Designing Future Employment Applications for Underserved Job Seekers: A Speed Dating Study

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ABSTRACT

Modern Information and Communication Technologies (ICTs) support job searches, resume creation, career development, and professional self-presentation. However, these technology tools are often tailored to high-income, highly educated users and white-collar professionals. It is unclear what interventions address the needs of job seekers who have limited resources or education, or who may be underserved in other ways. We gathered insights from the literature and generated ten tangible design concepts to address the needs of underserved job seekers. We then conducted a needs validation and speed dating study to understand which concepts were most viable among our population. We found that the three most preferred concepts immediately addressed job seekers' *social* and *personal* needs, where addressing social needs meant mediating job seekers' connections to others and supporting job seekers' limited access to strong ties.

Author Keywords

Needs validation; speed dating; design; employment, underserved job seekers

ACM Classification Keywords

H.5.m. Information Interfaces and Presentation: Misc.

INTRODUCTION

Many technologies facilitate the needs of relatively affluent populations, and there is generally less consideration for the needs of underserved populations [15, 18, 28]. As a result, offline social injustices [20] are often transferred to online job applications. For example, LinkedIn caters to high-income and highly educated users and to white-collar professionals [31, 39]. Further, while employment researchers have established that companies seek higher-skilled employees from sites such as LinkedIn, now even government services and companies seeking employees *without* a 4-year degree are moving their employment and recruiting process online [13, 35]. This leaves fewer opportunities to encounter recruiters face-to-face and to connect to social and other job resources.
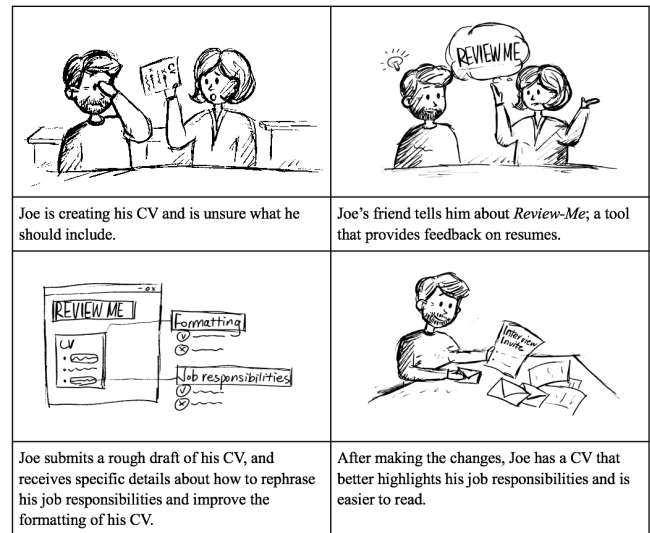
Figure 1. Storyboard of Review-Me, one of ten concepts used in the needs validation session.

According to a 2015 Pew Research report, Americans who could benefit the most from using socio-technical systems to support their employment endeavors (e.g., underserved job seekers) are the ones who find these tools most challenging to use [38]. Despite this, information and communication technologies (ICTs) have done little to support individuals who do not have the knowledge, skills, or experience to participate in these online venues. More and more individuals living in the United States have broadband access and availability; however, they often lack the skill set needed to make the most of Internet availability [46].

To provide insights into the features and requirements needed to build digital employment tools for this population, we conducted a literature review to investigate the needs and challenges of job seekers from underserved populations. A review of HCI research in this space identified job seeker barriers such as financial hardships, low wages, limited resources, lack of transportation, and homelessness [14, 15, 16, 17, 19, 26, 27, 43, 45]. Underserved job-seeking populations also include those on the autism spectrum [25]. From this review, we categorized the challenges as personal, social, and societal. Our literature review highlights barriers such as the lack of (*personal*) feedback from potential employers, limited *social* networks, and *societal* issues such as workers' limited support for wage theft and employee rights and limited reliable transportation. However, few interventions exist to over-

