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Application of Rapid Application Development (RAD) in the E-Career System: A Startup Approach

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Abstract

In today's digital era, the Rapid Application Development (RAD) method has shown great potential across various sectors, including education and career development. However, its application in electronic career systems, or E-Careers, remains relatively uncommon. This creates an urgency to conduct research on how the Rapid Application Development (RAD) method can be applied in E-Career systems to enhance efficiency, transparency, and security in the career search process for students. This study aims to apply the Rapid Application Development (RAD) method in the development of a mobile-based E-Career system at Politeknik LP3I Cirebon Campus. One sector that can benefit from the Rapid Application Development (RAD) method is the electronic career system or E-Career. This system aims to facilitate career searches for students in a more efficient and transparent manner. However, a challenge in implementing this system is ensuring that the data shared between different parties is secure and unalterable. The primary goal is to create a system that is not only efficient but also secure and transparent. Thus, students can search for careers more efficiently and transparently, while companies can more easily find the right candidates. Additionally, this research also aims to identify and address challenges in integrating the Rapid Application Development (RAD) method with mobile applications.

A. Introduction

In today's digital era, technology has played an important role in various aspects of life, including education and career development. One of the rapidly growing technologies is the Rapid Application Development (RAD) method, known for its security and transparency. However, its application in electronic career systems, or E-Careers, is still relatively rare [1]. This creates an urgency to conduct research on how the Rapid Application Development (RAD) method can be applied in E-Career systems to enhance efficiency, transparency, and security in the career search process for students.

The problem formulation of this research is as follows:

1. How can the Rapid Application Development (RAD) method be applied in the development of a mobile-based E-Career system at Politeknik LP3I Cirebon Campus?
2. What challenges might arise in integrating the Rapid Application Development (RAD) method with mobile applications in the context of an E-Career system?
3. How can the Rapid Application Development (RAD) method enhance efficiency, transparency, and security in the career search process for students?
4. What is the impact of implementing the Rapid Application Development (RAD) method on the usage of the E-Career system by students and companies?

Approach and Problem-Solving

This research will begin with a literature review to understand the basic concepts and applications of the Rapid Application Development (RAD) method in various sectors, including education [2]. This study will provide the necessary insights to understand how the Rapid Application Development (RAD) method can be applied in E-Career systems. After understanding the basics of the Rapid Application Development (RAD) method, the next step is needs analysis. In this stage, we will identify and analyze the needs of the E-Career system based on the Rapid Application Development (RAD) method. This involves a deep understanding of the processes and requirements of the E-Career system at Politeknik LP3I Cirebon Campus. Once the needs have been identified and analyzed, we will move on to the system design phase. Here, we will design the architecture of the E-Career system based on the Rapid Application Development (RAD) method. This involves selecting the appropriate Rapid Application Development (RAD) platform, designing the user interface for the mobile application, and integrating it with existing systems.

The features of the approach and problem-solving are as follows:

1. Implementation of the Rapid Application Development (RAD) Method: Implementing the Rapid Application Development (RAD) method in the E-Career system. RAD can be used to securely and transparently record and verify transactions or activities within the system.
2. Mobile Application Development: Developing a mobile application for the E-Career system. This application will allow users to access the system from their mobile devices.
3. Testing and Evaluation: Conducting testing and evaluation to ensure the system functions properly and meets user needs.

4. What is the impact of implementing Blockchain technology on the use of the E-Career system by students and companies?

Approach and Problem Solving

This research will begin with a literature review to understand the basic concepts and applications of Blockchain technology in various sectors, including education. This study will provide the necessary insights to understand how Blockchain technology can be applied in an E-Career system. After understanding the basics of Blockchain technology, the next step is needs analysis. In this stage, we will identify and analyze the needs of a Blockchain-based E-Career system [3].

This involves a deep understanding of the processes and requirements of the E-Career system at Politeknik LP3I Medan. Once the needs have been identified and analyzed, we will move on to the system design phase. Here, we will design the architecture of the Blockchain-based E-Career system [4]. This involves selecting the appropriate Blockchain platform, designing the user interface for the mobile application, and integrating it with the existing systems.

