan di lingkungan PT. Kereta Commuter Indonesia. Metode pengembangan yang digunakan dalam proyek ini adalah Metode Waterfall, yang merupakan pendekatan berurutan yang terdiri dari fase-fase yang jelas, termasuk perencanaan, analisis, desain, pengembangan, pengujian, dan implementasi.Aplikasi ini bertujuan untuk meningkatkan efektivitas dan efisiensi dalam manajemen dan pengembangan karyawan di perusahaan. Dengan fitur-fitur seperti pelacakan kinerja, pelatihan, evaluasi karyawan, serta penyusunan rencana pengembangan pribadi, aplikasi ini memberikan alat yang kuat bagi manajemen untuk memantau dan meningkatkan potensi karyawan mereka.Proses pengembangan menggunakan Metode Waterfall memungkinkan pengembang untuk merinci persyaratan dengan cermat sebelum memulai tahap implementasi. Ini memastikan bahwa aplikasi dapat memenuhi kebutuhan yang telah ditentukan dengan baik sepanjang siklus pengembangan. Selain itu, model ini memungkinkan pemantauan progres yang lebih terstruktur dan memungkinkan manajemen proyek yang lebih efisien.Dengan adopsi aplikasi KAI Commuter Employee Development dan penerapan Metode Waterfall, diharapkan perusahaan dapat meraih manfaat yang signifikan dalam pengembangan karyawan mereka, meningkatkan produktivitas, dan mengoptimalkan sumber daya manusia mereka.

Kata Kunci: KAI Commuter Employee Development, PT. Kereta Commuter Indonesia, Waterfall.

How to cite: Ramadan, A. R., Agus, J., Azis, M. A., (2023). Aplikasi KAI Commuter Employee Development Menggunakan Metode Waterfall

*Corresponding author: Angga Riski Ramadan (anggarr2212@gmail.com)

1. Introduction

KAI Commuter is one of Indonesia's largest commuter train services, with an extensive network and serving thousands of passengers daily. To maintain good service quality, KAI Commuter continues developing employees to have adequate competencies and are ready to face future challenges.

"Staff training and development is an important part of achieving company goals. Companies must invest in employee training and development programs to increase their skills, knowledge, and productivity" (Churchill, Ransford, Quarmyne & Hammond, 2018).

In this digital era, technological advances and situations are moving fast. They can be accessed from anywhere, and we must always be updated with developments, including companies, educational institutions, or institutions using these developments. Information technology has become an important part of the work process because speed, convenience, and accuracy are very useful in processing when agencies or companies need to fulfill each process quickly and accurately (Sahi, 2020).

Therefore, a web-based application is needed to facilitate the development process of KAI Commuter employees. This application will help the HR department manage employee data, identify employee development needs, and provide access to available training and development programs.

In order to develop this application, careful design is needed so that the application can suit the needs and desired goals. In designing the KAI Commuter Employee Development web-based application, attention will be paid to an easy-to-use interface design, data security, and integration with existing HR systems. Thus, it is hoped that this application can increase the effectiveness and efficiency of the employee development process at KAI Commuter.

2. Literature Review

Web Based Application

Web-based applications or web-based applications are programs that use web and internet technology. Web-based applications use a combination of server-side scripts, such as Views or PHP, to store and retrieve data. Client-side scripts such as JavaScript and HTML are also used to send data to users. It allows users to interact with website owners through online forms, comment boxes, content management systems, and more. Web-based applications allow employees to create documents, share information, collaborate, and work on the same projects and documents on different devices, perhaps elsewhere (Suryawinata, 2019).

Employee Training and Development

Appropriate training that employees receive usually results in employees retaining their jobs longer. Other studies show the positive role of the aim of this training is to achieve high levels of loyalty. Management is trying to develop the skills of their employees to create a better work environment. Effective training programs help employees make the expected progress (Setyati et al., 2021).

Databases

A database is a group of information stored on a computer systematically so that it can be checked using a computer program to obtain information about the data. The software used to manage and invoke basic data queries is a database management system (DBMS). Database systems study computer science (Andaru, 2018).

Frameworks

"A framework is a collection of statements collected in classes and functions with their functions for the convenience of developers who can call them without repeatedly writing the same program syntax to save time" (Sallaby & Kanedi, 2020). A framework is a set of tools, rules, and components to build software or systems. Frameworks provide a work structure that can help developers organize and develop applications more efficiently. The main goal of frameworks is to reduce the complexity of software development by providing proven design patterns, general reusable functionality, and other tools.