come these barriers and it is unclear whether interventions that address these challenges are viable solutions among these job seekers. Drawing from past studies (e.g., [12, 34, 48]), we created short storyboards to convey ten employment concepts, which we assessed using Ajzen's Theory of Planned Behavior (TPB) [2], a major theoretical perspective that has been used to frame the effects of employment interventions [10, 41, 47]. We then conducted a needs validation and speed dating study (see Figure 1) to understand which concepts are most viable among our target population. Findings from past research suggest that the most desirable tools for job seekers are those that either provide connections to others, or adhere to the *social* needs of job seekers. However, we found that the three most preferred concepts are those that immediately addressed job seekers' *social and personal* needs, where addressing social needs means supporting job seekers' limited access to strong social ties. These concepts provide job seekers with resume feedback [15], assist job seekers in articulating their skills based on their past jobs, and suggest a concrete path to achieve their goals. These concepts address the most practical needs of our participants and could increase their self-efficacy.

Our work builds on this past research to contribute:

- A literature review of HCI research investigations of underserved job seekers, the barriers they face, and the key design insights from these investigations. We contribute three job seeker need categories for future interventions: *social, personal, and societal*;
- A set of ten tangible design concepts for future employment tools that build on these design insights to address the needs of our targeted job seekers and their rank order;
- An analysis of our participants' feedback regarding the three most and three least popular concepts to expose the issues our job seekers faced and wished to address.

LITERATURE REVIEW
We frame our related work on two distinct categories based on the literature: (1) underserved job seekers' needs and challenges; (2) design insights from those applications that targeted underserved job seekers.

Job Seeker Needs and Challenges
We categorize job seeker needs, challenges, and design insights based on the literature as *social*, which refers to the need for social networks, social resources, social support, feedback, mentorship, assistance and emotional support; *personal*, or those needs requiring effort from one's self such as reflection on the job process and the ability to articulate one's skills; and *societal* [27], which refers to challenges that require community and/or government implementation, such as support for transportation, childcare access, combating discrimination, and access to job opportunities that are suitable to the skills of the current job seekers. Below, we discuss each of these categories of job seeker needs in detail.

Social
Social needs are those that are met by our social ties or social connections. Research shows that bridging ties—the ties that connect people across lines of race, class, ethnicity, and age—are valuable [37], particularly for job searching [32]. Granovetter argues that these ties are better sources of information [23]. However, some underserved job seekers are disadvantaged by social isolation and have limited access to ties of social worth [40]. These barriers suggest opportunities for technologies to aid in fostering social capital. Facilitating access to social connections that can provide mentorship and information about employment opportunities is also a recommended course of action for supporting job seekers, per a literature review on job search [24] and other recent reports [14, 43].

Researchers have investigated the viability of sharing economy applications such as Lyft, Uber, TaskRabbit, NeighborGoods and Airbnb as tools that could address these barriers among low-income, unemployed, and underemployed populations [17]. This research uncovered the need for trust, social support, and feedback. The need for feedback was also articulated by low-resourced job seekers in [43]. In an employment study of homeless youth, Hendry et al. found that assistance and emotional support were vital for successful employment and that external social resources were often needed to meet basic needs [26, 27].

Personal
We identify personal needs as those needs requiring effort from oneself, such as reflection on one's current life situation and how that could impact the job process. Personal needs also relate to an individual's ability to understand and articulate her current skillset and where she fits into the work environment. A common suggestion between Dillahunt et al. and Wheeler and Dillahunt's investigations was to support job seekers in articulating their current skills [15, 43]. Wheeler and Dillahunt also proposed that digital systems should encourage job seekers to reflect on the job process and educate them about the advantages their social networks could provide in the job search [43].

Hendry et al. identified two challenges in investigating work among homeless youth: *identity*, which is a problem these youth face when they must represent themselves for employment, and *availability* of job opportunities [26, 27]. They found that work is linked to life circumstances, which are deeply personal.

Societal
Societal-related needs require support from the community or government and sometimes also require regulations that would be difficult to implement by a single individual or tool. Dillahunt acknowledged that systemic issues such as income and social inequality exist beyond our control and that it might be difficult for technological interventions to address these issues [14]. For example, job seekers face types of discrimination such as age, gender, race, disability, and other factors [11]. Very little empirical research investigates interventions that aim to tackle employment discrimination—perhaps because technology is unable to address these issues.

Separate studies of underserved and low-resource job seekers identified barriers related to reliable access to transportation [16] needed to get to interviews. In addition, parents with

limited transportation who need to take care of their children during an interview are also left behind because they might have limited access to childcare or lack the funds to pay for it [8].

