

Demystifying the User Experience: A Case Study on Online Job Search Engines

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ABSTRACT

Since the onset of the COVID-19 pandemic in 2020, the demand for job search engines has increased because of the availability of searching for remote job positions. However, there is still a lack of research on how people interact with different job search engines. It is critical to assess the effectiveness and efficiency of these tools for people searching for jobs because search engines help job seekers find positions that best fit their qualifications. This study assessed a job search engine by utilizing surveys, interviews, and observational methods to provide an improved understanding of individuals' behavior and decision making in their search for career. The results showed that the job search engine needs improvement in the usability aspect because the website has an unintuitive interface and features, suggesting novice users may face difficulties in using it. The findings contribute to the limited body of literature that examines the user experiences in searching for jobs.

KEYWORDS: Usability, Job Search Engine, Online Recruitment, System Usability Scale, Satisfaction.

The growth of the internet has contributed to advancements in technology, resulting in dramatic use of digital resources by web users from all over the world (Attaran et al., 2019; Barak, 2003). Digital resources are becoming especially popular among job seekers, and several job search platforms are constantly expanding their databases by integrating the latest trends of technologies and enhancing their features. By using online job search portals, job seekers gain a better chance of increasing their employability because they can post their resumes and quickly apply to jobs (Wanberg et al., 2020). These services provide flexibility to job seekers and an opportunity for employers to get the best match for the positions they are offering.

Since the outbreak of the coronavirus pandemic in March of 2020, the need for online job search engines has increased because they allow job seekers to instantly apply for jobs across the globe at rates that surpass those of traditional methods (Wanberg et al., 2020). While in-person applications for local positions may continue, job search activities, such as creating a resume, finding a job posting, filling out an application, and contacting employers, have become significantly more efficient with the use of job search engines (Arora & Kumari, 2021; Wanberg et al., 2020). Websites allow applicants to save their information so they do not need to fill out the forms for each application, significantly increasing the number of jobs a person can apply to every hour (Wanberg et al., 2020).

A survey on online job searches in 2015 by the Pew Research Center revealed that about 54% of Americans searched for jobs on the internet and about 45% of them applied for a job online (Maurer, 2015). Since digital resources are becoming increasingly popular among

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Americans searching and applying for jobs, several job search platforms have expanded their databases by integrating the latest technology trends and enhancing their website features (Wanberg et al., 2020).

It is reported that Indeed.com is used widely by more than 200 million people searching for jobs per month (Indeed Editorial Team, 2017). As one of the meta-search engines, Indeed.com includes thousands of job boards, classified listings, newspapers, and other sources (Sundaram, 2011). The comparative statistics of job search engines in 2016 showed that Indeed.com ranked as one of the major job search websites in the U.S. because it delivered 65% of all hires made in the United States in 2017, which was more than double other top- brand online job portals (SilkRoad, 2017). Therefore, we examined the usability of Indeed.com to explore the effectiveness of the website in searching for jobs and whether users were satisfied with the learnability and usability of the website. Although online job search engines were serving as a medium for the job-seeking process even before the pandemic, the usability of job search engines has not been well examined. To date, there is a lack of research evaluating user satisfaction when interacting with job search engines. Therefore, it is critical to assess the effectiveness and efficiency of these tools for people searching for jobs because job search engines help job seekers find positions that best fit their qualifications.

Literature Review

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%).

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

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.

Shahbazi and Hedayati (2016) examined the usability features of the Indeed.com website regarding the content of the job advertisements for the "Digital Librarian" position through a qualitative study that involved content analysis of 596 job advertisements from 10 countries. They identified four popular job categories, namely IT librarian (38%), digital librarian (36%), metadata librarian (17%), and digital archivist (9%). Based on their findings, Shahbazi and Hedayati (2016) reported the usability of the Indeed.com website in identifying the necessary skills expected from a digital librarian, such as good communication and problem-solving skills to work with library visitors.

