Development of Job Vacancy Information System at Darma Persada University Career Center

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Abstract — Career centers play a vital role in bridging the gap between higher education and the workforce by helping students and alumni access job opportunities and develop relevant skills. At Universitas Darma Persada, the career center faced challenges in disseminating job vacancy information efficiently due to time constraints and limited distribution methods, primarily via Instagram. This study aims to design and develop a web-based job vacancy information system to improve accessibility and communication between job seekers and employers. The uniqueness of this research lies in the development of a role-based job portal system that integrates multiple user roles, namely job seekers (students and alumni), career staff, and employers, into a single digital platform. The objective is to accelerate job vacancy publication, facilitate job applications, and streamline employer access to candidate data. This study adopts the Waterfall methodology, including stages of requirement analysis, system design, implementation, and testing. Data were collected through observation, interviews, and literature review. The final system was developed using Visual Studio Code, PHP, MySQL, and other web development tools. The results show that the system successfully reduces delays in job vacancy announcements, expands reach beyond Instagram, and provides a more structured and interactive recruitment process. Employers can post jobs and review CVs, while job seekers can apply directly and track their application status. The system has proven effective in enhancing the career center's role in graduate employability support.

Keywords – Career Center, Information System, Job Vacancy, Recruitment, Web-based

I. INTRODUCTION

In the era of digital transformation, higher education institutions are increasingly expected not only to produce academically competent graduates but also to facilitate their entry into the workforce. This expectation has led to the establishment of Career Centers at most universities, which serve as intermediaries between students, alumni, and the job market. Their role is crucial in providing job vacancy information, organizing career preparation programs, and maintaining strong relationships with industry partners [1].

However, many university Career Centers in Indonesia still rely on social media platforms, such as Instagram, to distribute job vacancy information. While effective in outreach, these platforms are limited in terms of data structuring, user-specific content delivery, and system-generated reporting [2]. Consequently, students and alumni often miss job announcements due to poor visibility, lack of search features, or publication delays. In institutions where job postings are handled manually or semi-digitally, administrative staff struggle to validate employers quickly, publish posts in real time, and monitor applicant engagement [3].

Recent studies emphasize the importance of integrated job vacancy information systems in academic settings. A centralized digital system can streamline the publication of job listings, enhance access to opportunities, and ensure that applicants and employers interact through structured channels [4], [5]. These systems often support digital CV creation, role-based access, employer validation, and candidate tracking—features that are increasingly standard in modern career platforms.

This research was conducted in response to limitations faced by the Career Center of Darma Persada University, which currently uses informal

channels to share job information and lacks a structured system for managing employer submissions or student applications. By benchmarking similar platforms and applying the Waterfall development model, this study aims to build a role-based, web-based information system to manage job vacancies and improve institutional engagement with employers.

The system is expected to not only increase the efficiency of job announcement dissemination but also align the university's career service with digital trends in recruitment and employability enhancement [6], [7]. It integrates functionality for employers to post vacancies, career staff to validate submissions and generate reports, and job seekers to register, apply, and manage application history in real time.

II.　METHODOLOGY

This study adopts the Waterfall development model, a structured and sequential approach commonly used in systems with clearly defined requirements and project scope [8]. The Waterfall model includes five main phases: requirement analysis, system design, implementation, testing, and evaluation. This model is considered effective for academic information systems because of its documentation clarity and linear progress [9]. The phases of the Waterfall method applied in this study are showed in Figure 1.
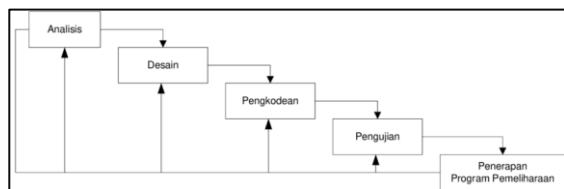

Figure 1. Waterfall Model

A.　Requirement Analysis

The research began with interviews and observations conducted at the Career Center of Darma Persada University. The staff identified three main pain points: delays in job posting due to manual verification of employers, difficulty in tracking applicant data, and limited accessibility for alumni. A benchmarking study was also carried out by reviewing similar web-based career platforms implemented at other universities, which typically include structured role access, employer dashboards, and automated applicant tracking features [10].

