



INTERNATIONAL JOURNAL OF MULTIDISCIPLINARY RESEARCH

IN SCIENCE, ENGINEERING, TECHNOLOGY AND MANAGEMENT

Volume 11, Issue 4, April 2024



INTERNATIONAL
STANDARD
SERIAL
NUMBER
INDIA

Impact Factor: 7.802



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Job Portal: MERN Stack Web Application for Job Seekers and Recruiters

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ABSTRACT: Job portals centralize a variety of opportunities and pair qualified people with openings, revolutionizing the job search process. By providing resources for CV development, career counseling, and planned career growth, they enable job seekers. They optimize the employment process for organizations by providing insights about market trends and recruitment techniques. Job portals encourage diversity and inclusivity by giving people from different backgrounds equal access to possibilities. The authors of this work have presented an online recruiting system architecture that enables companies to submit job adverts, which job seekers can access and use in their job search. The job criteria on this portal might be recorded according to the demands of the sector.

KEYWORDS: - React JS, Mongo DB, Express JS, Node JS, SaaS, Next JS

I.INTRODUCTION

Job portals have become revolutionary platforms in the modern employment market, allowing job searchers and employers to interact digitally. These web portals act as dynamic centers, compiling a large variety of job postings from various industries and geographical areas, providing individuals with unrivaled access to opportunities globally. Job portals utilize advanced algorithms and user-friendly search filters to enable users to narrow down their job searches according to particular criteria like geography, experience, and talents. This helps users apply for jobs more effectively and efficiently. Additionally, job portals offer an abundance of tools and resources, such as career assessments, networking opportunities, and resume builders, giving job searchers all they need to succeed in their professional endeavors.

Job portals are essential digital channels that link businesses and candidates in today's talent acquisition and job hunting market. By combining job postings from different sectors and regions, these portals act as centralized hubs that expedite the hiring process for both companies and job seekers. Job portals that include advanced search and filtering functions allow users to tailor their job search according to specific parameters like geography, experience, and talents, which increases relevancy and efficiency. Job searchers gain access to a variety of employment options as well as tools for networking, career counseling, and resume writing. Employers use job portals to connect with a wide range of competent applicants and acquire information about hiring practices and market trends that helps them make wise decisions. Job portals continue to be essential tools, always changing to meet the changing needs of the modern workforce while maintaining data privacy and listing accuracy.

Additionally, job portals often offer resume builders and profile creation tools, allowing users to showcase their skills and experience effectively to prospective employers. Job alerts keep users informed about new job listings matching their preferences, while networking tools and career resources provide avenues for professional development and connection. On the employer side, job portals provide functionalities such as job posting, applicant tracking systems (ATS), and access to a resume database, streamlining the hiring process.

II.LITERATURE REVIEW

Job portals play a crucial role in the recruitment process, facilitating the search for employment across various work categories such as engineering, law, insurance, social work, teaching, and mobile application development. The advent of digital technology has revolutionized the recruitment world by reducing search time and costs, and offering a transparent information method for candidates.

The early 2000s saw corporate sites acting as the primary source of news about their organizations. However, modern web innovations such as Web 2.0 forever changed the process of talent acquisition, a phenomenon known as “electronic recruitment”. Recruitment strategies differ globally, but the common elements are attracting, finding, and procuring. Recruitment is often reported in literature as the process of analyzing the job requirements, pooling together a network of qualified candidates, and hiring the best fit person for the role to gain a competitive advantage.

Literature relevant to the usability of online job search websites is diverse and explores many popular job search engines around the world. Job search websites provide users with information for using the internet effectively in career planning and job search assistance (D'Silva, 2020; Hosain et al., 2020; Hui et al., 2021; Reile & Harris-Bowlsbey, 2000; Rong, 2019; Sabha, 2018). Online job search websites enhance the employment process and help employers post jobs, allowing job seekers to explore job positions in their fields of interest and submit applications online (Sabha, 2018). Some popular job search engines are Indeed, Monster and LinkedIn as they allow to explore job postings from multiple recruiters (Rong, 2019).

Using job search engines has changed the job search behaviors of people around the world. To examine those behaviors, Garg and Telang (2012) focused on search modes such as agencies, print media, internet job boards (e.g., Monster.com, hotjobs.com), online social networks, and circles of friends and family. Collecting survey data from 109 unemployed job seekers in the United States, Garg and Telang (2012) found that job seekers spent the most time (41%) browsing for jobs and submitting their applications (43%).