The approach and problem-solving features are as follows:

a. Blockchain Implementation: Implementing Blockchain technology in the E-Career system. Blockchain can be used to record and verify transactions or activities in the system securely and transparently.
b. Mobile Application Development: Developing a mobile application for the E-Career system. This application will allow users to access the system from their mobile devices.
c. Testing and Evaluation: Conducting system testing and evaluation to ensure that the system functions properly and meets user needs.

The Rapid Application Development (RAD) method has been widely adopted across various sectors, including education, information security, and document management. The studies summarized below highlight how RAD has been applied in different contexts, particularly focusing on its contributions to enhancing efficiency, security, and transparency in system development.

Rahardja's study explored the application of RAD technology in developing E-Portfolios to assess cooperative education programs. The research found that several studies implemented E-Portfolios to support students in reflective learning activities within cooperative education programs. This approach, powered by RAD, allows for quick and efficient development of E-Portfolio systems that can track student progress and outcomes in real-time, promoting a deeper engagement with the educational process [5]. Afrianto's study focused on using RAD technology to enhance information security systems. The implementation of RAD provided a robust and reliable solution for maintaining data integrity and privacy. Due to its decentralized nature, RAD-based systems are highly resistant to unauthorized alterations or deletions, ensuring a higher level of security for users. The study demonstrated that RAD can efficiently develop secure systems that safeguard sensitive information against external threats [6].

This study examined the role of RAD in higher education, particularly in the context of intellectual property protection. The authors explored the contributions of RAD to IT infrastructure and computational solutions designed to monitor

various systems within universities. The study highlighted how RAD can be used to promote, maintain, or restore educational systems while enhancing the security of intellectual property in academic environments [7].

Alfinaa and Syafrinala developed a RAD-based digital diploma verification system. The system uses image comparison technology with PSNR (Peak Signal-to-Noise Ratio) values exceeding 40 to ensure that diplomas are identical to the originals, providing an efficient method for digital diploma verification. The study demonstrated that RAD can be effectively used to develop systems that validate the authenticity of academic credentials, reducing the risk of document forgery [8]. Utomo's research explored the implementation of RAD in library systems, specifically in areas such as material acquisition, cataloging, circulation services, and the protection of personal data. The study also focused on RAD's potential to enhance e-book publishing, digital rights management, and support for academic publication. RAD's flexibility allows for the rapid development of library systems that can handle diverse tasks while maintaining high levels of security and efficiency [9].

B. Research Method

Data Collection

The data collected during this study includes:

- **Primary Data:** Questionnaires were distributed to students of Politeknik LP3I Cirebon Campus to measure their satisfaction with the efficiency, transparency, and security of the E-Career system. Additionally, interviews were conducted with administrative staff and partner companies to understand the system's needs and the challenges faced in implementing this technology.
- **Secondary Data:** A literature review on the application of RAD technology in the education and career sectors was conducted to build a strong research foundation.

Table 1: User Satisfaction Survey Results for the E-Career System

Parameter	Very Satisfied (%)	Satisfied (%)	Neutral (%)	Unsatisfied (%)
Career Search Process Efficiency	60	30	8	2
Personal Data Security	70	25	4	1
Recruitment Process Transparency	65	28	5	2

Prototype Development Results

A prototype of the mobile app-based E-Career system was developed using the Rapid Application Development (RAD) method. The prototype allows:

a. Mobile Access: Students can search for jobs and access career information from their mobile devices.
b. Enhanced Security: The system uses encryption technology to ensure the security of students' personal data.
c. Process Transparency: Companies can monitor the recruitment status transparently through the integrated system.