B.　System Design

The system was designed to accommodate three main user roles: job seekers (students/alumni), employers, Head of Biro Akademik Kerjasama dan Kemahasiswaan (BAKK) and career center staff. System modeling was performed using Unified Modeling Language (UML) tools such as Use Case Diagrams and Activity Diagrams. These diagrams represent how each user interacts with the system and the flow of data through key processes like employer validation, job posting, CV submission, and application status tracking [11].

A relational database was developed and modeled using an Entity Relationship Diagram (ERD), which defined key entities such as Users, JobPostings, Applications, and Employers. This structure ensures scalability, data consistency, and integrity in multi-role access systems [12].

C.　Implementation

The system was implemented as a web-based application using a modular tech stack. The front-end was built using React.js to ensure responsive and dynamic interaction, while the back-end was developed with Node.js and PostgreSQL to manage structured data and user sessions efficiently. Authentication and role-based access were implemented using JWT (JSON Web Tokens) to ensure security and user isolation. The system was hosted on a university server with HTTPS protocol and daily data backups [13].

D. Testing

System testing was carried out in three stages:

i.　Structural testing, to verify data flow between pages and internal logic.

ii.　Functional testing, to validate the success of job posting, registration, login, and application tracking features for all roles.

iii.　Validation testing, involving users (students and employers) to ensure that system behavior aligned with user expectations.

Performance metrics, such as page load speed and response time, were benchmarked to ensure system usability under typical academic usage loads. The final system was reviewed and validated by the Career Center staff.

III.　RESULTS AND DISCUSSION

The implementation of the system yielded a fully functional web-based application that connects job seekers (students and alumni), career staff, and employers on a single platform. Each user role has access to dedicated features that support job posting, application tracking, and recruitment decision-making. This role-based structure ensures that system functions align with actual business processes and support accountability in the university's career service delivery.

According to the methodology, the system design phase utilized both Unified Modeling Language (UML) and Entity Relationship Diagrams (ERD). UML diagrams helped identify user interactions and system workflows for each actor. The first UML model
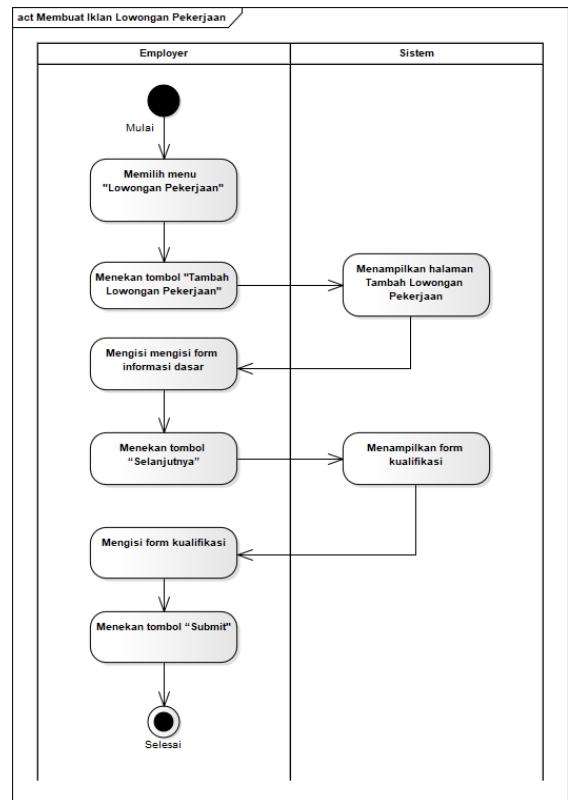
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is the Use Case Diagram for Career Staff, as shown in Figure 2.
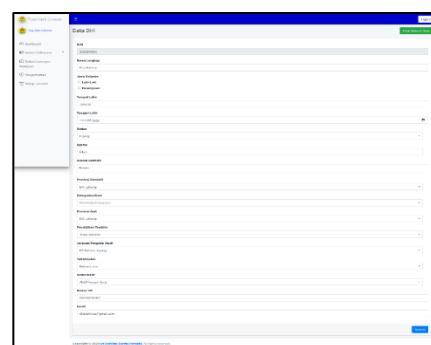