In Rong's (2019) study, four expert evaluators tested the usability of three job search sites: Monster.com, Indeed.com, and Glassdoor.com, which have been consistently ranked in the top ten job portals in the last three decades. To assess the usability of those websites, experts used traditional heuristic evaluation and then new specialized heuristic evaluation methods (Rong, 2019). By deploying such methods, many critical usability problems were identified, such as a lack of options to set up a website account for job applications at any time and the ability save, edit, or delete their information or documents before submitting.

Although studies on online job search portals have examined the usability of the websites by applying different methodologies, there is still a lack of research that assesses job search engines using standard usability surveys. Usability testing of websites through valid and reliable surveys is important and, as Lazar and Preece (2002) explained, usability testing can improve the interactive nature of websites, their effectiveness, and ease of using them from the user's perspective. Moreover, usability testing of a website provides the owners of those portals with direct feedback for making improvements (D'Silva, 2020). These improvements were especially important during the outbreak of the coronavirus pandemic because there was an increased need for online job search engines due to unemployment in the United States hitting 16% or higher since the onset of the pandemic (Kochhar, 2020). This study fills the gap by measuring the effectiveness, efficiency, and subjective satisfaction of users of a leading job search engine, Indeed.com, in the midst of the COVID-19 global pandemic.

Theoretical Framework: Usability Construct of System Acceptability Model

Since the 1980s, human-computer interaction (HCI) has been a successful field because it effectively integrates software engineering and the human factors of computing systems through the concepts and/or methods of cognitive science (Hartson & Pyla, 2012). The term “usability” emerged in the field of HCI in the 1990s (Ghasemifard et al., 2015; Hartson & Pyla, 2012; Moreno-Ger et al., 2012; Tractinsky, 2018).

Usability has become one of the most vital subjects of both HCI research and practice because it denotes a desired quality of interactive systems and/or products (Tractinsky, 2018). However, to assess the benefit of usability to HCI, the meaning of this concept should be well understood (Hartson & Pyla, 2012). The International Organization for Standardization (9241-11) defines usability as “the extent to which a product can be used by specified users to achieve specific goals with effectiveness, efficiency and satisfaction in a specified context of use” (Barnum, 2011, p. 11). Since usability draws from different properties of the product to be tested, it serves as an umbrella construct and a building block for developing a testable theory on usability (Stage, 2018; Tractinsky, 2018). Additionally, this construct serves as a basis for scientific or practical measurements of a system or a product (Tractinsky, 2018). However, the concept of usability alone cannot serve as a tenet that can form a foundation of the usability theory (Stage, 2018). This is because despite its intensive use in HCI research over many years, the potential of usability to form a theory is not well examined (Stage, 2018; Tractinsky, 2018). In the field of human-computer interaction, the practical acceptability of any system, especially its usability, is very important (Nielsen, 1993; Stage, 2018). Thus, this model fits this study because, from the perspective of usability engineering, the usability attribute of the model is vital as it combines diverse methods (easiness, efficiency, memorability, and satisfaction) that are designed to improve the design, development, and evaluation of systems (Nielsen, 1993).

Purpose of the Study and Research Questions

The purpose of this study was to evaluate users’ experience with the Indeed.com website. The following research questions guided this study:

1. To what extent do the participants effectively complete pre-defined tasks on Indeed.com?
2. To what extent do the participants efficiently complete the pre-defined tasks on Indeed.com?
3. To what extent are the participants satisfied with Indeed.com?

Researchers’ Positionality

This research project was designed by a diverse team of researchers with backgrounds in educational technology, research and assessment, instructional design, and user experience (UX). The research team was supervised by a professor because during the research process, three of the team members were completing their doctoral degrees during the research process. As researchers, we participated in UX studies designed by other professionals and conducted additional research projects separate from this current one while the current research project was underway.