2. Research methods

The Waterfall model is an SDLC model commonly used in developing information systems or software. This model uses a sequential and systematic approach. The stages of this model start from the planning stage to the management (maintenance) stage and are implemented in stages. Developers need to know more about how the system development process works using the waterfall model, as well as the features of the Waterfall model (Wahid Abdul, 2020).

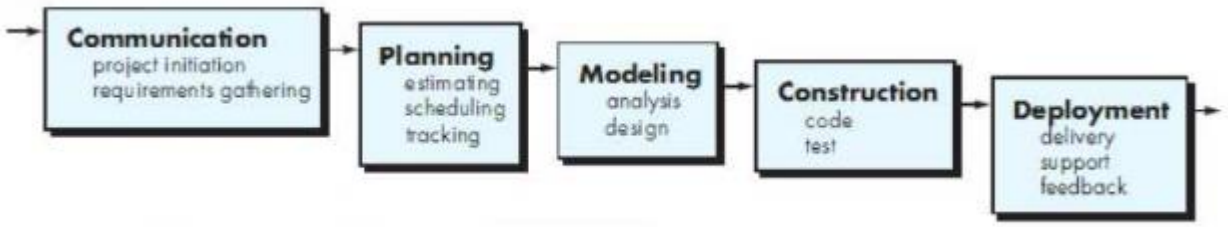

Figure 1 . Pressman's Waterfall Model

The following is an explanation of the steps taken in the Waterfall model (Wijaya & Astuti, 2019):

A. Requirements Definition The requirements research process is improved and focused on the software. To understand the nature of the program to be created, the software engineer must understand the information domain of the software, for example required functions and user interface. These 2 activities (system and software requirements study) must be documented and presented to the customer.

B. System and Software Design This process converts the above requirements into a representation as a software "blueprint" before coding begins. The design must be able to implement the needs stated in the previous stage. Like the previous 2 activities, this process must be documented as a software configuration.

C. Implementation and Unit Testing To be understood by machines, in this case, computers, the design must be changed into a form that can be understood by machines, namely into a programming language through the coding process. This step implements the design steps that the programmer will technically carry out.

D. System integration and testing: Something that is created must be tested. Same with software. All software functions must be tested to be error-free, and the results must truly comply with predetermined requirements. VND. Operation and Maintenance Software maintenance is very necessary, including development, because the software that is created is not always just that. When running, there may still be small bugs that were not previously discovered or additional features that still need to be available in the software. Development is needed when changes from outside the company, such as changes to the operating system or other devices.

3. Results and Discussion

C-Emdev (Commuter Employee Development) is a website-based application that records and organizes all input and output documents using the digitization process. It contains two modules consisting of a training module and a certification module. The training module is useful for recording training that will be carried out in a year following the RKAP by involving HR, division admin, superior users, and employee users in all units, which produce graphical dashboard outputs and monitoring tables, print-ready documents, and notifications for all users. Meanwhile, the certification module records the certification extension for ASPs and Facilities Officers with HR, producing output through dashboards, monitoring documents ready to print, and notifications. In creating web application projects on the front-end side using the Bootstrap 5 framework and on the back-end side using the Codeigniter 4 framework, the programming languages used are PHP, HTML, CSS, and Javascript.

Use Case Diagram C-Emdev

1. Actor:
   a) Employee Users: Can access the training activity evaluation feature, which is used to fill in the evaluation of the results of training activities.
   b) Admin User: Can access the training submission feature and activity evaluation feature.
   c) Superior Users: Can access the training calendar feature, RKAP (Company Budget Work Plan) approval feature, VP (Vice President) approval feature for training applications, VP (Vice President) approval feature for training evaluation, assessment feature, and certification file approval feature from users employee.
   d) HR: Can access the RKAP (Company Budget Work Plan) input feature, training calendar feature, training application approval feature, implementation cost form feature, monitoring feature, certification file review feature, and verification feature.

2. Use Cases:
   a) Login: This use case covers logging in for employers and employees into the application using their user accounts and passwords.
   b) View Training Schedule: This use case allows employees to view available training schedules.

c) Take Training: This use case allows employees to register and take available training.
d) Training Evaluation: This use case allows employees to evaluate the training they have attended and provide feedback.