Figure 2. Use case for Career Staff

As illustrated in Figure 2, Career Staff must log in to access the system's administrative functions. Once authenticated, they are granted access to key modules including company membership activation, management of registered company data, alumni and student data viewing, monitoring of job applicants, approval of job postings, and management of job and internship listings. A secure logout function is also included to ensure session security and prevent unauthorized access. To further elaborate the workflow, an Activity Diagram was created, focusing on the job posting approval process. This diagram visualizes how job postings submitted by employers move through stages of validation, approval, and publication by Career Staff.

In terms of data structure, an Entity Relationship Diagram (ERD) was developed to model the relational database schema that supports the system's backend operations. The ERD includes entities such as Users, JobPostings, Employers, Applications, and CVs. This schema ensures that each transaction—registration, job submission, or application—is stored consistently and can be accessed efficiently based on user roles.

Figure 3. Entity Relationship Diagram of the system

The ERD provides the backbone for secure and scalable data management across all features in the system. It also enables integrity constraints such as primary keys, foreign keys, and many-to-one relationships, which are critical in preventing redundancy and ensuring referential integrity.

Figure 4 a workflow ensures that job postings undergo administrative verification, thereby maintaining data quality and filtering legitimate employer entries before publication.

Figure 4. Activity Diagram of Job Posting Approval Workflow

The Job Seeker interface allows users to register, create digital CVs, and apply for available jobs via a guided form. This function enhances graduate employability by enabling alumni and students to present their professional profiles digitally. The registration and CV interface is shown in Figure 5.


Figure 3. Form Registration and CV

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Employers can register their companies, submit job postings, and review applicants directly through the system. Employers can also view applicant data sorted by educational background, skills, or work experience, increasing recruitment accuracy showed in Figure 6.

Figure 4. Candidate List from Employer Page

Career Staff can manage job listings, approve postings, validate company legality, and generate internal reports which showed in Figure 7. These features help streamline administrative work and improve reporting accountability to higher university leadership.

Figure 5. Management Job Listing

Compared to the previous system—manual distribution of job vacancies via Instagram—the newly developed system centralizes the entire process into a traceable, structured platform. It supports real-time interactions, improves access for employers and students, and offers accountability through logging and role-based access. These outcomes reflect best practices in the digital transformation of career services in higher education.

Overall, the system not only meets functional requirements but also lays the groundwork for continued digitization of career management systems. Its design, functionality, and process alignment support the university's mission to improve graduate employability, industry engagement, and institutional responsiveness, in line with findings from current research on digital career platforms.

IV.   CONCLUSION

This study successfully developed a web-based Job Vacancy Information System for the Career Center at Universitas Darma Persada, designed to streamline the dissemination of job postings, employer validation, and applicant tracking.

Upon implementation, the system demonstrated measurable improvements. The time required to publish a new job posting decreased from an average of 1–2 days (using Instagram) to under 10 minutes via the new platform. In the pilot phase, 37 student users and 8 employers registered in the first month, with 15 job postings published and 45 applications submitted. Additionally, a short user satisfaction survey conducted with 20 participants yielded a positive response rate of 90%, indicating ease of use, improved information accessibility, and faster response times compared to the previous manual process.

The system also enables real-time status tracking, centralized data storage, and automated reporting, all of which support better decision-making and reduce administrative workload. These outcomes affirm that the proposed system meets the intended functional and non-functional requirements, and aligns with digital transformation goals in university career services.
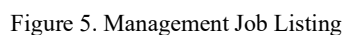
Future enhancements may include integration with third-party job portals (e.g., LinkedIn, JobStreet), mobile application support, and analytics dashboards to monitor long-term career outcomes. Continued monitoring of user engagement and periodic feedback collection are also recommended to ensure sustained system relevance and effectiveness.

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