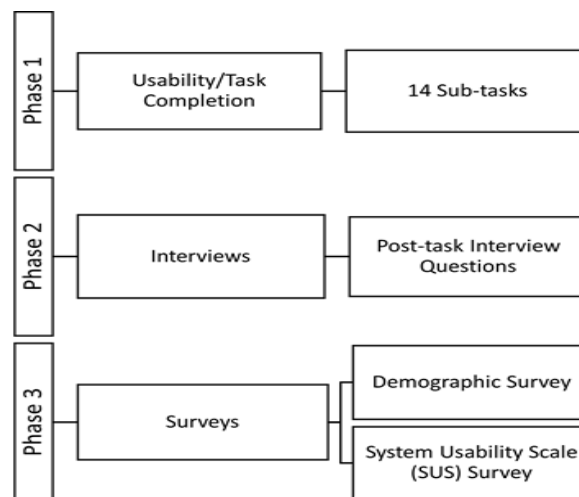
When searching for jobs in our respective fields, we have also used many job search engines. In using those portals, we noticed some issues, such as their navigation and unintuitive features. This fact prompted us to evaluate those engines to enhance their usability for other users.

Our educational background and experiences influenced the decision to use a mixed-methods approach, which allowed for a more detailed account of the research process. Our diverse backgrounds brought unique perspectives to the research process and reinforced the study’s credibility (Porteli, 2008; Surmiak, 2020). Our experiences of working with diverse learners in different educational settings were also beneficial in promoting the researchers’ cognizance of different abilities of individual learners.

Methodology

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



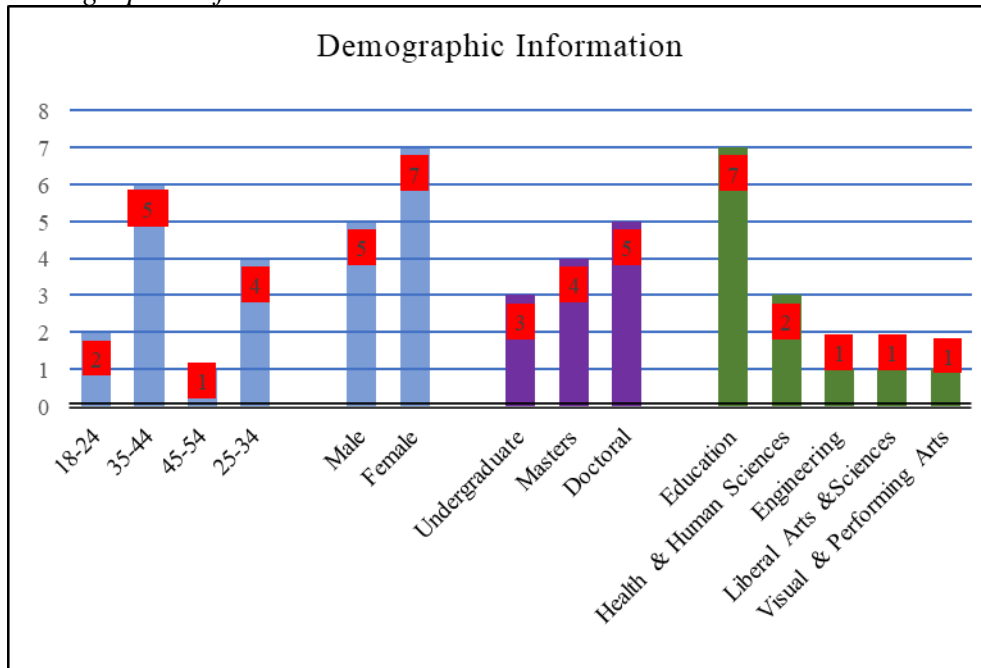
Institutional Review Board (IRB) approval was sought prior to conducting this study to ensure the human participants’ rights, wellbeing, and welfare were protected. IRB approval was obtained on October 22, 2020.

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 male (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.