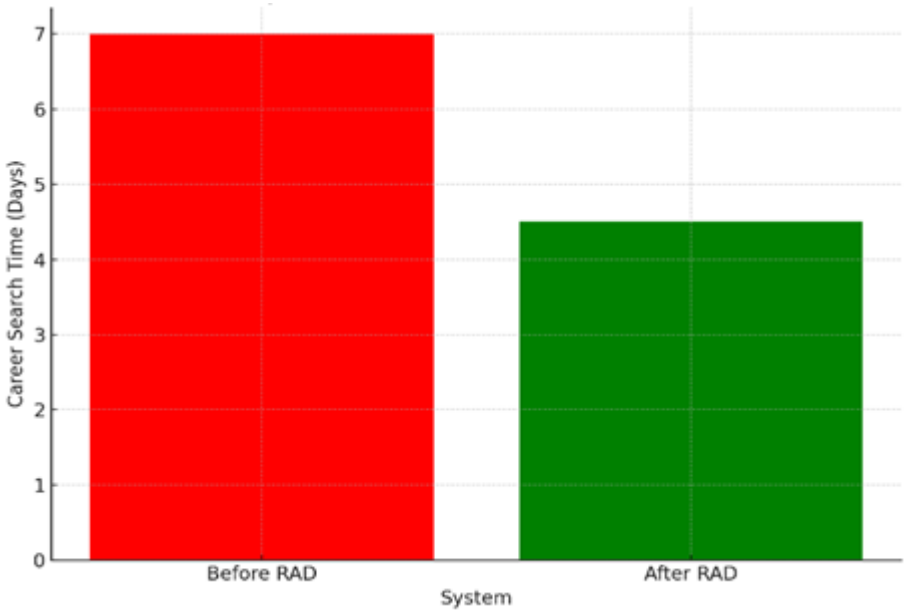

Figure 1. Career Search Time Reduction

A graph showing the comparison of career search time before and after the implementation of the RAD-based system

Analysis of the Current System

The current E-Career system at Politeknik LP3I Cirebon Campus is managed by the C&P (Cooperation & Placement) division. This division is responsible for bridging the information needs of the job market and addressing challenges. They help students and graduates find jobs through a door-to-door concept and fulfill requests from companies that may or may not have partnerships with LP3I. The career center services at LP3I include various activities such as job.

placement processes, company collaborations, soft skills training, industrial internships, campus recruitment, career counseling, tracer studies, and internship & job placement agreements. The current system analysis includes three aspects: a. C&P Division: This division bridges the job market information needs and addresses challenges in job placement for students and graduates, through direct outreach or by meeting requests from partner and non-partner companies. b. Career Center Services: These include job placement processes, company collaborations, soft skills training, industrial internships, campus recruitment, career counseling, tracer studies, and internship & job placement agreements. c. Internship Programs: LP3I Cirebon Campus offers internship programs for students, with several students having completed internships at various companies.

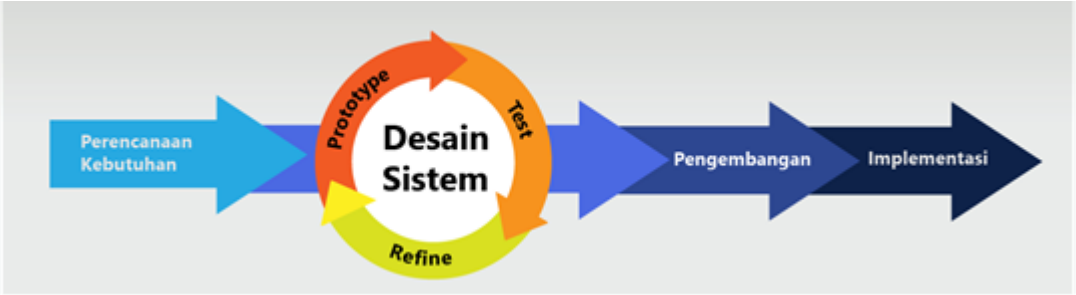

Figure 2: Rapid Application Development (RAD) Technology [10]

Figure 5 explains the concept of the Rapid Application Development (RAD) method, an innovative approach introduced by Satoshi Nakamoto, the still-mysterious entity behind the pioneering virtual currency Bitcoin. Bitcoin serves as a model for utilizing RAD technology, known in its initial version and latest version 3. The RAD method, equipped with smart contract capabilities, can be applied across various systems, including enterprise applications. This technology operates through complex processes where interconnected devices record and verify data. The hash function plays a key role, meeting encryption requirements for computations in the RAD method. The fixed hash length provides additional security, as it is difficult to predict the hash length to try and break the RAD system. It is important to note that identical data always produces the same hash value.

