

Project Phase 4:
Evaluation

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Introduction

Every day in the city of Atlanta, thousands of homeless people wander the streets searching for sustenance. These poverty-stricken individuals are often in need of help, and many of them have simply given up. According to recent surveys, there is a high rate of turnover in the homeless population, with many individuals finding themselves homeless who have never been in this situation before (Pathways, 2005, pp. 18-19). Others are simply new to the city, and they do not know the resources that are available in Atlanta. Regardless of circumstance, these itinerant people could all use a helping hand.

In 2005, a survey revealed that more than half of the homeless people in Atlanta have no steady income (Pathways, 2005, p. 26). Furthermore, there are nearly 7,000 homeless people in the city, resulting in an estimated 4,000 people without jobs (Pathways, 2005, p. 9). Of the exact same group of people, almost two thirds cited “Economic Issues” as the primary cause of their situation (Pathways, 2005, p. 21). All of these facts and more demonstrate a great need for gainful employment among the homeless population.

Homeless people often have great difficulty finding jobs that are worth keeping. Word of mouth and newspaper listings simply haven’t matched the right jobs with the right people. On-location kiosks have failed for a number of reasons, including poor design and usability. Others, such as paper applications at fast-food restaurants are difficult to reach for those who have no transportation. The existing internet job services tend to target middle-class white collar jobs which are often beyond the reach of homeless people. Clearly, the current methods for seeking jobs are not working properly. Through careful research and great effort, we have found a better way.

We propose the Career Gateway as a solution to this problem. Through months of investigation, planning, and hard work, we ultimately built a prototype to test our proposal. Finally, we carried our system into the field and tested it with the help of live users. This report summarizes the previous phases of the project, and it finishes by fully describing the evaluation phase of the Career Gateway.

Previous Phases of the Project

Phase 1: Understanding the Problem

During the first phase of this project, we investigated the homeless population and examined their areas of greatest need. We spoke with many subject matter experts, including staff-members of Saint Mark United Methodist Church and The EDGE. Furthermore, we read several important papers on the subject of homelessness and consulted with multiple different homeless individuals. Throughout our research, we were able to determine that homeless people have two categories of needs: “basic” needs (such as food, clothing, and shelter), and improvements in the “quality of life” (such as communication with friends and family, rehabilitation, and gainful employment). As a result of our investigation, we were able to determine several key factors in building a solution for homeless people. First, we must always consider the impact of any solution not only on the homeless population, but also on the service providers and the general public. It is very important that we deploy our solution in such a way that homeless people are neither damaged nor further disenfranchised, and we must be certain that our actions will not be destructive to public goodwill. Furthermore, we found that many homeless people have access to mobile phones and (to our great surprise) that there are computer labs available to poverty-stricken people both in public libraries and other locations throughout the city of Atlanta. According to the Homeless Survey Report, “roughly three-fourths of the homeless surveyed in 2005 had a high school education or better” (Pathways, 2005, p. 7). This information provided us with some distribution channels that we had not anticipated. Finally, there were several other key factors that we determined throughout the first phase, including environmental requirements (such as weather), time constraints, very limited funds, and the services already being provided.

All of these findings helped us to determine some basic usability criteria by which we needed to develop and test our final design. For any system we deployed, it must be easy to learn and remember, and it should be accessible to as many users as possible (including those with physical or mental disabilities). Furthermore, we needed to develop a tool that was easy to reach from any location, and this fact encouraged us to consider solutions that are durable and portable.

Phase 2: Design Alternatives

Based on our findings during Phase 1, we developed several plausible design alternatives. Some of these ideas were scrapped in favor of others, and we moved forward with three alternatives that would provide the greatest benefit to homeless people. These three designs were very different from one another, but they had a common thread. The ideas that we proposed were all based on the different “phases” of homeless life. The first idea (Hitchhiker’s Guide for the Homeless) provided useful information to anyone who is new to being homeless, or even a homeless person who is new to the city of Atlanta. The second design (Pod Home) provided shelter to anyone who has exhausted their “couch-surfing” options with friends and family. The final option (Career Gateway) was aimed toward someone who wishes to rejoin the labor force and transition back into a permanent-home situation. Although we could only choose one design as our solution for this project, we were confident that any of these alternatives would provide a great deal of help to the homeless people of Atlanta.

In order to get feedback from other students and teachers, we made a poster to display our ideas. On October 5, 2007, we participated in an open poster session where we displayed our three design alternatives. Much to our delight, we received a great number of comments and suggestions which helped us decide which design to pursue. Although it received a great deal of interest and positive feedback from viewers, the Pod Home was not chosen as our final project. We discussed multiple ways

in which a capsule shelter could be prototyped, from cardboard mockups to CAD sketches to computer simulations. Unfortunately, the Pod Home was more of an industrial design problem than the other two alternatives, and it largely fell outside the scope of Human-Computer Interaction. We were very pleased that both of our other designs received largely positive feedback as well. While the Pod Home was certainly an interesting prospect, we had put much more effort and time into developing the ideas behind the Hitchhiker's Guide for the Homeless and the Career Gateway. We felt that either of these solutions could be immensely successful, and we had a hard time choosing between the two of them. Some of our reviewers at the poster session recommended that we combine the two ideas into a single system. We considered this prospect, but we ultimately decided against it. We wanted to make sure that whatever solution we deployed performed all of its functions very well, and we felt that this would be far more likely if we focused on a single design with a more limited domain.

Phase 3: System Prototype and Evaluation Plan

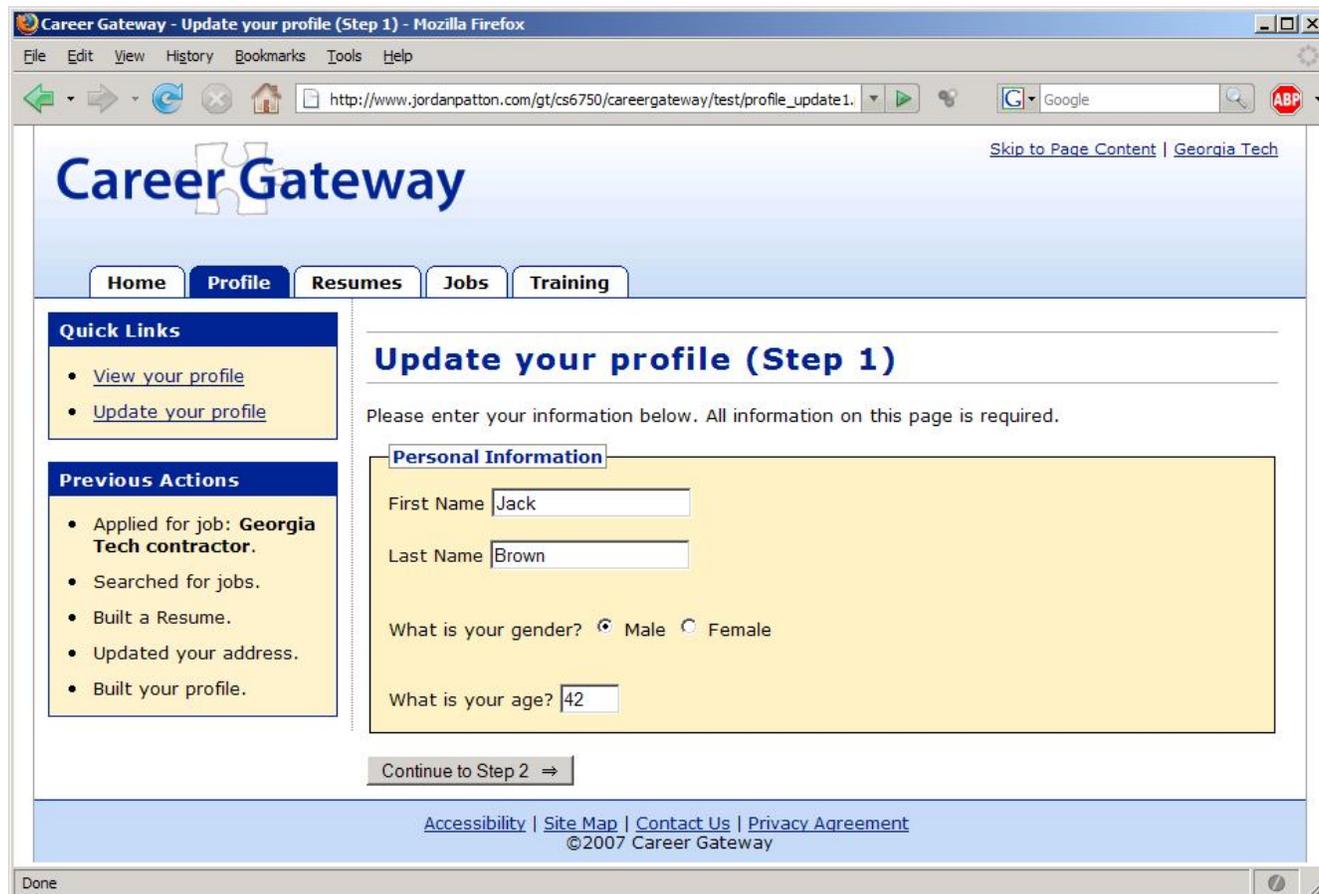
After much thought and debate, we opted to build the Career Gateway. For several months, we planned and worked hard to build a system that would provide several career services to homeless people. Furthermore, we wanted to help level the playing field for underprivileged job seekers. For far too long, homeless people have been at a great disadvantage for reasons such as transportation, training, and computer literacy. While the Career Gateway cannot immediately resolve these issues, it can help to ameliorate them by providing alternate ways to seek jobs. The system we built will provide multiple services, including an automated resume-builder and a targeted job search. The advantages do not stop there, however; the Career Gateway will provide training modules to help homeless people improve their skill sets. In future versions, the system will suggest links to outside information sources so that users can seek additional training in whatever area they desire.