Results of Quantitative Data

The task completion success rate (effectiveness), task completion time (efficiency), and the survey on satisfaction/dissatisfaction yielded quantitative data. Responses to the post-task interview questions yielded qualitative data. The data were analyzed in relation to each research question (RQ) and the pertinent results are presented accordingly.

RQ1: To what extent do the participants effectively complete predefined tasks on Indeed.com?

To measure the effectiveness of the system, the success scores of the participants on task completion were assessed using a “1” and “0” scale, where 1 indicated success and 0 indicated failure (see Table 1).

Table 1
System Effectiveness

Student #	T1	T2	T3	T4	T5	T6	T7	T8	T9	T10	T11	T12	T13	T14	Mean Completion Rate (%)
S1	1	1	1	1	1	1	1	1	0	0	0	0	1	1	71
S2	1	1	1	1	1	1	1	1	0	1	0	1	1	1	85
S3	1	1	1	0	1	1	1	1	1	1	1	1	1	1	93
S4	1	1	1	1	1	1	1	1	1	1	1	1	1	1	100
S5	1	0	0	1	1	1	1	1	0	0	0	0	1	1	57
S6	1	1	1	1	1	1	1	1	1	1	1	1	1	1	100
S7	1	1	1	1	1	1	1	1	1	1	0	1	1	1	93
S8	1	0	0	1	1	1	1	1	1	1	1	1	1	1	86
S9	1	1	1	0	1	1	0	1	1	1	0	1	1	1	85
S10	1	1	1	1	1	1	0	1	1	1	1	1	1	1	93
S11	1	1	1	1	1	1	1	1	1	1	1	1	1	1	100
S12	1	1	1	1	0	1	0	1	1	1	0	1	1	0	71
Mean Total Score	12	10	10	10	11	12	9	12	9	10	6	10	12	11	86

Note. 1 indicates success; 0 indicates failure.

As it is seen in the findings, the success rate of all tasks was overall high (86%). However, some tasks, such as T2 (sign-in to Indeed.com), created confusion for some users (11 out of 12) as they struggled to locate information. Specifically, seeing only the email address and password spaces, the users mistakenly assumed that they could sign in by entering the password associated with their Gmail accounts. They failed to see the text “*New to Indeed?*” and “Create an account” because that information was below all other prompts for the sign-in process. Due to their confusion with the sign-in process, they recommended placing that information after the “sign-in” tab.

RQ2: To what extent do the participants efficiently complete the predefined tasks on Indeed.com?

The participants were given an unlimited time to complete each task. To measure the efficiency scores, the researchers used cell phones to keep the time from beginning of the task to the end. This method helped measure the exact time spent completing each task. Table 2 presents the amount of time spent by each participant.

RQ3: To what extent are the participants satisfied with Indeed.com?

The total score of the SUS was calculated through the formula developed by Brooke (1996). To calculate the SUS scores, statistical analysis was performed in an Excel spreadsheet. The calculated values through the built-in formula yielded the SUS, usability, and learnability scores for each participant as well as the overall mean for all participants (in bold). The obtained scores are presented in Table 3.

In our study, the satisfaction score for Indeed.com was ($M=75$), meaning the Indeed.com website was assessed as over the industry average of 68 (Demir et al., 2012). Since our study reported the mean SUS score of 75, it corresponds to letter grade B, a curved grading scale for the SUS that was developed by Sauro (2011) where the highest and lowest 15 percentile points correspond to the A and F ranges, respectively.

In addition to calculating the SUS score with Brooke’s (1996) formula, we also calculated the Cronbach’s alpha to test the reliability of the 10 items of the survey in assessing the usability of the Indeed.com website. Before obtaining the Cronbach’s alpha of the test items, the negatively worded items of the SUS (items 2, 4, 6, 8, and 10) were recoded. After that, we ran the test and the Cronbach’s alpha value obtained for SUS was ($\alpha = 0.89$).