3. Relationship Between Actors and Use Cases:
a) KAI Commuter employees can log in to access the various use cases mentioned above.
b) After logging in, they can view the training schedule, take part in training, and evaluate the training they have received.
c) They can also view their personal development track record and available career opportunities.

4. Example of Interaction:
a) A KAI Commuter employee logs into the application.
b) After logging in, the employee views the available training materials and takes certain training.
c) After completing the training, employees provide evaluation and feedback regarding the training.
d) Employees can also view their development track record and career opportunities that suit their skills.

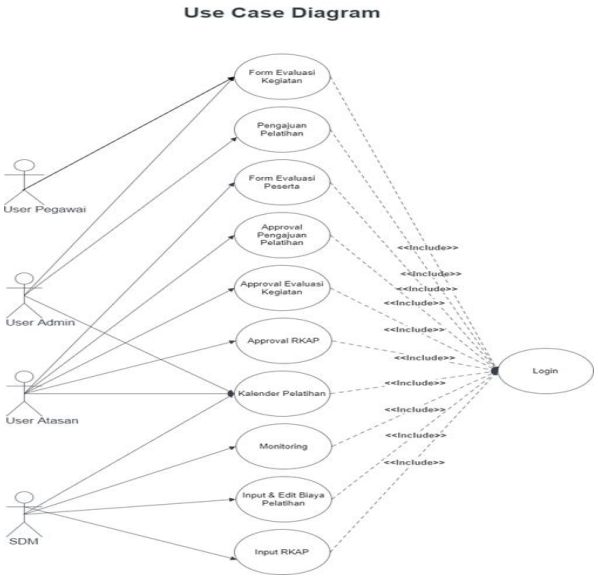

Figure 2. C-EmDev Use Case Diagram

Activity Diagram C-Emdev

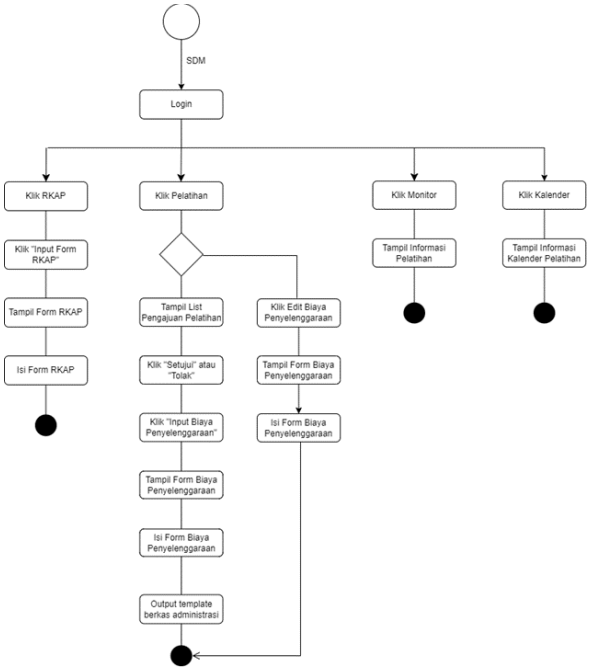

Figure 3. C-EmDev Activity Diagram

The following is a general overview of the activity diagram for the "KAI Commuter Employee Development" application. This diagram guides the sequence of activities that users must carry out in accessing and using the features in the application.

1. Initialization
   a) This activity marks the beginning of the KAI Commuter employee development process, especially the process carried out by HR.
   b) SDM starts the application and logs into the system.
2. Select the Maintenance Fee Menu
   a) Edit maintenance costs to change the saved cost data
   b) The system displays a form for filling in maintenance fees
   c) Maintenance cost form to add or update maintenance fee data
3. View Training List
   a) The system displays a list of available training based on the selected category.
   b) Training listing includes title, description, and related information.
4. Input RKAP (Company Budget Work Plan)
   a) HR accesses the RKAP (Company Budget Work Plan) menu.
   b) HR can add, change, and delete RKAP data.
   c) When HR wants to add RKAP, they will immediately be redirected to the filling form.
5. Monitor Training
   a) Displays information on available and implemented training
6. Training Calendar
   a) Displays of available training activity schedule information.
   b)