We chose to design this system for many reasons. Of all the competing designs, the Career Gateway proved to be the best from any angle. First, the greatest immediate need called for a career system. Of all of the other ideas we could have built, the Career Gateway had the greatest potential to help the most people. Second, this design was the most feasible of all. Not only are similar systems already in place for other demographics, but they have also succeeded from a financial standpoint (making this system an easier "sell" for city governments). Finally, the intended audience for this system was readily available for testing and implementation. With thousands of homeless people in the Atlanta area, the Career Gateway already had a huge group of potential testers and end-users.

We built a prototype of the Career Gateway, which we chose to implement as a dynamic website. The information is presented to the user with standards-compliant XHTML. Furthermore, the presentation aspects of the website are controlled by Cascading Style Sheets. Using this combination of technologies, the website was made available to an extremely large audience – anyone who can access the internet. Also, a great deal of work was performed to ensure universal access, such as complying with the Web Content Accessibility Guidelines 1.0 (W3C, 1999). The Career Gateway utilizes a server-side scripting language (PHP) to hold the pages as templates. This allows for a very consistent "look and feel" all throughout the website. Furthermore, the use of PHP means that most changes made to the website will automatically perpetuate to all pages; this means fewer errors and bugs to track down. For the purposes of this prototype, we opted to use global PHP variables to emulate a relational database. In a real implementation, the website would be built with a full database backend, but time did not allow for this feature. Using the pseudo-database, however, we were able to store all of the user-specific information in a single location, which could then be edited to present multiple different user experiences. (To see an example of the Career Gateway, please refer to

Figure 1 or view the live prototype at <http://careergateway.jordanpatton.com>.)

Figure 1: Screenshot of the Career Gateway



During Phase 3, we also developed a plan for evaluating our prototype. In order to test this system, we built a list of usability requirements. We sought to ease the learning curve for all users, and we wanted to help our intended audience feel comfortable by providing natural dialogs in a question and answer format. At the same time, we wanted the users to feel that they were “in control” of the situation, and that they need not fear that the system would do anything without their permission. Finally, we wanted the users to be able to accomplish their tasks as they saw fit, and we wanted them to know that the Career Gateway would catch their mistakes and recover gracefully.

In order to aid in testing, we built three scenarios to evaluate different user experiences. Each of these roles provided the tester with a different “identity”, including a name, background, purpose, and all of the relevant information. Using these scenarios, our research participants would be able to protect their own personal information. Furthermore, using an “assumed identity” would encourage the testers to evaluate the system without fear of giving away their vital information to any observers. We believed that test scenarios would help our users feel more comfortable exploring the system and learning about it, rather than just carrying out the tasks as they were told.

Finally, we planned for our users to provide multiple forms of feedback as they evaluated the Career Gateway. First of all, we wanted to get their candid thoughts as they used the system. We planned to

have them “think out loud” as they used it and ask as many questions as they wished. Secondly, we decided to use a survey with multiple questions and a Likert scale for the responses. This would allow us to gather quantitative data about specific features, dimensions, and potential problems with our system. Finally, we planned to ask the evaluators to write down their comments on any specific items they found particularly confusing or helpful. This would give us the qualitative data we needed to fix further problems, and it would likely provide us with ideas for features that we had not yet considered. After months of planning, building, and preparing, we were finally ready to evaluate the Career Gateway.

Evaluation Method

Criteria

Our interactions with the homeless population and their supporters during Phase 1 and our design space exploration in Phase 2 helped us to establish the goals we wanted to achieve and the qualities we wished to promote with the Career Gateway. In the Phase 3 report, we established several functional requirements by which we would judge the results of the prototype evaluation. These requirements included such things as successfully managing the user's information and helping the user locate relevant jobs and employment opportunities. Other criteria included preparing material for job applications and developing skills and locating services that would assist in finding a job. All of these requirements were successfully met due to the Career Gateway's core functionality. The Profile, Resumes, Jobs, and Training sections of the website all provide solutions for these criteria.

We also planned to evaluate the Career Gateway by a set of accessibility criteria. These requirements would ensure that the widest possible audience would be able to access our website. Accordingly, we built and tested our website thoroughly using the WCAG 1.0, and we were able to achieve compliance with both Priority 1 and Priority 2 of the guidelines (W3C, 1999). We felt that universal access was a crucial consideration, as many homeless people have disabilities that might otherwise preclude them from using the Career Gateway. By sticking to our accessibility criteria, we have ensured that this will not be an issue.

Finally, we planned to assess the usability of our website according to a number of usability criteria. As our list of objectives, we chose to use the principles established by Dix, Finlay, Abowd, and Beale (DFAB, 2005, p. 260). First, we wanted to assess the Learnability of our interface, which includes such things as familiarity, generalizability, and consistency. This criterion largely examines how easy it is for a user to learn a new system and get better with it over time. Second, we wished to examine the Flexibility of the Career Gateway, which entails dialog initiative, task migratability, and substitutivity. This principle speaks about how well a system engages the user, and how successfully it passes control back and forth with the user. Finally, we planned to evaluate our website's Robustness along such dimensions as observability, recoverability, and task conformance. This criterion requires that the system provide sufficient feedback, handle and recover from errors, and perform all of the functionality as needed by the user.