Although there is some consistency among the research findings regarding challenges job seekers face, there have been few attempts to conceptualize and make any design insights concrete. Next we discuss what we know of these attempts from the literature.

Design Insights from Applications Targeting Underserved Job Seekers

The studies that exist to our knowledge have evaluated current tools; conceptualized new tools; or designed, implemented, and evaluated new tools. The tools to address the needs outlined previously are somewhat limited. For example, one study has conceptualized a tool that addresses societal needs for homeless young adults. Researchers in two other studies have designed, implemented, and evaluated feedback tools—one resume feedback tool and one interview feedback tool—for low-resource job seekers and young autistic job seekers respectively.

Evaluations of Existing Tools

Perhaps one of the earliest assessments in the HCI space of employment tools that target underserved job seekers was done by Jen et al. [28]. In this work-in-progress, authors conducted a competitive analysis to assess seven existing employment tools against three user profiles with characteristics reflecting those of underserved job seekers. Other work has extended this research by using these profiles among job seekers facing similar challenges to assess the potential value of various web services and sharing economy applications for this population [14, 17]. Hendry et al. conducted a similar investigation of six work-related systems to determine whether the systems could be altered to address the needs of homeless young adults [27]. These authors discussed three key findings: (1) these applications fell short in providing homeless young adults with suitable jobs and job sponsors that conformed to regulations; (2) these applications did not support life skills development or lead to self-efficacy and confidence among the youth; and (3) the applications were not sensitive to the effects of being homeless (flexible job schedules). The authors took the results of their study to provide a storyboard that envisioned a socio-technical concept, the *U-District Job Co-op*, as a solution [27].

Concepts for New Tools

Hendry et al.'s [27] concept represents a service that matches jobs that community members post to homeless job seekers who can perform the work. The co-op pays and provides emotional support and mentorship to the job seeker, which leads to confidence, a stronger resume, and individuals who can serve as references, which aligns with Dillahunt's findings regarding economically distressed job seekers [14]. The overall concept was viewed positively among all stakeholders involved; however, issues of trust arose, and these trust issues were similar to issues raised in [14], where community members had reservations about hiring individuals with

felony records. The socio-technical solution, as discussed in Hendry et al., requires the implementation of varying levels of trust [26]. While the past investigations have included evaluations of existing tools and the envisioning of new ones, none of these implemented or piloted the tools that were suggested.

New Tool Implementation

Dillahunt et al. followed a user-centered design process to design, develop and pilot a resume review tool for disadvantaged job seekers [15]. The researchers built this tool as an extension of their prior work [14, 17]. One of the researchers' goals was to understand who continued to be left behind after implementing a tool designed for disadvantaged job seekers. The evaluation results revealed the limitations for disadvantaged job seekers with limited digital literacy skills and with criminal records, as well as unexpected issues with digital access and document storage [15].

Hayes et al. investigated video modeling and video prompting as potential solutions for teaching interview skills among youth with autism spectrum disorder (ASD) [25]. They designed, implemented, and evaluated VidCoach, an iOS software prototype that demonstrated video modeling and prompting techniques in seven interview videos. The authors randomized 15 students with ASD into either a control or VidCoach condition. All students received a mock employment interview at the beginning and end of a 1-month period: students in the control group did not use VidCoach whereas those in the intervention group used VidCoach as frequently as they wished during the 1-month period (on average they used the tool twice per day, which increased to four times per day 3 days before conducting the second set of mock interviews). The results suggest that those in the VidCoach group made a statistically significant improvement in terms of their evaluation performance as rated by employers. The students also showed improvement in presenting succinct and logical ideas, in their health care and hygiene, and with reduced fidgeting, and the students rated the tool highly.

In summary, past employment concepts and interventions have worked to eliminate barriers that would prevent underserved job seekers from being able to use employment tools, connected job seekers to social resources and helped to improve self-efficacy, and provided tools to access expert feedback.

Key Social Factors

Given the focus of past employment concepts and interventions, we applied Ajzen's Theory of Planned Behavior (TPB) [2] as a theoretical model for assessing the design concepts we developed in this work (see Table 1). The TPB is a major theoretical perspective that has been widely used to model the effectiveness of job search interventions on employment [10, 32, 41, 47].