Relevance to current Research

The proposed method for performing the digital forensic observation in Cloud on VM for introspection which addressed the issues related with the assembling of evidences. For resolving they made use of certain methods of introspection on VM. This work can be useful in current research if incorporated as a part of the investigation process.

Hubert Ritzdorf Nikolaos, Karapanos Srdjan Capkun proposed [3] Assisted deletion of Related Content in ACM, 2014 Hubert and Karapanos in their paper has discussed a system which helps the user of that system to diminish the similar and associated files, contents of any project. This system did not affect the user or systems components in any sense as it was directed embedded with the system of user itself. It starts functioning from user space and preserves the files along with its metadata. When they executed their work, realized that the resulting accuracy and the overhead was feasible. The results were appropriate to be used for the purpose of deployment. The aim to the system was to aid users by displaying all the associated files of project to be diminished and it was successful in providing it.

Ahmed et al. (2015) surveyed 250 students from multiple universities across Pakistan. Their findings showed that e-recruitment was popular because the students reported positive perceptions of online job portals. Minimal cost, less time, and unlimited access to the most relevant and diverse kinds of jobs were the main motivators for online job seekers in their adoption of online job portals. Leelavathi et al. (2020) developed a survey that included 24 statements to examine Indian job seekers' perceptions when interacting with different job websites. Their study found the Naukri website was the most preferred because the participants saw this portal as a job seeking avenue in India. Wadhawan and Sinha (2018) also examined Naukri.com to explore the factors affecting young job searchers' perceptions of the website. They developed a questionnaire that included 28 statements to measure variables such as user friendliness, perceived ease of use, information provision, and fairness perception to identify which factors determined young job seekers' perceptions of job portals in their job search process. The findings showed a significant difference among job seekers' age groups, showing that younger job seekers expected job portals to be easy to use. Using a mixed-method design, System Usability Scale (SUS), and cognitive walkthrough sessions, Agazzi (2020) assessed the usability of LinkedIn in applying for a job and/or joining a professional community.

The SUS data revealed that at least 30% of 235 participants were satisfied with LinkedIn's feature "applying for a job," while the other 67.5% underscored LinkedIn's community feature, stating it could enhance their knowledge and expertise. However, the participants recommended a quicker application process through the website, such as adding an "easy apply" tab next to every job advertisement. D'Silva (2020) examined the job seekers' satisfaction with online recruitment portals of different companies and found out that 46.1% (70 out of 152) of respondents reported that companies that utilized effective e-recruitment tools could select the right people for the job vacancies. Similarly, Hosain et al. (2020) reported that when organizations use the appropriate social media platforms, such as LinkedIn, for job advertising and recruitment, these platforms provide the organizations with valid information on choosing right candidates for the positions. Hosain and Liu (2020) examined the usability of LinkedIn in Bangladesh from the employers' perspective. They used a purposeful sampling of 153 graduate internship-seeking candidates who had active LinkedIn accounts and a convenience sampling of 49 employers who had organizational LinkedIn profiles. The researchers contacted those 49 employers, asking them to hire graduate students based on their LinkedIn profile information. Sixty-six graduate students were hired for paid internships by the 49 employers. After completing their recruitment process, the employers were asked to fill out a questionnaire that sought responses about the criteria they considered when selecting the candidates. The findings revealed the employers hired the graduate students based on the qualifications listed on LinkedIn because the website provided easy access to the participants' profiles.

| No. | Paper Title | Author Name | Key Points | Remark |
|-----|--|-------------------------|---|--|
| 1 | Improving Job Search Success Through Personalized Recommendations: A User-Centric Approach | Li et al. (2023) | Explores AI-powered recommendation systems for personalized job searches. | Highlights the potential of AI to improve job search efficiency. |
| 2 | The Impact of Job Portals on Job Search Behavior: A Longitudinal Study | Brown et al.(2020) | Conducts a longitudinal study on how job portals have changed job search behavior, analyzing user preferences and search patterns. | Provides valuable insights into how job seekers utilize job portals for their job search journey. |
| 3 | The Rise of Mobile Recruitment: Optimizing Job Portals for the Mobile User | Khan (2021) | Analyzes the importance of mobile optimization for job portals. | Focuses on the critical role of mobile optimization in today's job market. |
| 4 | Beyond Borders: Leveraging Job Portals for International Recruitment | Garcia & Schmidt (2022) | Investigates how job portals can be used for international recruitment, considering factors like language translation and cultural differences. | Highlights the potential of job portals to connect employers and job seekers across geographical boundaries. |