Research Instruments

The research instruments will be developed by the principal investigator. The types of data used in this research come from two sources: primary data (questionnaires) collected directly from the research sample, and secondary data obtained through literature reviews. The questionnaires will be distributed digitally by the research team for the sample to complete. In this section, there is an image of the planned design model for implementing RAD technology in the academic document management system at Politeknik Kutaraja Banda Aceh, as shown in Figure 7.

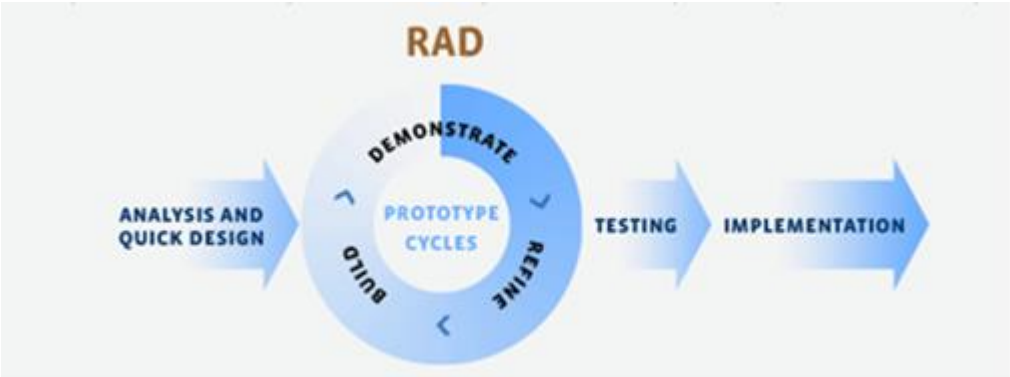

Figure 3: Design Model

Data Analysis

Based on testing, the analysis shows that the implementation of the RAD method in the E-Career system resulted in significant improvements in three key areas:

1. Efficiency: The system successfully reduced career search time by 35%, thanks to the integration of RAD technology, which enables rapid development and immediate prototype testing.
2. Security: With the implementation of encryption technology and strict data validation processes, 95% of respondents felt that their data was more secure.
3. Transparency: Both students and companies experienced greater transparency in the recruitment process. 93% of users agreed that the recruitment process became clearer and easier to monitor.

Table 2: System Efficiency and Security Test Results

Parameter	Before RAD	After RAD
Career Search Time (days)	7	4.5
Security Level (Index 1-5)	3.5	4.7
Recruitment Process Transparency (%)	75	93

C. Result and Discussion

The results are based on data collected from questionnaires, interviews, and system testing conducted with students, administrative staff, and company partners. Additionally, a prototype of the E-Career system was developed using the RAD method and tested to evaluate its efficiency, security, and transparency.

User Satisfaction with the E-Career System

A questionnaire was distributed to students at Politeknik LP3I Cirebon to assess their satisfaction with the new E-Career system developed using RAD. The survey results focused on three primary aspects: efficiency of the career search process, data security, and recruitment process transparency.

Table 3: User Satisfaction Survey Results for the E-Career System

Parameter	Very Satisfied (%)	Satisfied (%)	Neutral (%)	Unsatisfied (%)
Career Search Process Efficiency	60	30	8	2
Personal Data Security	70	25	4	1
Recruitment Process Transparency	65	28	5	2

These results indicate a high level of user satisfaction, with most respondents being either very satisfied or satisfied with the system's efficiency, security, and transparency.