In the TPB, intention is the central determinant of behavior [2] and is determined by *attitude*, *subjective norms*, and *perceived behavioral control*. Intention describes an individual's willingness to try to perform a behavior—in this case, how worthwhile it is to put effort into the job search. Attitude toward the job search is the individual's personal evaluation of

how worthwhile it is to put effort into the job search. For example, job seekers with a positive job search attitude would believe that applying more effort to their resume or practicing for interviews would be very beneficial for their eventual success, while those with a negative job search attitude might believe that even preparing a resume would be useless. Subjective norms are the degree to which a person perceives social pressure to perform or not to perform. This includes a person's motivation to meet external expectations [3, 33, 36]. Finally, Ajzen defines perceived behavioral control as the "perceived ease or difficulty of performing the behavior" [3, p.665]. This has been consistently operationalized in the job-seeking literature as job search self-efficacy, which is an individual's internal belief about their ability to perform job-search-related actions effectively [5, 32]. This also relates to whether individuals believe that they have the opportunities and skills required to succeed at tasks in the job search process [32].

These three factors (job search attitudes, subjective norms/social support, and perceived behavioral control/self-efficacy) contribute to the job search intentions that inform actions and have been shown to positively predict job attainment. Therefore, employment interventions that aim to address these factors have the potential to improve employment outcomes. These constructs can also be considered in relation to the three levels of barriers and needs (personal, social, and societal) that we described in the previous section. In general, interventions that address personal needs are expected to increase job seekers' self-efficacy because they augment job seekers' abilities. Interventions that address social barriers do so in a variety of ways: some help job seekers leverage existing social capital, while others help create opportunities to build social capital or provide social resources through alternative means. We expect those interventions that help a job seeker build capital or provide increased access would increase self-efficacy, while those that help job seekers leverage existing social resources would increase subjective norms. We would expect interventions aimed at societal barriers to increase self-efficacy and improve job search attitude. In the next section, we introduce each of our ten concepts and their expected value in the context of our three types of identified needs (social, personal, and societal) and the Theory of Planned Behavior.

DESIGN CONCEPTS

This section describes each of the ten design concepts—all inspired by the literature. For the sake of brevity, we refrain from providing technical implementation details, or extensive detail about concepts that were less popular among our participants. Our goal was to validate the theoretical needs underlying each concept and to evaluate each concept's perceived usefulness from the perspective of potential users. Table 1 provides an overview of the categories of needs and aspects of behavioral intention that each concept aims to address. The majority of our concepts (N=8) would promote users' confidence in their job search practices, and two would increase subjective norms. We argue that all ten concepts are likely to improve users' job search attitude and note three cases in

| Tool | Categories of Needs | | | Aspects of Behavioral Intention | | |
	Social	Personal	Societal Related	Self-Efficacy	Subjective norms	Job-search attitudes
Vouch for Me	✓				✓	✓
Review-Me	✓	✓		✓		*
Interview4	✓	✓		✓		*
WeCandoIt	✓	✓		✓	✓	*
ForgetAboutIt	✓		✓	✓		✓
Anon-Inerviews			✓			✓
Skills Identifier		✓		✓		✓
DreamGigs		✓		✓		✓
Job Score		✓	✓	✓		✓
MediaTutorial		✓		✓		✓

Table 1. **Categories of Needs and Aspects of Behavioral Intention met by Concept Applications. Note that an * indicates that the interventions could lead to positive or negative job search attitudes.**

which specific forms of feedback *could* lead to negative outcomes (see * in Table 1).

Based on past literature from sociology and HCI, [14, 15, 23, 26, 27, 44], we predicted that concepts that aimed to address social needs and increase job seekers' access to important resources would be ranked highest among the concepts. We thought that concepts that additionally aim to address the personal needs of job seekers—such as Review-Me, Interview4, and WeCanDoIt—could increase self-efficacy and lead to positive job-search attitudes, and would be among the highest ranked. WeCanDoIt could also lead to increased social norms and we thought the concept would be successful among our participants.