III.METHODOLOGY OF PROPOSED SURVEY

Usability testing employs different research methods to evaluate users' performance and acceptance of products and systems (Barnum, 2020; Csontos, 2019; Vaezi et al., 2016; Wichansky, 2000). This study used a mixed-method research design to collect quantitative and qualitative data through online moderated usability testing, observations, think-aloud processes, demographic questions, the SUS survey, and semi-structured interviews (See Figure 1). Mixed methods research is a type of research that includes collecting, analyzing, and integrating quantitative and qualitative research in a single study (Creswell & Plano-Clark, 2007). The rationale for choosing this form of research was to provide a better understanding of a research problem rather than using only either a qualitative or quantitative research approach.

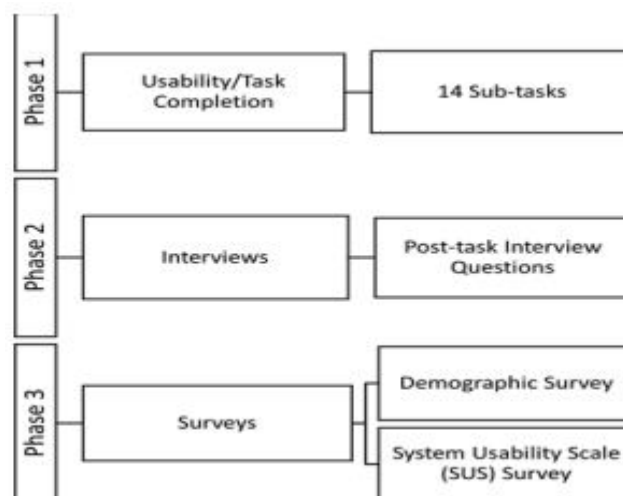


Figure 1 Research Phases

Institutional Review Board (IRB) approval was sought prior to conducting this study to ensure the human participants' rights, wellbeing, and welfare were protected. IRB approval was obtained on October 22, 2020. Data Collection Data collection began in November of 2020. We started to reach out to potential participants via email. We employed a purposeful sampling method when selecting participants, choosing the ones who were currently seeking jobs in their respective fields. Three undergraduate and nine graduate students at a Midwestern US university received an invitation to participate in the study through their student email addresses. To ensure diversity in the participants, we recruited students from various educational, ethnic, and racial backgrounds. Prior to conducting the task sessions, the participants signed consent forms. Out of the 12 participants, there were five males (41.67%) and seven female users (58.33%). The majority of the participants (70%) were international students from different countries, including Dominica, Iran, and Saudi Arabia. More detailed data on the demographics of the participants is presented in Figure 2. The participants were in the age ranges of 18-24 (2), 25-34 (4), 35-44 (5), and 45-54 (1). The participants identified as undergraduate, master's, or doctoral students pursuing degrees in various colleges, including education, engineering, health and human sciences, liberal arts and sciences, and visual and performing arts (see Figure 2).