Table 2
System Efficiency

Student #	T1	T2	T3	T4	T5	T6	T7	T8	T9	T10	T11	T12	T13	T14	Total time
S1	0:30	0:30	1:17	2:06	0:26	0:30	0:27	0:40	3:36	5:04	2:05	2:00	0:48	1:22	21:21
S2	0:30	0:31	2:09	2:33	0:29	0:20	2:02	2:11	1:58	0:33	4:26	2:04	0:28	3:02	23:16
S3	0:11	0:00	1:00	2:19	2:07	0:14	2:09	0:06	1:09	1:01	0:18	3:30	1:08	0:44	15:56
S4	0:10	0:00	1:36	0:12	0:06	0:12	1:00	0:10	0:25	0:40	0:53	0:42	0:10	0:32	6:48
S5	0:10	0:20	4:00	1:10	0:10	0:08	2:30	0:10	2:10	4:00	1:25	2:00	1:00	1:00	20:13
S6	0:05	2:00	0:00	0:32	0:04	0:07	0:18	0:03	0:20	0:05	0:03	0:20	0:15	0:36	4:48
S7	0:05	0:25	0:00	1:20	0:07	0:05	0:06	0:11	0:55	0:30	1:33	0:42	0:17	0:03	6:19
S8	0:10	2:00	2:10	0:22	0:05	0:17	0:05	0:05	0:18	0:33	0:50	1:16	0:25	0:03	8:39
S9	0:12	0:10	1:05	3:00	0:34	0:14	0:50	0:10	0:30	0:20	2:00	1:15	0:25	2:00	12:45
S10	0:12	0:10	1:09	0:49	0:11	0:32	0:37	0:10	0:40	0:19	0:30	0:28	1:43	0:15	7:45
S11	0:20	0:10	0:05	1:04	0:20	0:30	0:21	0:35	0:09	0:22	0:18	1:00	1:10	0:10	6:34
S12	0:30	0:45	1:37	2:05	1:31	2:00	1:55	1:07	1:10	0	1:12	0:50	1:13	1:47	17:42
Average	0:15	0:35	1:20	1:27	0:30	0:25	1:01	0:28	1:06	1:07	1:17	1:20	0:45	0:57	12:40

Note. Task Completion Time, mm:ss.

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

Findings from Qualitative Data

At the end of the SUS survey, the participants were given an opportunity to add any suggestions or concerns about Indeed.com by answering item 11, an open-ended question. Only seven students answered the open-ended question, and six of the seven stated they were able to find what they are looking for on the website. We thematically analyzed the open-ended responses to item 11 together with participants’ responses to the post-task interview questions that sought participants’ opinions about their experiences when interacting with Indeed.com. Three major themes emerged: (1) wealth of information, (2) navigation, and (3) learnability.

Wealth of Information

The major findings from the data revealed that novice users of Indeed.com liked the wealth of information when searching for jobs because the website generated jobs most relevant to their field. Typical comments were positive; for example, Jessica shared, “The website has adequate information because I was able to find information I am looking for.” The participants also liked the availability of additional information such as annual salary for the jobs and best companies in their fields as well as finding information about the highest paying cities for their professions.

Navigation Problems

Although the participants liked the wealth of information on the website, they did not like the limited number of tabs on the main menu of the website. They would have preferred more tabs to search for specific information, such as annual salary. The participants also noted that the website was not user-friendly enough because some tasks made them think for at least 3-5 minutes. Therefore, they made several recommendations for improving the usability of the website. For example, Jasmin stated, “Adding a virtual chat assistant would be better.” Navigation problems were observed during the think-aloud process as well because the participants frequently expressed their frustration during the task completion session. Particularly, they expressed their anxiety with the sign-in process (Task 2). Completing Task

4 was difficult as well because at least eight participants struggled to locate the salary tab on the website.

Learnability and Other Issues

Some participants noted the Indeed.com website had an unintuitive interface and features, which meant it was not easily learned by novice users. For example, Atiya noted, “This website was somewhat difficult for novice users. They need a long time to be able to use and find information.” One of the experienced users noted, “A very ineffective recruitment website. I also use it as an employer and the turn-out is very low quality despite its popularity.”