Measurement

Our user testing was designed to assess the Career Gateway according to the criteria described above. The accessibility requirements were satisfied by diligent testing and retesting all throughout the design of the prototype. The functional requirements were completed by carefully selecting and implementing the functionality present in the prototype. The usability requirements, however, could only be accomplished through user testing. To this end, we conducted several tests with human subjects, and we observed and recorded their actions. Through direct observation, we were able to get a great deal of both qualitative and quantitative information. Furthermore, we used a screen-recording program so that we could later analyze the actions of our users. After completing the tasks, each user filled out a survey, which gave us some excellent numerical data. Finally, our participants completed a questionnaire, which provided us with qualitative data about the strengths and weaknesses of the Career Gateway. (Please refer to **Appendix A** for an example of our survey and **Appendix B** for a transcription of our questionnaire.)

Procedure

When preparing for user testing, we submitted a formal protocol to the Georgia Tech IRB (Institutional Review Board). It required several revisions and resubmissions, but we were eventually able to receive permission to conduct our study with human subjects. (This was particularly tricky, because our proposed subject pool – homeless people – constitutes a very “vulnerable” population.) As part of our IRB protocol submission, we included a description of our experimental procedure. We stuck to this plan, and it is explained as follows.

For the purposes of evaluation, we sought help from 10 to 15 human subjects. We formed a temporary partnership with a local service provider for homeless people (The EDGE) in order to recruit these subjects. The staff-members of this center regularly interact with homeless people who are seeking gainful employment. Furthermore, many of these people plan to do so with the aid of the service center’s computer lab, and this presented us with a unique opportunity. With this invaluable resource, we sought help from a truly “representative sample” of our intended user group.

On the days that we conducted evaluations, members of our team arrived at The Samaritan House (a partner of The EDGE) early in the morning (around 8:00 AM) to recruit potential subjects. We made it very clear that participants in our study would be compensated with one round-trip ticket to ride MARTA, whether they actually completed the study or not. We believe this compensation had a very positive impact on motivating individuals to participate in our study. Once a subject volunteered for the study, he was told where it would take place and assigned a 30-minute time slot between 1:00 pm and 4:00 pm of the same day. When all of the time slots were filled, the team members left The Samaritan House.

Later in the day, the entire team travelled to The Samaritan House to prepare for the evaluation sessions. Prior to 1:00 pm, we set up the hardware and software for testing, and we prepared all of the paper documents for informed consent, instruction, and evaluation. When a subject arrived at our meeting location, we explained the basics of our study. Next, we asked the participant to read and sign our Consent Form. Once this was complete, we assigned the user to one of our three test scenarios. In doing so, we provided the user with an instruction sheet that explained the tasks he was to perform, and it gave the details of the assigned scenario (name, goals, etc.). This sheet served as the “guide” for accomplishing the tasks, and it provided “dummy information” that the user could substitute, thereby protecting the user’s identity. When the subject completed these preparatory tasks, he was given the opportunity to ask any questions. After all questions had been answered to the participant’s satisfaction, we allowed him to begin the hands-on test.

The test began with the user sitting at the computer. All users were assigned to the same web browser, and it was already opened to the Career Gateway’s home page. The participant followed the instructions on his information sheet, and he continued until all tasks had been completed. If the user had any questions at any point, he was allowed to ask them. During the evaluation, the user was encouraged to “think out loud”, especially if he came upon any particularly good or bad points in the system. Using this free-form information technique, we were able to gather qualitative data about each user’s “knee-jerk” responses to problems that they encountered.

When the hands-on testing was complete (signaled by the completion of the final task), we provided the user with a feedback form. This document was a combination of Survey and Questionnaire, and we explained to the user that we would greatly appreciate their help in completing the form. (Once again, users could ask any questions they liked.) Finally, once the user had completed the feedback

form, we asked him if he would like us to answer any questions. Furthermore, if the user wanted a better explanation of the purpose or functionality of the Career Gateway, we were happy to provide it at this point. When the evaluator was sufficiently satisfied that his questions had been answered, we thanked him for his help, provided him with compensation, and he went on his way.

Tasks

The actual tasks assigned to each user varied slightly according to the three different scenarios. In general, they can be described as follows:

1. Update & Review your Profile

- Update your existing Profile.
- [Change one specific value of a single aspect of your Profile].
- When finished, review your Profile.

2. Create & Review a Resume

- Create a new Resume.
- The Resume should be focused on [a specific industry] jobs.
- When finished, review the Resume.
- (Note: the information listed on the actual resume is irrelevant, so don't worry about accuracy.)

3. Search & Apply for a new Job

- Search for a job in [a specific industry].
- Choose the job at [a specific employer]. (Find out more info.)
- Apply for this job.

We chose these tasks, because we feel that they accurately represent most of the major functionality of the website. Each of the three assignments uses a different major capability of the Career Gateway to accomplish a realistic goal. It is also important to note that we did not have users perform a training task for several reasons. First, a training session (on top of the other tasks) would have taken far too long, and it may have driven our users away. Second, we opted not to fully build the training section of the Career Gateway, due to the limitation of time.

The chosen tasks require the user to take advantage of many different features of the website. For example, the subject has to use both Global and Local navigation to find each one of the assigned tasks. Furthermore, the participant must learn and utilize the “stepped approach” in order to complete each of the three tasks. Other concepts such as searching versus browsing were encapsulated within the chosen tasks as well. Overall, we feel that these assignments give the user a good representation of the full functionality of the Career Gateway. (Please refer to **Appendix C** for screenshots of the actual tasks being completed.)

Participants

During the evaluation of the Career Gateway, we sought help from the Atlanta homeless population. We were delighted to receive a great deal of help from a number of homeless individuals, each of whom provided excellent feedback for our prototype. We worked with a local organization called “The

EDGE” which regularly provides free computer services to underprivileged people in Atlanta. This was an ideal matchup since the people with whom they put us in contact were already motivated and willing to look for jobs using computers. Unfortunately, during our testing we were unable to get as many users as we would have liked. Our first visit to the Samaritan House (a partner organization of The EDGE) went extremely well, and we received excellent input from five different users. We returned two days later for our scheduled time period, but there was a time conflict that precluded us from accessing their facilities or the users. Due to the already-constrained schedules of the Samaritan House, we were unable to return and conduct another user session. We considered using other evaluators, such as random people or students at Georgia Tech, but we ultimately decided against this course of action. While it was tempting to use more subjects simply to increase the sample size, we did not wish to skew the results of having tested it on a homeless population. It was very difficult to get approval from the IRB to test the Career Gateway with this population, and it was even more challenging to form a partnership with an organization that would allow us to do so. As a result, we wished to preserve the results of our findings from homeless users.