Vouch for Me

Vouch for me allows freelancers or any job seeker to gather testimonials from their past clients and customers; it is somewhat similar to LinkedIn Recommendations, which allows people to provide informal recommendations about another person's work. Hendry et al. [27] and participants providing feedback about sharing economy applications [17] described benefits of having access to references, or someone who could vouch for him or her. Vouch for Me was derived for individuals who may have difficulties finding references and provides a platform for some individuals to collect testimonials as an alternative to traditional references.

Vouch for Me addresses social needs by enabling job seekers to use idle social resources, in the form of testimonials, to improve their application materials. We also hypothesized that this would increase subjective norms because users would feel greater pressure to exert effort in the job search process from the contacts who provide testimonials.

Review-Me

Review-Me extends the pilot application evaluated in [15]. Review-Me sources volunteers to provide resume feedback to job seekers. The concept addressed the timing barriers identified in [15]. In the needs validation study, we implied that the feedback was immediate.

Review-Me addresses both social and personal job seeker needs. First, the concept provides expert resume feedback, which is traditionally drawn from mentors and other social

connections. Second, the feedback requires some reflection from the job seeker in order to update his or her resume. This system would increase users' self-efficacy in the job search by increasing their confidence in their application materials and their understanding of what a "good" resume is. This system could improve users' attitude toward the job search, though it is also possible for job seekers to be discouraged by the feedback they receive.

Interview4

Interview4 [1] is an existing tool designed for employers, service providers, and job candidates to support the interviewing process. Interview4 is a free online video tool that allows candidates to practice and record interviews. While the current tool relies on self-reflection like VidCoach [25], our concept sourced feedback from professionals and is similar to Review-Me, except that Interview4 supports reviews of interviews rather than resumes. We expect that Interview4 would provide the same types of support for job seekers as Review-Me.

WeCanDoIt

WeCanDoIt is an online support group where people can support one another in the job search process and share practical tips on how they go about job searches and interviews. Such a support group could also provide positive affirmation to help everyone stay motivated. For example, a job seeker may hear that hiring is slow right now for larger companies but people have had success with local organizations. This information might lead a job seeker to change his or her strategy and spend more time networking and applying for jobs at local businesses.

WeCanDoIt addresses the social needs of job seekers (e.g., social and emotional support, feedback, information). These conversations also enable users to reflect on their process [43] and get useful feedback [15, 43], addressing job seekers' personal needs. We argue that WeCanDoIt could increase self-efficacy and subjective norms in users, by providing valuable information and emotional support to increase job seekers' confidence in their ability to perform during the job search, and also create a community where they feel expected to do their best in the job search. However, WeCanDoIt could have a positive or negative effect on job search attitudes, depending on the content of discussion or information provided.

ForgetAboutIt

ForgetAboutIt is the only service concept. The service helps to arrange transportation and babysitting services for job seekers who must manage childcare. For a small (unspecified) fee, job seekers are able to arrange a babysitter to come to their house so that they can leave on time for interviews without issues.

ForgetAboutIt aims to alleviate structural barriers in the job search process, such as child-care [6] or transportation [30], that would otherwise be addressed through the use of social or societal resources. We argue that ForgetAboutIt would improve self-efficacy and attitude in the job search because job

seekers would feel more confident that they could overcome barriers that they encounter during their efforts to secure a job.

Anon-Interviews

Anon-Interviews masks identifying information that could lead to discrimination such as name, age, and gender. This concept addresses issues of discrimination, such as those identified in [14, 19, 43]. These are societal issues that can possibly be mitigated via technology but must be regulated externally. This concept would have a positive effect on users' job search attitude because it would increase the belief that the job search process is fair and that effort exerted by the users directly relates to the outcomes of their search.

Skills Identifier

Skills Identifier helps job seekers identify and communicate their current skill set. Imagine a job seeker, Andy, who wants to work in a customer-service job but is unsure how his previous experiences are related to customer service. Using Skills Identifier, Andy would enter his previous job as a construction worker and Skills Identifier would determine that customer service jobs and construction jobs both require problem-solving skills and teamwork skills. Andy would then update his resume and cover letter to highlight his skills in problem-solving and team work.