Trustworthiness

To increase trustworthiness of the data, we utilized data triangulation and investigator triangulation (Guion et al., 2011). For data triangulation, we compared the findings from qualitative and quantitative data. First, we extracted the responses from post-task interview questions that were related to learnability and usability of the website and then compared them to the mean scores, the average time spent to complete the task, and the overall SUS score. This process helped us support the findings from qualitative data where participants reported that the Indeed.com website had learnability issues.

As for the investigator triangulation, each of the researchers carefully examined the textual data from interviews. Developing a procedure for conducting thematic analysis helped us to meet the trustworthiness criteria (Lincoln & Guba, 1985). This process helped us develop a deeper understanding of the data and reach consensus on analyzing the data. Thus, both types of triangulations helped enhance the trustworthiness of this research.

Reliability and Validity of SUS

The standard questionnaires differ from other surveys due to the scientific validation that has been applied to them (Gronier & Baudet, 2021). This validation is mainly based on two psychometric measurements: validity and reliability (Drost, 2011). Reliability refers to the overall consistency of a measurement tool (Gronier & Baudet, 2021). Calculating the coefficient alpha of the SUS is an accepted method for measuring reliability of this survey (Sauro & Lewis, 2016). Extant research (e.g., Sauro, 2011; Sauro & Lewis, 2016) on SUS reports that the Cronbach’s alpha values should be at least 0.80 to be reliable. In our study, Cronbach’s alpha value was at a high level, 0.89. An acceptable level of reliability of SUS showed consistency with previous research reliability (Sauro & Lewis, 2016; Tullis & Stetson, 2004) that utilized SUS to assess website or system usability. This score also supports Sauro’s (2011) study results, which reported that the reliability of the SUS scale items could be 0.80 or higher even with a smaller sample size.

“Validity refers to the meaning of the research components” (Drost, 2011, p.114). In our study, the items of SUS were valid because the items of the survey measured what they purported to measure, i.e., the survey items assessed the learnability and usability of the Indeed.com website. The overall SUS score in this study was 75, supporting of the validity of the SUS items in collecting subjective usability ratings. This result is consistent with relevant research (e.g., Bangor et al., 2008; Lewis & Sauro, 2018) that provided evidence of the validity of the SUS’s 7-point objective rating questions for an overall rating of “user friendliness.”

Limitations

There are few limitations inherent to this case study. First, there was a small sample size of 12 people. Although relevant studies indicated that a sample size of 12 people is good for conducting usability studies (e.g., Lewis & Sauro, 2018; Tullis & Stetson, 2004), a larger sample may have produced better outcomes. Second, the sample was drawn from participants from only one institution. In future studies, participants from different higher education institutions should be selected to have more diversity. Third, eight participants were novice users; only four had some familiarity with using similar job search engines. Future research could recruit participants with different experiences of using job search portals. Fourth, to test the reliability of the SUS to measure usability of the Indeed.com website, the overall coefficient alpha was calculated with all factors included. Future studies should clarify the relationship between usability and learnability factors within the SUS. This will allow one to obtain more information from the SUS data with minimal effort.

Discussion

The system acceptability model was used as the theoretical framework for this study. In this model, usability is defined as a multi-dimensional construct, as it has five quality components: learnability, efficiency, memorability, error free, and satisfaction (Nielsen, 1993). The usability construct of the model entailed using diverse methodologies to measure each attribute of usability. Using both qualitative and quantitative methods for usability testing also enhanced the robustness of the findings. Effectiveness of the website was measured using two metrics: task completion rate and the number of errors. Previous studies (e.g., Al-Kinani et al., 2020; Huang, 2020; Majrashi et al., 2020) also reported the benefits of task completion for measuring the effectiveness of the website by identifying the number of errors produced when completing the tasks.