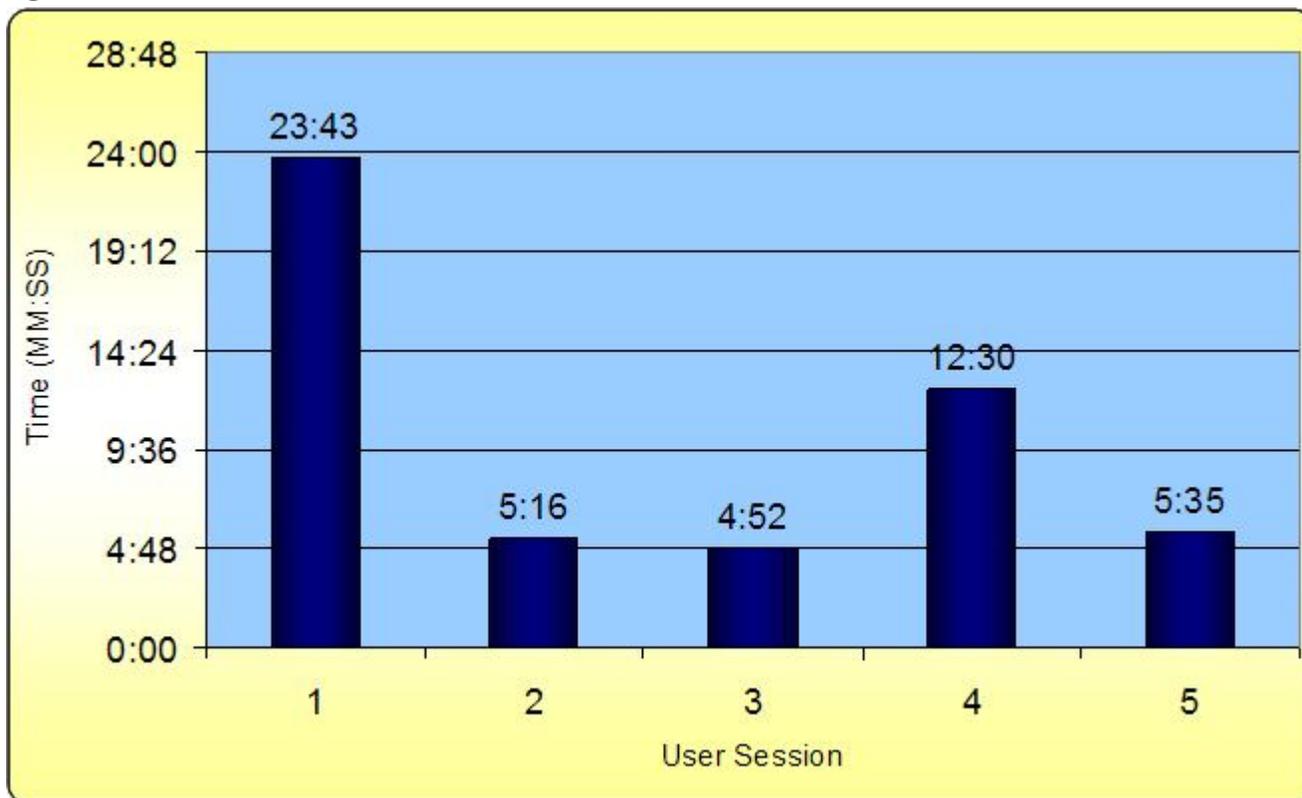
Accordingly, all of our users were homeless individuals who were ready and willing to seek a job. Furthermore, all of them were prepared to use a computer in order to accomplish this goal. One of the users had a great deal of previous experience with computers, three had limited experience, and one had no experience whatsoever. We were pleased to note that all of the users successfully completed the tasks that were given to them. Even the user with no prior experience was able to figure out the website and accomplish all of his assignments. We feel that the input provided by our users was extremely useful, and it provided us with excellent suggestions as to how we can improve the Career Gateway.

Results

Observation

During the evaluation of the Career Gateway, all of the user sessions were monitored by members of the project team. We directly observed all of the participants, and the users' facial expressions and body language provided excellent information about their feelings toward the system. Furthermore, we used screen-recording software to preserve the actions of the users for later review, and we took notes on the users' verbal responses to the Career Gateway. Overall, most of the participants had few major problems completing the assigned tasks. Every one of the subjects completed the entire evaluation, but the amount of time varied according to the subject. (Please see **Figure 2** below.)

Figure 2: Chart of the Evaluation Session Times



Reactions to the Career Gateway were mostly positive, and the feedback provided was quite useful. We became somewhat nervous when our first user stated that he had never used a computer before. After explaining how to use the mouse and keyboard and some of the conventions of the web, however, he had relatively little trouble navigating the system. In less than 24 minutes he had completed all three tasks. The next participant used a computer quite often, and he flew through the three assignments in a matter of only a few minutes. He seemed very excited about the Career Gateway and how much more efficient his job search might be with its use. The next three participants were very similar in that they had used a computer but not on a consistent basis. Furthermore, they only had limited knowledge of web conventions. Each one had a couple of difficulties that temporarily held them up, but they overcame them quickly and had little trouble moving forward with the Career Gateway.

It was somewhat difficult to get users to “think aloud” (we assume due to their comfort level), but users had no qualms about asking us questions when they felt stuck. We would be asked only a couple of questions by each user except for the first participant who had no computer experience. The majority of issues dealt with participants simply not seeing a link or misinterpreting the items on the screen that were clickable and those that were not. After we explained the issue to them, they had no troubles with the other sections. Judging from our observations on a mirrored screen, the learning curve seemed to be very low for our participants. Most of the problems appeared to stem from the subjects’ inexperience with the web and the accompanying lack of knowledge of web conventions. As such, many users were initially confused by the navigation system. For example, several users did not know where to look when trying to update their profiles. They understood the global navigation system fairly quickly (tabs across the top), but several users were initially confused by the local navigation options (list of links on the left-hand side). Furthermore, some users may have been a bit confused by the “stepped approach” to task completion. (In order to keep information “above the fold”, we divided user input forms into multiple steps.) At first, some of the users may not have understood this approach. Fortunately, once the users figured out the navigation system they didn’t have any further problems with it. The initial learning may have been a bit confusing, but the consistency of the navigation allowed users to recycle their knowledge of the system very effectively. Regardless, we see this as an opportunity to improve our design for users with no prior knowledge.

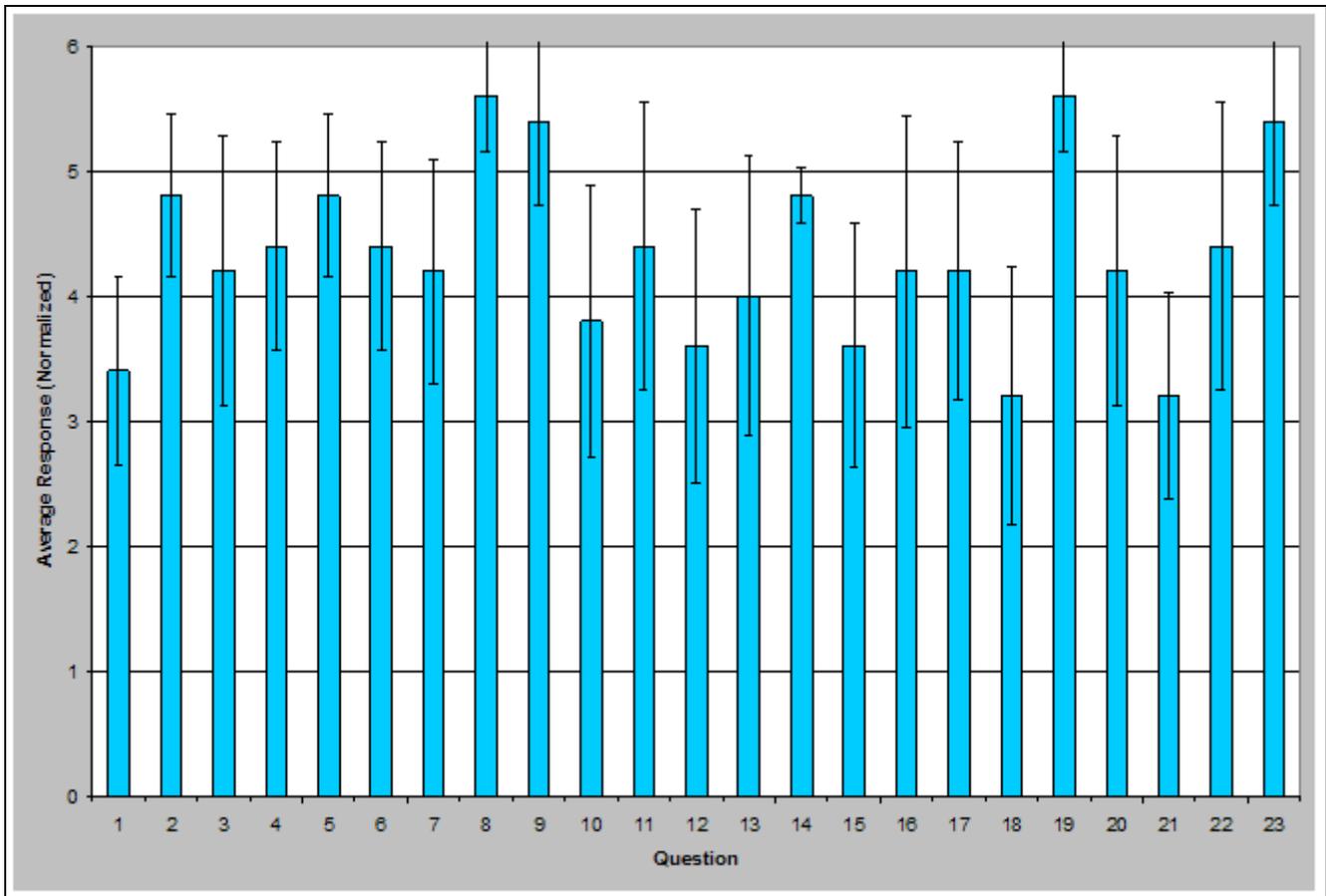
We were pleased to get users that represented multiple levels of computer familiarity. The participant with the most computer experience seemed the most excited about the Career Gateway, and he continuously asked when we would have the system live and available for real use. Other users seemed to like the system, and many felt it would be helpful. It is important to note, however, that they appeared to be a bit hesitant about switching to the Career Gateway. From their comments, both in-person and on the survey, it appeared that most users felt comfortable with their current way of doing things. It may be due to other variables, but the fact that the Career Gateway was a website seemed somewhat intimidating to some users. Again, this is a great opportunity for improving the website.