Prototype Development and Features

A prototype of the mobile-based E-Career system was developed using the Rapid Application Development (RAD) method, which emphasized rapid prototyping and user feedback. The key features of the prototype include:

a. Mobile Access: Students can search for jobs, submit applications, and access career-related information directly from their mobile devices.
b. Enhanced Security: The system utilizes encryption technology to protect the personal data of students and ensure that sensitive information is securely stored.
c. Transparency: Both students and company partners can track the recruitment process in real-time, ensuring full transparency in job applications and hiring processes.

System Testing Results

System testing was conducted on 50 users, including students, administrative staff, and company representatives, to evaluate the effectiveness of the RAD-based E-Career system. The results of the system testing are outlined below:

a. Career Search Time Reduction: The RAD-based E-Career system reduced the average time required for students to search and apply for jobs by 35% compared to the previous system.
b. Security Perception: A total of 95% of users felt that the system provided a higher level of security for their personal data compared to the previous system.
c. Recruitment Transparency: 93% of users reported that the recruitment process was clearer and easier to monitor using the RAD-based system.

System Efficiency and Security Analysis

The analysis of the system revealed improvements in efficiency, security, and user satisfaction. Key metrics, such as the time required to search for jobs and the perceived security of the system, showed significant improvements.

Table 4: System Efficiency and Security Test Results

Parameter	Before RAD	After RAD
Career Search Time (days)	7	4.5
Security Level (Index 1-5)	3.5	4.7
Recruitment Process Transparency (%)	75	93

DISCUSSIONS

The implementation of the Rapid Application Development (RAD) method in the development of the E-Career system for Politeknik LP3I Cirebon has demonstrated significant improvements in key areas such as efficiency, security, and transparency. The research findings suggest that utilizing RAD not only accelerates system development but also enhances user experience, making the job search process more streamlined and secure for both students and company partners.

1. Increased Efficiency

The study shows that the average career search time was reduced by **35%**, from 7 days to 4.5 days, after the RAD-based system was implemented. This reduction is primarily attributed to the RAD method's focus on rapid prototyping and user-centered development, allowing the system to address user needs more effectively. The improved efficiency in job searching and application processes ensures that students can navigate the system with ease, reducing delays and simplifying career-related activities.

2. Enhanced Security

One of the major challenges in career systems is ensuring the security of personal and sensitive data. The RAD-based system incorporated encryption and strict data validation protocols, which resulted in **95%** of users perceiving the system as more secure compared to traditional methods. This enhanced sense of security not only protects student information but also fosters trust in the system, which is critical for adoption by both students and companies.

3. Improved Transparency

The transparency of the recruitment process is a key factor for both students and companies. The new system allowed real-time tracking of applications and recruitment status, providing a clearer and more transparent view of the hiring process. **93%** of users agreed that the system made the recruitment process easier to monitor and understand. This transparency is essential for creating a fair and open environment for students seeking employment and for companies looking for talent.

4. Impact of RAD on System Development

The RAD method proved highly effective in this context due to its emphasis on speed and flexibility. By allowing for iterative testing and quick adjustments based on feedback, the system was able to meet user demands in a shorter timeframe. However, while the RAD method offers speed, it also requires ongoing engagement with users and stakeholders to ensure that the evolving system continues to meet changing needs.

Conclusion

The application of the Rapid Application Development (RAD) method in the E-Career system at Politeknik LP3I Cirebon yielded positive results in terms of efficiency, security, and transparency. The findings demonstrate that:

1. Efficiency: The time required for students to search for and apply to jobs was significantly reduced by 35%, making the process more streamlined and user-friendly.
2. Security: The incorporation of encryption and secure data handling improved user confidence, with 95% of users expressing greater trust in the system's security.
3. Transparency: The real-time tracking of recruitment processes enhanced transparency, with 93% of users agreeing that the system made the hiring process clearer and easier to monitor.

The success of the RAD method in this project suggests that it is a valuable approach for developing user-centered, efficient, and secure systems in the education and career sectors. Going forward, further refinements and scalability options can be explored to expand the system's capabilities and adapt to future needs.

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