This concept addresses an important personal need in the job search process, enabling job seekers to understand and articulate the skills they already possess and focus on how to improve their resumes accordingly. This tool should lead to increased self-efficacy because it improves users' ability to articulate their skills. Based on work with low-resourced populations [15], we also hypothesized that this system would improve job-search attitudes by increasing job seekers' awareness of their skills.

DreamGigs

DreamGigs helps job seekers understand what career-related skills they need to reach their ideal, or "dream" gig or job. Dream Gigs is an extension of SkillsIdentifier and allows job seekers to specify the positions that they have held in the past. However, the tool also specifies: (1) the skills the job seeker would need to develop to achieve his or her ideal job and (2) available positions that job seekers could pursue to acquire these skills.

Like SkillsIdentifier, DreamGigs aims to address some of the personal needs important in the job search process, by helping job seekers articulate their skills and identify a path towards a long-term employment goal. The concept requires the job seeker to reflect on the skills he or she has already and what path he or she should take to obtain those needed skills, thus boosting one's self-efficacy. In related work [18, 44], job seekers have explicitly stated their desire for a path to achieve their career aspirations, so we argue that this system would improve users' job search attitudes.

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[1] https://www.interview4.com/.

Job Score

Job Score provides detailed job information for a specified geographic area or location and allows job seekers to evaluate how accessible jobs are (e.g., on bus routes, walkable, bikeable) and evaluate whether or not he or she should try to move to other areas or train for new skills.

Job Score addresses some of the personal and societal concerns raised by Hendry et al. about the lack of potential jobs available for individuals based on their skill set [26]. Users of this system would be afforded the ability to understand the types of jobs available in their area, and the opportunity to consider new job search strategies. We argue that users of this system would experience higher levels of self-efficacy because they would have more information to inform their job seeking practices, and more positive job search attitudes because this system would expose barriers and biases that previously made the job search seem unfair.

MediaTutorial

MediaTutorial helps job seekers develop a professional online brand. The concept helps job seekers who may rely on contract work and wish to advertise their skills. For example, take Samantha, who is a freelance designer looking for a way to get her name out there. She could use MediaTutorial to identify free platforms to help her display her work and advertise her work. MediaTutorial would also scan her Facebook and LinkedIn sites to determine what content to change and remove. MediaTutorial helps job seekers with their presentation and with managing their personal identity.

MediaTutorial addresses the fragile issue of *identity* as uncovered in Hendry et al. [26, 27] and builds on job seekers' motivation to find ways to leverage their networks to advertise their skills [14, 17]. The tool primarily supports personal job seeker needs because it helps to improve how a job seeker would convey his or her personal identity. MediaTutorial could help to increase self-efficacy of users by educating them about valuable ways of finding employment and thereby improve job search attitudes.

METHODOLOGY

We drew from studies on need validation and speed dating (e.g., [12, 34, 48]) and created a set of short storyboards [42] to convey our concepts[2]. We conducted pilot sessions of our storyboards with five participants to clarify and refine our concepts before our formal study. The results of these pilot sessions were not included in our final results.

Our goal was to understand which concepts are most viable among our target population. The needs validation and speed dating study allowed us to rapidly iterate through our concepts for feedback. The next subsections describe our recruitment process and research setting and the details of the need validation and speed dating study.

Recruitment and Research Setting

We conducted our study in December 2017 in southeastern Michigan, USA. We recruited from non-profit organizations

that focused on economic mobility and finding employment for underserved job seekers, as well as job seekers from a pool of past study participants, and we asked participants to refer others to our study via snowball sampling. We also posted advertisements to Craigslists' "Gigs" section. To be eligible for our study, job seekers also needed to (1) be at least 18 years of age, (2) have less than a four-year college degree, and (3) have been searching for jobs in the past 6 months.

Needs Validation and Speed Dating

We conducted needs validation and speed dating studies one-on-one with each job seeker at local institutions such as cafes, libraries, and community centers. Participants completed surveys upon completion of the study. We presented participants with ten storyboards illustrating common issues job seekers face, and the concept for a tool to address this issue. We randomized the order we presented the storyboards for each participant. We asked participants to read each storyboard and to describe their initial thoughts after reading each one. We probed for details and asked clarification questions as needed. After participants read all ten storyboards, we held a general debriefing session and asked participants about their overall thoughts, specific concepts that stood out, and unaddressed needs.