Overall, the in-person responses were largely positive. Most of our participants inquired when we would return with the real system. While they seemed a little afraid of the technology, they appeared to recognize the potential of the Career Gateway in aiding their job searches. We were very happy to receive such excellent help in testing our prototype. The participants proved extremely helpful to the evaluation of our system, and they provided us with a number of opportunities for improvement.

Survey

After completing the assigned tasks, each participant filled out a survey with 23 items. For each statement, the user provided a number between 1 and 6 that indicates whether he strongly disagrees (1) or strongly agrees (6) with the statement. Using this survey, we were able to analyze such things as the initial difficulty of the system, the level of user control, and the helpfulness of the website’s feedback. (See **Appendix A** for more information on the survey and calculation methods. In summary, we normalized the results so that higher scores on the survey indicate “positive responses” to aspects of the system, and lower scores represent “negative responses” to the same aspects.)

Figure 3: Chart of Survey Responses (Normalized Averages)



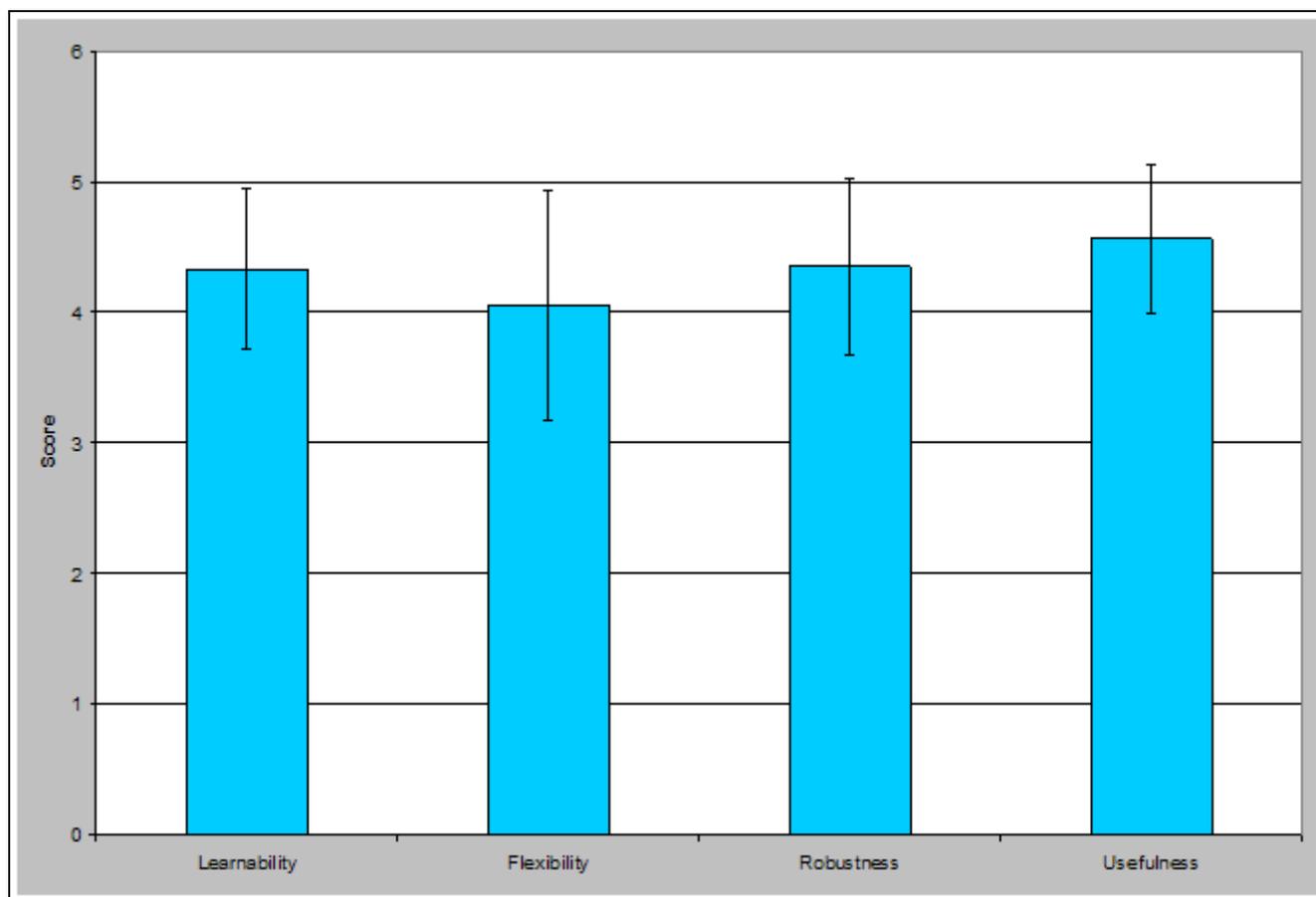
The responses to this survey provided invaluable data about the usability of the Career Gateway. For example, the first statement, “I found the system difficult to use in the beginning,” received a normalized score of 3.40. Further analysis reveals that some users had a hard time with the earlier tasks. With a score of 5.60, however, item number 8 reveals that most users “found the system easy to learn.”

Overall, the responses on the survey indicate very positive experiences with the Career Gateway. Of the 23 items reviewed, only 6 received normalized averages that were below a 4 (or 66.67%). These items revealed that some users had a hard time in the beginning (1), and they wanted a better set of instructions (15). Others felt that the Career Gateway did not give them enough control (12), and that there were “things [they] would have expected the system to do, but it did not” (21). Clearly, these responses indicate that different users of varying experience levels expect different things from the system. As such, it is important to note that **none** of the responses on the survey fell below a normalized average of 3 (or 50%).

In fact, most of the responses were very positive, giving 17 of the 23 items a normalized average of 4 or above (or 66.67%). 4 of the items even received a normalized average above 5 (or 83.33%). On these items, users indicated that they “found the system easy to learn” (8), and that if they “made a mistake, it was not hard to correct” (9). Furthermore, several participants felt that the Career Gateway made it much easier to perform some tasks than ever before (19), and most of them “could see [themselves] using the system again” (23). Given these responses, it is logical to conclude that users found the

website easy to learn, and once they understood how it worked they wanted to continue using it.