Entity relationship diagram C-Emdev

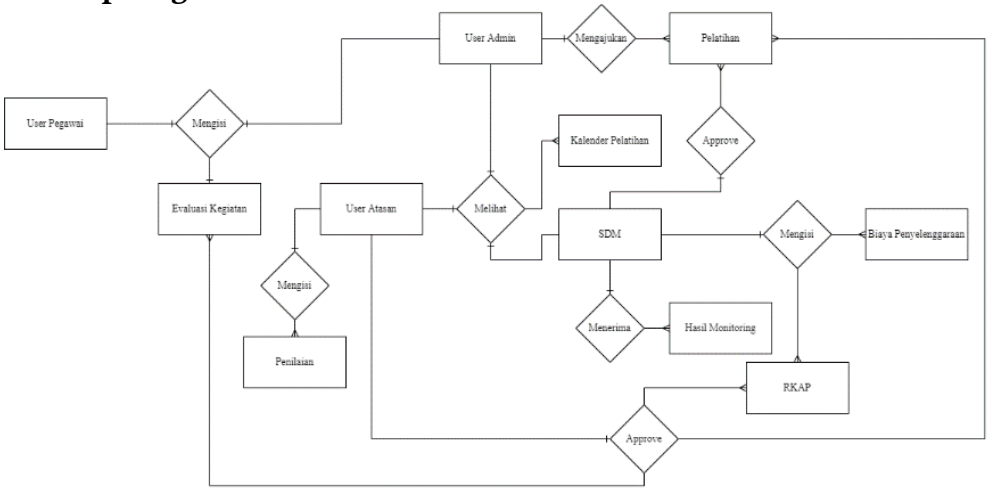

Figure 4. Entity Relationship Diagram C-EmDev

ERD (Entity Relationship Diagram) or entity relationship diagram is used to design a database and show the relationships between objects or entities and their attributes in detail.

Project results

The author is responsible as a Fullstack Developer in working on the KAI Commuter Employee Development web-based application project. The following are the results of the application project that we created:

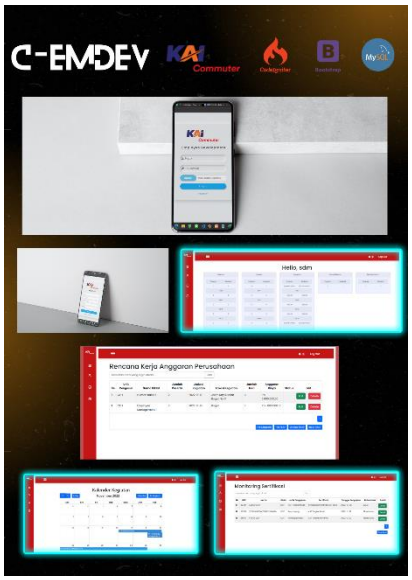

Figure 5. C-EmDev Application Layout

The "KAI Commuter Employee Development" application was created to assist in developing employees within the KAI Commuter company. In this context, we will discuss the development of this application using the Waterfall Method, which is one of the approaches in software development involving a series of linear and structured phases. Here are the results and discussions:

1. Planning Phase:
   a) Result: In this phase, the project team conducts a needs analysis and formulates the goals of the KAI Commuter Employee Development application. The project plan, schedule, and budget are also prepared.
   b) Discussion: The main role in this phase is to identify the needs of employees and the development of an application that supports employee development. The project plan prepared will serve as a guide throughout the project.
2. Analysis Phase:
   a) Result: The project team gathers and analyzes user requirements, such as required features, needed databases, and user interfaces.
   b) Discussion: This requirement analysis is crucial to ensure that the application to be developed will meet the needs of KAI Commuter's employees and organization.
3. Design Phase:
   a) Result: Application design, including user interface (UI/UX) design, database design, and system structure, is created.
   b) Discussion: In this phase, the project team designs how the application looks and operates. This design must consider user needs and ensure the application is user-friendly.
4. Development Phase:
   a) Result: The project team develops the application based on the previously designed specifications. Program code and application functions are built.
   b) Discussion: This development process involves writing program code and implementing the previously created design. Each development stage should refer to the project plan.
5. Testing Phase:
   a) Result: The KAI Commuter Employee Development application is thoroughly tested to ensure all features function properly and meet the requirements.
   b) Discussion: This phase is a critical step in ensuring the quality of the application. Testing involves functional testing, integration testing, and performance testing.
6. Implementation Phase:
   a) Result: The application is introduced into the production environment, allowing KAI Commuter employees to use it in real-life scenarios.

b) Discussion: Implementation involves launching the application to end users. During this process, employee training and application performance monitoring are necessary.