Next, we asked participants to rank each concept from most to least preferred, specifying that they should base their rankings on their own challenges in the job search, not someone else's challenges. After participants ranked each concept, we asked participants to discuss their reasons for their ranking. We assigned participants' most preferred tool a value of 10 and their least preferred tool a value of 1. To provide a final ranking for all concepts, we summed rankings for all the tools from all the participants and the highest value was considered the most preferred.

At the end of the study, participants completed a survey consisting of 13 questions. The survey included questions about demographics, job status, and familiarity with technology. Demographic questions included gender, date of birth, ZIP code, race, education level, marital status, and number of individuals in the household. Job status questions included job seeking status and type of job desired. Familiarity with technology questions, included those about devices owned, type of device used to access the Internet, and familiarity with and use of web and job-related web services.

RESULTS

We recruited a total of 11 participants from local community organizations. We recruited the most participants (N=4) from an organization that provided housing for families and individuals who were homeless or at-risk for homelessness. The organization used the U.S. Department of Housing and Urban Development's definition of homelessness: "a person sleeping in a place not meant for human habitation or living in a homeless emergency shelter" [3]. The remaining participants (N=7) saw our Craigslist advertisement, were past study participants, or were participants who were referred to our study.

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[2]Please refer to https://doi.org/10.7302/Z2BV7DSF for the full set of storyboards.

[3]https://www.hud.gov/

Name	ID	Age	Race	Sex	Employment Status	Top 3 Tool Preferences	Bottom 3 Tool Preferences
Geoff	P1	42	African American	M	Looking for full time position	1. DreamGigs; 2. Interview4 3. Review-Me	1. MediaTutorial; 2.Vouch for Me 3.ForgetAboutIt
Angel	P2	42	African American	F	Looking for full time position	1. Review-Me; 2. DreamGigs 3. SkillsIdentifier	1. WeCanDoIt; 2. ForgetAboutIt 3. Vouch for Me
Ignacio	P3	28	African American	M	Looking for short-term part-time position	1. Interview4; 2. Review-Me 3. SkillsIdentifier	1. DreamGigs; 2.WeCanDoIt 3. ForgetAboutIt
Tamara	P4	38	African American	F	Looking for long-term part-time position	1. Review-Me; 2. DreamGigs 3. SkillsIdentifier	1. ForgetAboutIt; 2. Vouch for Me 3. MediaTutorial
Chelsea	P5	40	Caucasian	F	Looking for long-term part-time position	1. DreamGigs; 2. SkillsIdentifier 3. Anon-Interviews	1.ForgetAboutIt 2. MediaTutorial; 3. Vouch for Me
Elizabeth	P6	55	Caucasian	F	Looking for long-term part-time position	1. Review-Me; 2. Interview4 3. Anon-Interviews	1. DreamGigs 2. Vouch for Me; 3. MediaTutorial
Aaron	P7	55	Caucasian	M	Looking for long-term part-time position	1. DreamGigs; 2. Review-Me 3. Vouch for Me	1. Anon-Interview; 2. ForgetAboutIt 3. MediaTutorial
Erica	P8	31	African American	F	Looking for full time position	1. We Can Do It; 2. DreamGigs 3. SkillsIdentifier	1. Interview4; 2. MediaTutorial 3. Job Score
Allynna	P9	31	African American	F	Looking for full time position	1. Job Score; 2. ForgetAboutIt 3. WeCanDoIt	1. Anon-Interview; 2. Interview4 3. Vouch for Me
Jill	P10	29	African American	F	Not currently looking for any additional employment	1. Review-Me; 2. Interview4 3. MediaTutorial	1. DreamGigs; 2. Anon-Interview 3. SkillsIdentifier
Chrissy	P11	38	African American	F	Looking for long-term part-time position	1. SkillsIdentifier 2. Vouch for Me; 3. ForgetAboutIt	1. Job Score; 2. DreamGigs 3. Anon-Interview

Table 2. Participant Details and Participants' Top and Bottom 3 Tool Preferences

Sessions lasted 1 hour: participants spent approximately 20 minutes looking over the ten storyboards and the remaining time (40 minutes) discussing the concepts. All participants (N=11) completed the demographic survey. Out of the 11 participants, eight were female and three were male. Participants were 28 to 55 years old (M=39, STD=9.39), single/separated/divorced, and living in households of one or two people. Education levels varied with most participants having completed high school.