Figure 4: Chart of User-Centered Design Metrics



In order to better understand the different aspects of the system, we used another set of metrics. Each of the survey items was grouped under a larger category, and we were able to get average scores for Learnability, Flexibility, Robustness, and Usefulness. The first three of these are commonly used in Human-Computer Interaction as “guides” for the dimensions of usability (DFAB, 2005, p. 260). The last category, Usefulness, represents a value- and experience- based measurement of how applicable the system was to the user’s lives. In other words, this metric calculates how relevant the Career Gateway was to the individual user’s situation. As would be expected, this score was very high with a calculated value of 4.56 (or 76%). All of our users were already planning to use a computer to aid in their job search, and the metric simply reflects this situation.

Of the other three metrics, all of them scored above a 4 (out of 6 possible points). Learnability did very well with a value of 4.33 (or 72.17%). This score represents the very same attitudes discussed above regarding ease of learning. Flexibility did fairly well at 4.05 (or 67.5%), but a large standard deviation on this item indicates that different aspects of this metric varied greatly. Finally, the score for Robustness was the highest of these three with a value of 4.35 (or 72.5%). This was very important, because we wanted the users to be able to understand what the system was doing with their information at all times. Furthermore, we wanted them to feel safe to make mistakes so they would be

willing to explore and learn about their options. Overall, the Career Gateway surpassed our expectations of usability regarding this survey. We were pleasantly surprised to see that the participants had very positive attitudes in this section of the evaluation.

Questionnaire

The final form of feedback provided by our participants was a questionnaire. It contained 4 questions, each of which allowed the user to respond in a free form. Surprisingly, most users only responded with very positive comments. We are unsure if this is due to a very good experience, or perhaps because the users did not wish to write any more than was necessary. Either way, the written responses yield some excellent insights into the individual user experiences.

The very first user stated that he felt like “the system could have been [easier to use] the first time because a lot of people [have] never used a computer before.” He continues by stating that “as time went along I found it easy to use.” This indicates to us that many users may find the Career Gateway a bit confusing at first, but they are likely to learn quickly how it works. The subject confirmed this in another response when he stated “it takes time.”

The second user stated that he was expecting the system to “move a lot slower.” He felt that the “system performs very well and didn’t do anything I [did not] want it to do.” This rapid performance was due to two factors: careful design and the testing environment. The system that the users evaluated was running from a web server local to the computer, and as such it was able to process all requests extremely quickly. Regardless, the Career Gateway was designed very carefully so that it would require as little bandwidth as possible. Our tests with a live (and remote) web server have yielded largely favorable results, with the pages still serving up very quickly. This user also stated that he wished the Career Gateway would “go from resume to job search without leaving the system.” (We assume he meant he did not want to change “sections” of the website in between resume building and job search.) Finally, this participant stated that “it made resume writing very easy” and that “nothing was hard at all.”

The third and fifth users had mostly the same comments on each of their questionnaires. One stated that “it’s very fast and easy” and that “I don’t think they can make it any easier.” The other subject wrote that “it did everything with ease.” He went on to state that the Career Gateway “was much easier” to use than other job search engines. Neither of these participants had anything negative written in their comments.

The fourth user wrote very little on the questionnaire, but he did mention one specific problem. He stated that he “did not expect to send [a] resume.” This was a very important comment, because it brings up one of the major weaknesses of the system. In the version of the prototype used for testing, the weakest area was probably the feedback system. In future versions, we must focus on keeping the user much more informed about the system’s state (and future actions) at all times. In this particular case, we need to notify the user that his resume will be sent to a potential employer *before* he clicks the “Apply for this Job” button.

Overall, the information gathered from the questionnaires turned out to be invaluable. The flaws that the participants pointed out will help us to focus our efforts on improvements to the Career Gateway. Furthermore, the positive responses have helped us to recognize the good decisions that were made during the design phase. Knowing about these good and bad points will help us to direct our efforts in making a better system.

Conclusion

The evaluation of the Career Gateway proved to be very helpful for the betterment of the system. We were able to pinpoint several strengths (such as ease of learning) and weaknesses (such as the feedback system). Furthermore, we had the opportunity to work with a truly representative sample of our intended audience. We were very grateful for their help, and we recognize that a great deal of the learning process took place in working with these individuals. Overall, we were very pleasantly surprised to receive good reviews for the usability of the Career Gateway. There were no specific areas that “shut down” the evaluation process for any of the users, and they were all very helpful in the multiple forms of feedback they provided.

The single biggest drawback to this entire project was not any specific feature of the system, but rather the amount of time allotted to designing it. We have learned that good design requires a great deal of time, and that with more time we would be able to make the Career Gateway a much better website. Furthermore, with better access to homeless users as participants, we could receive much more feedback. Using this feedback, we suspect that we would discover several other opportunities to improve our system. If we had more time and resources, we would also like to make several changes to the Career Gateway as it stands. First, we would probably need to reconsider the “stepped approach” to task completion. Using steps to accomplish assignments made feedback very difficult on the website, and as a result many users could not tell what the system was doing or what it was expecting from them. Furthermore, we would need to build (from scratch) an error-handling system for the website. Currently, the prototype simply redirects the user to the current page, which was a conscious decision to protect the evaluators from 404 errors. In order to allow the users to learn from their mistakes, however, they need to be aware that they made a mistake, and they need to know how they can avoid it in the future. Given more time and resources, we would like to perform further tests and iron out all of the problems that we encounter.

Finally, we learned a great deal about usability from working on this project. The single most important thing that our group realized was that usability must be considered from the very beginning, and it must constantly be taken into account throughout the entire design process. Even with all of the time we put into making a usable (and accessible) system, there were still bugs to be worked out at the end of the process. If we had built the system *without* usability in mind, retrofitting the Career Gateway with it might have been impossible. We also learned a great many lessons about aspects of team work. It was often difficult to coordinate our schedules so that we could meet together, but we managed to circumvent this problem largely through the use of technology. We kept each other informed through regular emails and a wiki. Besides these lessons, there were many other things that we picked up along the way. The process was difficult and intense, but it was well worth the effort. The Career Gateway was an excellent learning opportunity for all of us, and we look forward to building for usability in the future.



See the working prototype at:

<http://careergateway.jordanpatton.com>

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Appendix A: Survey

Questions

Each participant in the evaluation completed a two page survey. For each statement, they were asked to provide a number between 1 and 6 that indicates whether they strongly disagree (1) or strongly agree (6) with the statement. The following list is a transcription of the questions on the survey:

1. I found the system difficult to use in the beginning.
2. I was able to discover what the system was capable of doing.
3. I knew when the system required information from me.
4. I understood what type of information the system required.
5. I knew when the system correctly understood and acted upon the information I provided it.
6. I could find my way around the system without much difficulty.
7. The system responded promptly and correctly to my commands.
8. I found the system easy to learn.
9. If I made a mistake, it was not hard to correct.
10. The system made me do too much work.
11. The order in which the system required me to do things made sense to me.
12. The system did not give me enough control.
13. The system asked me things I did not know.
14. The system asked me things I did not feel comfortable sharing.
15. Better instructions are needed for this system.
16. The system made it easier to do things that I have done before and may do again.
17. The system let me do things I could not do before.
18. The system let me do things I was not motivated or comfortable doing before.
19. There are ways of doing the things this system does that I'm more comfortable with.
20. There are ways of doing the things this system does that I'm faster and/or better at.
21. There are things I would have expected the system to do, but it did not.
22. The benefits of the system outweigh its difficulties.
23. I could see myself using the system again.

(continued on the next page...)