7. Maintenance Phase:
   a) Result: The application is regularly maintained to ensure smooth operation and address emerging issues.
   b) Discussion: Application maintenance includes routine updates, bug fixes, and enhancements based on user feedback.

4. Conclusion

The design of the "KAI Commuter Employee Development" web-based application leads to several important conclusions: 1) Employee Potential Development: This application aims to develop the potential and skills of KAI Commuter employees within a web-based environment. This application demonstrates that the company prioritizes human resource development to achieve sustainable growth. 2) Accessibility and Flexibility: The web-based application allows easy and flexible access for employees, anytime and anywhere. Employees can access learning and development materials without physical limitations, supporting remote and independent learning. 3) Technology for Performance Improvement: Implementing web-based technology indicates that KAI Commuter strives to enhance employee performance through a modern approach. This web-based technology can improve overall efficiency, productivity, and job quality. 4) Measurement and Evaluation: The application may be equipped with tools for measuring and evaluating employee performance. This application enables management to track individual progress, identify areas for improvement, and take appropriate actions. 5) Enhanced Employee Experience: By providing access to development programs through a web-based application, KAI Commuter can enhance the employee experience. This can help build a corporate culture that cares about employees' personal and professional development. 6) Integration with Internal Systems: The success of this application may depend on its integration with KAI Commuter's internal systems, such as HR management and employee data systems. Seamless and accurate information exchange will be enabled through good integration. 7) Continuity and Continuous Improvement: The design of this application should include plans for maintenance, improvement, and ongoing development. Technology constantly evolves, and this application should remain relevant and effective. 8) Impact on Organizational Performance: If executed well, this application can positively impact the overall performance of KAI Commuter. Skilled and developing employees are more likely to contribute effectively to organizational goals. 9) User Training Needs: The existence of this application may require training for employees on how to use it effectively. Support and guidance should be available to ensure smooth adoption. 10) Alignment with Company Strategy: This application should ideally align with the vision, mission, and employee development goals previously set by KAI Commuter.

References

Andaru, A. (2018). Pengertian Database Secara Umum. *Section Class Content*, 1–7. https://doi.org/10.1145/1147282.1147284

Churchill, Ransford, Quarmyne & Hammond, Hilda. (2018). the Role of Employee Training and Development in Achieving Organisational Objectives: a Study of Accra Technical University. *Archives of Business Research*, *6*(2), 67–74. https://doi.org/10.14738/abr.62.4190

Sahi, A. (2020). Aplikasi Test Potensi Akademik Seleksi Saringan Masuk Lp3I Berbasis Web Online Menggunakan Framework Codeigniter. *Tematik*, *7*(1), 120–129. https://doi.org/10.38204/tematik.v7i1.386

Sallaby, A. F., & Kanedi, I. (2020). Perancangan Sistem Informasi Jadwal Dokter Menggunakan Framework Codeigniter. *Jurnal Media Infotama*, *16*, 48–53. https://doi.org/10.37676/jmi.v16i1.1121

Setyati, A., Setiawati, L. A., & Ichwanto, A. R. (2021). Aplikasi Learning Course System Berbasis Web Dengan Metode Rad (Rapid Application Development). *JATISI (Jurnal Teknik Informatika Dan Sistem Informasi)*, *8*(3), 1483–1495. https://doi.org/10.35957/jatisi.v8i3.1081

Suryawinata, O. M. (2019). Buku Ajar Mata Kuliah Pengembangan Aplikasi Berbasis Web Diterbitkan oleh UMSIDA PRESS. In *Buku Ajar Mata Kuliah Pengembangan Aplikasi Berbasis Web*. http://dx.doi.org/10.21070/2019/978-602-5914-81-2

Wahid Abdul, A. (2020). Analisis Metode Waterfall Untuk Pengembangan Sistem Informasi. *Jurnal Ilmu-Ilmu Informatika Dan Manajemen STMIK*, 1–5.

Wijaya, Y. D., & Astuti, M. W. (2019). Sistem Informasi Penjualan Tiket Wisata Berbasis Web Menggunakan Metode Waterfall. *Seminar Nasional Teknologi Informasi Dan Komunikasi*, 274.