Findings from qualitative data revealed the participants had an overall favorable attitude toward the website because they underscored the wealth of available information. Nielsen (1993) recommended that subjectively pleasing elements within the usability construct can be measured by simply asking the users' subjective opinions about their experiences with the website. In this regard, our findings from the post-task interviews revealed the subjective opinions of the users were positive as they were satisfied with their experiences. This finding is consistent with Lin's (2010) study, which found that job-search website users had a positive experience when they could easily retrieve jobs in their field, highlighting the easiness of searching for jobs.

Findings from our quantitative data revealed that 144 out of 168 tasks were completed by the 12 participants, failing only 24 tasks (14.2%). The mean of the task completion scores was 86%, showing the effectiveness of the system for searching for information. This score supports the usefulness of the metrics because Nielsen's (1993) usability construct indicates the system should be easy to learn, which aligns with having only a few errors when interacting with a system. This score exceeds average scores reported in Majrashi et al.'s (2020) study; the task completion rate varied between 50% and 70%, meaning that users could complete their tasks effectively in tested platforms.

To measure efficiency, the task execution time was calculated. Efficiency results revealed the participants completed all the tasks in an average of 12:40 minutes. The task completion time per task ranged from 0:15 seconds to 0:57 seconds. The longest time spent for completion of all tasks was 21:21 minutes, and the shortest time for task completion was 6:48 minutes. Some participants spent more time than the average, and a better design would help shorten the task completion time. From a usability point of view, Nielsen (1993) underscores

that the system should be efficient to use; however, the longest period of time (21 min 21 sec) for completing the tasks revealed that the Indeed.com website might be challenging for some novice users. Only a few usability studies (e.g., Majrashi et al., 2020; Mehra et al., 2019) reported task execution time range, stating that those results were vital for performance metrics of a website. Drawing a parallel with those studies' recommendations, our study's results also suggest that the efficiency of the Indeed.com website could be improved, which would result in less time for performing tasks.

For this study, we measured user satisfaction implementing the standard SUS survey. The overall mean SUS score was 75 (see Table 3), which is above the industry-accepted average score of 68. Since the overall SUS score in our study was 75, it can be concluded that the participants were satisfied with the Indeed.com website. However, the Indeed.com website needs improvement because a few critical tasks (e.g., finding average annual salary, top companies, highest paying cities) were not completed by some participants. Even though the website was deemed as good in this study, the usability and learnability aspects of the website need some improvements to increase the SUS score. Other usability studies (e.g., Osada et al., 2020; Vlachogianni & Tselios, 2021) that utilized SUS also reported the usability and learnability aspects of websites or systems need some improvements to increase the SUS scores. Lewis and Sauro (2018) argued that systems need to achieve a SUS of 80 as evidence of an above-average user experience.

Findings from the qualitative data also revealed the participants were satisfied with the wealth and quality of information on jobs. This finding contradicts Cho and Hyun's (2016) study that examined job-search behavior of full-time and part-time users (novice users) of online job portals. In their study, full-time job explorers perceived value from the quality of information, while part-time job explorers appreciated the aesthetic dimensions of the websites. Our study's findings contradicted Cho and Hyun's (2016) study because the novice users appreciated the wealth of information on the website but were dissatisfied with the unintuitive design of the website as it prevented them from locating information quickly. They stated they had to click many times to access certain information. Therefore, they suggested improvement in the usability of the website, such as having more tabs for retrieving information easily.

Conclusions and Implications for Future Research

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. Based on our findings, we offer following recommendations for future research in usability studies:

- Conduct usability studies on job search engines with a larger sample size, recruiting both novice and expert users.
- Develop appropriate tasks based on the level of users because novice users may struggle in completing tasks, thereby decreasing the effectiveness and efficiency of the system.
- Utilize other validated psychometric evaluation questionnaires to assess the usability of systems or websites as they yield more valid data to measure usability.

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