Calculations

In general, items are phrased such that the higher the number of the response, the more positive the outcome is considered. For example, a participant responding with a 5 reflects a more favorable outcome than a response of 2. Some questions, however, are framed in terms of negative qualities (e.g. this task is *difficult*). During data analysis, these responses are **normalized** so that a higher number is still associated with a positive outcome. This is done by subtracting the response from 6 and treating the difference as the **normalized response**.

Participants' responses to statements are also aggregated into 4 categories. The first 3 categories, **Learnability**, **Flexibility**, and **Robustness**, are based on the user-centered design criteria established in Human-Computer Interaction (DFAB, 2005, p. 260). The final category, **Usefulness**, represents a value- and experience- based measurement of how applicable the system was to the user's lives. Each of these categories is calculated using the normalized responses as described:

$$\text{Learnability} = (Q1 + Q2 + Q3 + Q4 + Q8 + Q15) \div 6$$

$$\text{Flexibility} = (Q6 + Q10 + Q11 + Q12) \div 4$$

$$\text{Robustness} = (Q5 + Q7 + Q9 + Q13 + Q14 + Q16 + Q17 + Q21) \div 8$$

$$\text{Usefulness} = (Q18 + Q19 + Q20 + Q22 + Q23) \div 5$$

(continued on the next page...)

Responses

The complete list of responses is displayed as a table below.

	Subjects					Average		
	1	2	3	4	5	True	Normal	Std Dev
1	4	1	3	4	1	2.60	3.40	1.52
2	5	6	3	4	6	4.80	4.80	1.30
3	3	6	1	5	6	4.20	4.20	2.17
4	4	6	2	4	6	4.40	4.40	1.67
5	3	6	4	5	6	4.80	4.80	1.30
6	2	6	4	4	6	4.40	4.40	1.67
7	2	6	4	3	6	4.20	4.20	1.79
8	6	6	6	4	6	5.60	5.60	0.89
9	6	6	6	3	6	5.40	5.40	1.34
10	1	1	6	2	1	2.20	3.80	2.17
11	6	6	1	3	6	4.40	4.40	2.30
12	1	1	6	3	1	2.40	3.60	2.19
13	6	1	1	1	1	2.00	4.00	2.24
14	2	1	1	1	1	1.20	4.80	0.45
15	4	1	1	5	1	2.40	3.60	1.95
16	1	6	6	2	6	4.20	4.20	2.49
17	1	6	6	4	4	4.20	4.20	2.05
18	3	1	6	3	1	2.80	3.20	2.05
19	6	6	6	4	6	5.60	5.60	0.89
20	5	6	6	1	3	4.20	4.20	2.17
21	4	1	4	4	1	2.80	3.20	1.64
22	1	6	6	3	6	4.40	4.40	2.30
23	6	6	6	3	6	5.40	5.40	1.34
Learnability	3.7	5.7	3.3	3.3	5.7	4.33	4.33	1.22
Flexibility	4.5	5.5	1.3	3.5	5.5	4.05	4.05	1.77
Robustness	2.4	5.6	4.8	3.6	5.4	4.35	4.35	1.35
Usefulness	4.2	5.8	4.8	2.8	5.2	4.56	4.56	1.14

Appendix B: Questionnaire

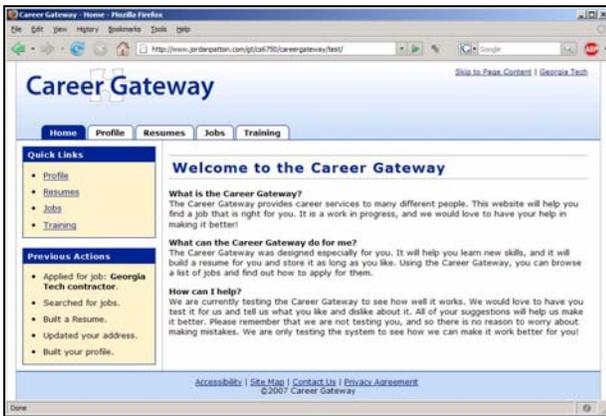
Following the survey, each participant in the evaluation was asked to fill out a brief questionnaire. This document posed 4 questions about the user's experience with the Career Gateway, and it provided half a page for each response. The following questions are transcribed directly from the questionnaire:

- 1.** What kinds of things did you think the system would do? What kinds of things did the system do that you did not expect? What kinds of things would you have expected the system to do but it did not?
- 2.** What things did you know that the system could do, but you found hard to actually do? How could these things have been easier?
- 3.** Were there things that the system asked you to do that you feel it shouldn't have? Were there times when the system did not understand what you told it, did not do what you told it to, or asked you something that you already told it? What were they?
- 4.** What are some of the things you've used before to look, find, and prepare for jobs? Was using this system easier or faster than using these things? In what ways was it better or worse?

Appendix C: Screenshots of the Career Gateway

The following screenshots represent the actual tasks carried out by the users during the study.

Home



Profile: Main



Profile: Update your profile (Step 1)



Profile: Update your profile (Step 2)



Profile: Update your profile (Step 3)



Profile: Update your profile (Complete!)



Profile: View your profile

The screenshot shows the 'View your profile' page. The navigation bar includes Home, Profile, Resumes, Jobs, and Training. The main content area displays the following information:

- Quick Links:** View your profile, Update your profile.
- Previous Actions:** Applied for job: Georgia Tech contractor, Searched for jobs, Built a Resume, Updated your address, Built your profile.
- Profile Information:**
 - First Name: Jack
 - Last Name: Brown
 - Gender: Male
 - Age: 42
 - Phone or Voice Mail Number: 555-385-2281
 - Email Address: Jack.brown@gmail.com
 - Mailing Address: 85 5th St NW, Atlanta, GA 30332
 - Place where you stay: United Way
 - Previous work experience?: Yes

Resumes: Main

The screenshot shows the 'Resumes' main page. The navigation bar includes Home, Profile, Resumes, Jobs, and Training. The main content area displays the following information:

- Quick Links:** Create a new resume, View an old resume, Edit an old resume, Delete an old resume.
- Previous Actions:** Applied for job: Georgia Tech contractor, Searched for jobs, Built a Resume, Updated your address, Built your profile.
- What is a resume?** A resume is a summary of your job experience and education. It also contains a description of your skills and abilities. A resume is a great way to represent yourself when applying for a job.
- Why do I need a resume?** Your resume will help you communicate with potential employers. Also, it will give them a way to remember who you are and how they can get in touch with you. Your resume will contain your mailing address and voice mail number, and it will help you to make a lasting impression when you look for a job.

Resumes: Create a new resume (Step 1)

The screenshot shows the 'Create a new resume (Step 1)' page. The navigation bar includes Home, Profile, Resumes, Jobs, and Training. The main content area displays the following information:

- Quick Links:** Create a new resume, View an old resume, Edit an old resume, Delete an old resume.
- Previous Actions:** Applied for job: Georgia Tech contractor, Searched for jobs, Built a Resume, Updated your address, Built your profile.
- Create a new resume (Step 1):** Please enter your information below. Type of Job: What kind of job are you applying for?
 - Construction
 - Cooking, preparing, or serving food
 - Driving vehicles (such as trucks)
 - Janitorial or housekeeping
 - Office work
 - Repair or maintenance work
 - Retail sales
 - Warehousing
 - Some other type of work

Resumes: Create a new resume (Step 2)

The screenshot shows the 'Create a new resume (Step 2)' page. The navigation bar includes Home, Profile, Resumes, Jobs, and Training. The main content area displays the following information:

- Quick Links:** Create a new resume, View an old resume, Edit an old resume, Delete an old resume.
- Previous Actions:** Applied for job: Georgia Tech contractor, Searched for jobs, Built a Resume, Updated your address, Built your profile.
- Create a new resume (Step 2):** Please enter your information below.
 - (Personal Information)**
 - Name: Jack Brown
 - Mailing Address: 85 5th St NW, Atlanta, GA 30332
 - Voice Mail: 555-385-2281
 - Work History**
 - Check all that apply:
 - I have worked as a construction laborer.
 - I have worked in a construction setup crew.
 - I have worked as a construction manager.