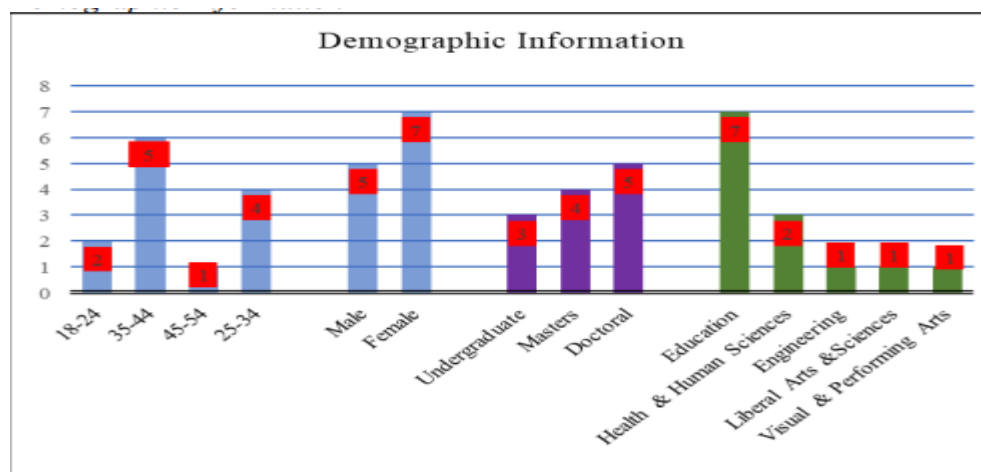


Figure 2 Demographic Information



Qualitative Data Collection According to Barnum (2020), when collecting qualitative data for usability studies, the remote-testing method is essential due to its potential for reaching out to users in moderated or synchronous or in unmoderated or asynchronous formats. Therefore, this study used online synchronous moderated remote testing with the researchers in the office and the participants at their homes. Qualitative data were collected through observations of remote moderated usability testing and post-interview questions responses. The session was established through a collaborative meeting software, Zoom, that allowed the participants to share their screen. The data were collected in different phases. In the first phase, the participants were asked to complete the given tasks. In the second phase, we conducted post-task interviews.

Phase 1: Usability/Task Completion Each researcher observed four students and recorded the task completion sessions using Zoom, asking the participants to share their screens. Each task session, including post-task interview sessions, lasted 15-30 minutes. During the session, each student was asked to perform a set of predefined tasks. The purpose of the observation was to take notes on the users' behaviors when they performed the tasks while thinking aloud. Upon completion of the observations, we kept a tally of the performance observations conducted by each team member. We developed 14 tasks for the participants to complete. 1. Open Indeed.com. 2. Sign in to the Indeed.com. 3. If you are a new user, create an account. 4. Assume you are looking a job paying at least \$60,000 in your field of study. 5. Find jobs posted in the last 7 days. 6. Find full-time jobs in your field in Illinois. 7. Sort the jobs listed in your field of study in the state of Illinois by relevance. 8. Sort jobs by mid-level experience. 9. Find the average annual salary for the job title you have selected. 10. Find top companies for your job in the United States. 11. Find the highest paying cities for your job. 12. Find the best companies in Chicagoland area. 13. Find the reviews on Amazon in Illinois. 14. Find that company's response to COVID-19.

Phase 2: Post-Task Interviews After completion of the tasks, we asked students to answer nine post-task interview questions. 1. How would you describe the assigned tasks? 2. Was the time sufficient to complete the tasks? 3. What did you like about the website? 4. What didn't you like about the website? 5. Would you consider using the website to look for a job in the future? Why? Why not? 6. What other things would you consider when you search for a job? Would this website allow you to find what you were searching for? 7. What do you think about the user interface? Do you like the design of the website? 8. Have you used a similar job search websites site before? If yes, could you please tell us whether you prefer Indeed.com over the other job search engines? Why? Why not? 9. Do you have any final comments or recommendations?

Quantitative Data Collection

Quantitative data for this study included calculating the time spent on task completion and the system's efficiency when users performed the tasks (see Phase 1 and Phase 2). To collect additional quantitative data, this research also used the SUS to measure the participants' satisfaction with Indeed.com. The SUS was invented by John Brooke at the Digital Equipment Corporation to measure usability of a website or system (Brooke, 1996). The SUS is a 10-item survey in which respondents indicate their level of satisfaction with each item on a scale from 1 (strongly disagree) to 5 (strongly agree). The odd-numbered items (1, 3, 5, 7, and 9) are positively worded and the even-numbered items (2,4,6,8, and 10) are negatively worded. The SUS post-test questionnaire was selected for several reasons. First, it has been widely used in several usability studies (e.g., Bangor et al., 2008; Tullis & Stetson, 2004). Secondly, previous research (e.g., Brooke, 1996; García-Peñalvo et.al., 2019; Tullis & Stetson, 2004) has also ascertained the effectiveness, efficiency, reliability, and validity of this survey. Moreover, the SUS provides a high-level measurement of subjective usability even with a sample size as low as 12 users (Tullis & Stetson, 2004).