Resumes: Create a new resume (Complete!)

The screenshot shows the 'Create a new resume (Complete!)' page. The navigation bar includes Home, Profile, Resumes, Jobs, and Training. The main content area displays the following information:

- Quick Links:** Create a new resume, View an old resume, Edit an old resume, Delete an old resume.
- Previous Actions:** Applied for job: Georgia Tech contractor, Searched for jobs, Built a Resume, Updated your address, Built your profile.
- Create a new resume (Complete!):** Success! You have completed making a resume. Please review your resume to make sure it is correct.

Resumes: View an old resume

The screenshot shows the 'View an old resume' page. The navigation bar includes Home, Profile, Resumes, Jobs, and Training. The main content area displays the following information:

- Quick Links:** Create a new resume, View an old resume, Edit an old resume, Delete an old resume.
- Previous Actions:** Applied for job: Georgia Tech contractor, Searched for jobs, Built a Resume, Updated your address, Built your profile.
- View an old resume:** Here is a list of your current resumes:
 - Jack's Construction Resume

Resumes: Jack's Construction Resume

Career Gateway

Home Profile Resumes Jobs Training

Quick Links

- Create a new resume
- View an old resume
- Edit an old resume
- Delete an old resume

Previous Actions

- Applied for job: Georgia Tech contractor.
- Searched for jobs.
- Built a Resume.
- Updated your address.
- Built your profile.

Jack's Construction Resume

Name: Jack Brown

Mailing Address: 85 5th St NW, Atlanta, GA 30332

Voice Mail: 555-385-2281

Objective: To obtain a career in the construction industry.

Work History:

- I have worked as a construction laborer.
- I have worked in a construction setup crew.

Skills:

- I can clean and prepare construction sites.

Jobs: Main

Career Gateway

Home Profile Resumes Jobs Training

Quick Links

- Job Search
- Browse Jobs
- Recommendations

Previous Actions

- Applied for job: Georgia Tech contractor.
- Searched for jobs.
- Built a Resume.
- Updated your address.
- Built your profile.

Jobs

How do I search for jobs?
When you search for jobs, you tell us what you're looking for. The Career Gateway will go an find jobs that match, and then it will display them to you.

How to I browse for jobs?
You look at a list of all the jobs available, and you try to find one that you like. Browsing for jobs can take more time than searching, but it will let you see everything at once.

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Jobs: Job Search

Career Gateway

Home Profile Resumes Jobs Training

Quick Links

- Job Search
- Browse Jobs
- Recommendations

Previous Actions

- Applied for job: Georgia Tech contractor.
- Searched for jobs.
- Built a Resume.
- Updated your address.
- Built your profile.

Job Search

What kind of job are you looking for?

construction

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Jobs: Job Search Results

Career Gateway

Home Profile Resumes Jobs Training

Quick Links

- Job Search
- Browse Jobs
- Recommendations

Previous Actions

- Applied for job: Georgia Tech contractor.
- Searched for jobs.
- Built a Resume.
- Updated your address.
- Built your profile.

Job Search Results

Position	Employer	Location	Hours	Pay	More Info
Construction Cleanup	Donshoe	8624 Peachtree Street	8am - 4pm	\$9.00/hr	More Info
Construction Laborer	Archer-Western	1789 Auburn Ave.	8am - 5pm	\$12.50/hr	More Info
Construction Laborer	Holder	150 Edgewood Ave.	7am - 4pm	\$10.50/hr	More Info
Construction Setup	Holder	150 Edgewood Ave.	7am - 4pm	\$8.80/hr	More Info
Construction Setup	Georgia DOT	1503 Jackson Street	8am - 7pm	\$8.50/hr	More Info

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Jobs: Job Details

Career Gateway

Home Profile Resumes Jobs Training

Quick Links

- Job Search
- Browse Jobs
- Recommendations

Previous Actions

- Applied for job: Georgia Tech contractor.
- Searched for jobs.
- Built a Resume.
- Updated your address.
- Built your profile.

Job Details

Position: Construction Laborer

Employer: Archer-Western

Location: 1789 Auburn Ave., Atlanta, GA 30319

Distance from United Way: 1.3 miles by foot, or 2 miles by MARTA

Hours: 8:00am - 5:00pm (Monday - Friday)

Wages: \$12.50/hr (paid every 2 weeks)

Phone: 555-575-6132

E-mail: jmcpherson@archer-western.com

Description: Hard work, both in-doors and out. Ability to use tools is desired. Please be prepared to provide a work history.

Jobs: Job Application Complete

Career Gateway

Home Profile Resumes Jobs Training

Quick Links

- Job Search
- Browse Jobs
- Recommendations

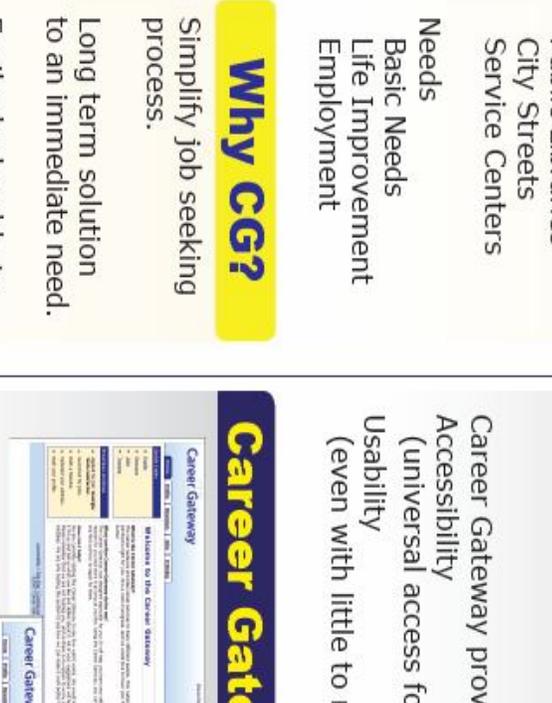
Previous Actions

- Applied for job: Georgia Tech contractor.
- Searched for jobs.
- Built a Resume.
- Updated your address.
- Built your profile.

Job Application Complete

Your resume has been submitted, and you have **successfully** applied for this job.

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<p>Context</p> <p>Users Homeless Individuals Service Providers</p> <p>Environment Shelters Public Libraries City Streets Service Centers</p> <p>Needs Basic Needs Life Improvement Employment</p> <p>Why CG?</p> <p>Simplify job seeking process.</p> <p>Long term solution to an immediate need.</p> <p>Easily deployable in many locations at once.</p> <p>Current process is lengthy and often difficult for novice computer users to perform.</p>	<p>Career Gateway</p> <p>What is Career Gateway?</p> <p>Career Gateway is a website designed to help homeless people build resumes, find jobs, and get training necessary to attain and keep a job.</p> <p>Career Gateway provides:</p> <ul style="list-style-type: none"> Accessibility (universal access for a wide audience) Usability (even with little to no computer experience) <p>Career Gateway Screenshots</p> 	<p>Evaluation</p> <p>Performed at the Samaritan House</p> <ol style="list-style-type: none"> Users were asked to run through 3 different scenarios on C.G. Users filled out a survey to provide feedback. <p>Learned</p> <p>Most Users liked the system and found it easy to use.</p> <p>Some users are more comfortable with their previous methods.</p> <p>Some training may be required.</p> <p>Even users with no computer experience learned quickly.</p> <p>Team La Gente Intelligente:</p> <ul style="list-style-type: none"> Chris Howe Dinesh Nagar Jordan Patton Justin Smith
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