Phase 3: Survey In the third phase, the participants completed the System Usability Scale (SUS) survey. We sent the participants a link to the SUS survey developed in Qualtrics. Prior to taking survey, they were asked to answer demographic questions.

Data Analysis

Data analysis of both quantitative (survey responses) and qualitative data (responses to open-ended questions) were conducted concurrently during data collection process. In any research, the process of data collection, data analysis, and report writing are not distinct steps; they can occur simultaneously throughout the research process (Creswell & Plano-Clark, 2007). Quantitative data was analyzed in relation to research questions. Qualitative data was done using thematic analysis. Before we started coding the responses to open-ended questions, we read them several times to elicit responses related to effectiveness, efficiency of the website, and user satisfaction with the website. After subsequent rounds of coding,

we separately identified emerging themes. Then we met as a team on a weekly basis via Zoom during December of 2020 to compare our emerging themes and discuss the findings.

Table 3*SUS Score*

| SUS | Usability | Learnability |
|-------------|-------------|--------------|
| 75.0 | 73.2 | 82.3 |
| 60.0 | 62.5 | 50.0 |
| 97.5 | 96.9 | 100 |
| 70.0 | 75.0 | 50.0 |
| 40.0 | 25.0 | 100.0 |
| 97.5 | 96.9 | 10.0 |
| 90.0 | 87.5 | 100.0 |
| 72.5 | 71.9 | 75.0 |
| 75.0 | 75.0 | 75.0 |
| 70.0 | 68.8 | 75.0 |
| 77.5 | 75.0 | 87.5 |
| 100.0 | 100.0 | 100.0 |
| 50.0 | 43.8 | 75.0 |

IV.CONCLUSION AND FUTURE WORK

In conclusion, job portals play a pivotal role in modern recruitment processes, offering a wide range of features and functionalities to both job seekers and employers. Through this study, we have gained valuable insights into the usage patterns, satisfaction levels, and preferences of users regarding job portals. The findings highlight the importance of job portals in facilitating efficient job searches, connecting candidates with suitable opportunities, and streamlining the hiring process for employers. While job portals have made significant strides in enhancing accessibility and usability, there are still areas for improvement, including addressing data privacy concerns, improving algorithmic matching accuracy, and enhancing user experience. In summary, we conducted a usability study that assessed the Indeed.com website, a leading job search portal. We used mixed-method research method using both qualitative and quantitative data. In addition to measuring the efficiency and effectiveness of the time in terms of task execution and task completion rate, we collected subjective usability rating of the website as measured by the SUS. It is worth noting that there is a scarcity of usability studies on job search engines that use validated evaluation surveys, such as SUS, to measure user satisfaction of a website. The participants' satisfaction score of 75 with Indeed.com indicated that they were satisfied overall with the website. Our findings also showed that the job seekers appreciated the availability of a wealth of field-related positions and, therefore, described their satisfaction with the website. By conducting this usability study and examining the users' experiences with the website through the lens of its usability, our goal was to offer data-driven recommendations for enhancing usability to reach the suggested SUS score of 80 or more to meet the users' needs when using job search portals

Future Work:

- **Integration of Emerging Technologies:** Explore the integration of emerging technologies such as artificial intelligence (AI), machine learning, and natural language processing (NLP) to improve job matching accuracy, personalize user experiences, and automate routine tasks.
- **Data Privacy and Security Measures:** Implement robust data privacy and security measures to safeguard user information, including compliance with regulations such as GDPR and CCPA, and transparent data handling practices to build user trust.
- **Personalization and Recommendation Systems:** Develop advanced recommendation systems based on user preferences, behavior, and past interactions to deliver personalized job recommendations, content, and notifications tailored to individual needs.
- **Mobile Optimization:** Optimize job portals for mobile devices to accommodate the growing trend of mobile job searching and ensure seamless user experiences across different devices and screen sizes.
- **Collaboration with Educational Institutions and Industry Partners:** Foster partnerships with educational institutions and industry partners to provide targeted training programs, internships, and skill development opportunities aligned with industry needs, bridging the gap between education and employment.



By addressing these areas of focus, job portals can continue to evolve and adapt to meet the evolving needs of users, employers, and the broader labor market, ultimately driving efficiency, transparency, and inclusivity in the recruitment process.

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