All participants had access to the Internet and access to at least one digital device such as a smartphone, desktop computer, or personal laptop. The majority of our participants used a smart phone as the main tool to access the Internet (N=7). Two participants (N=2) did not have a personal smartphone and accessed the Internet using public computers at the library and public housing. Participants seemed proficient in the use of digital tools as demonstrated by taking the online survey. All participants used Google's search engine, and most participants expressed familiarity with Facebook (N=9) but did not use it every day. The main job search tools used by our participants were Indeed.com (N=5) and Google (N=4). See Table 2 for additional participant details. In the next subsections, we discuss the three most and least validated concepts. Table 3 provides a summary of the rankings from most to least preferred.

Design Concepts
We anticipated that concepts aiming to provide social support, or address the *social* needs of job seekers, would be highly ranked. We specifically thought Review-Me, Interview4, and WeCanDoIt would be the top three highest ranked tools because they also addressed the personal needs of job seekers. While Review-Me was the highest ranked concept of our participants, Skills Identifier and DreamGigs, which address a personal need among job seekers, were ranked second and third (see Table 3). The lowest ranked concepts were ForgetAboutIt (*social and societal*), Vouch for Me (*social*), and the MediaTutorial (*personal*). We discuss the details of these rankings next.

Review-Me
Overall, Review-Me was ranked as the most preferred concept tool by the participants. Specifically, 7 of the 11 interviewees listed it as a top-three choice, and all the participants expressed that the problem of developing appealing resumes was personally relatable. During the needs validation and speed dating sessions, most participants recognized the importance of resumes in getting a job. Many job seekers expressed they had limited resume-building skills and believed that Review-Me was a viable solution.

Participants struggled to include their related experiences on the resume and tailor it to different industries and valued Review-Me for this capability. For example, Tamara (P4) indicated that she struggled in terms of finding the right experience to list on her CV. Erica (P8), who had a criminal background, mentioned that she needed to make a resume because of her poor job history from the past. It is also worth mentioning that four (N=4) participants sought help from external resources such as job centers and libraries. Angel (P2) mentioned that she used to go to the local job center to receive similar services as Review-Me from a job coach. She viewed Review-Me as a service to provide to those with no means to reach the center and for those unable to pay for paid services.

Given the capability for spelling and grammar checking in standard word-processing tools, a finding that stood out was that most participants felt that Review-Me could be used to ensure that their grammatical errors were addressed. Participants often discussed challenges with online job-seeking and the need for help getting past the initial screening process. Participants also noted seeking help from others. Elizabeth (P6) emphasized this in her discussion of Review-Me:

> My son helps me because he grew up with computers. He lives with me but it's taken me a long time to learn

the computer and how to maximize my phone even... So, if I didn't have him, I'd be in trouble.

When asked about what issues job seekers were currently facing, Geoff (P1) described his challenge with online applications:

> This ain't like it was maybe back in like 2000. They want to see that you can do your resume online. You know most of the time you gave them a paper resume. They don't take that no more. Sometimes you have to put it online. I have a computer but sometimes my computer is messing up I can't really do that way I have to go to Lowe's to get a paper resume printed out.

Skills Identifier

Skills Identifier was the second highest rated concept, with 6 out of 11 participants ranking Skills Identifier in their top three choices. Participants expressed career transitions as a common experience and Skills Identifier as a viable solution to aid in these transitions. Seven of our participants (N=7) believed that Skills Identifier could help them identify related skills and transfer the related experiences during the process of career transition. Angel (P2) described her previous experience of switching industries:

> I went from bookkeeper/office manager to working with food, [and I am now] looking to go back into an office-type position. I was a supervisor and it was like I went from one field to the next, from one extreme to the next.

Participants considered the most beneficial application of Skills Identifier was as a tool for building more competitive resumes. Job seekers also indicated that Skills Identifier would enable them to align resumes with the different requirements across industries. Similarly, job seekers who were discouraged during the job seeking process indicated that Skills Identifier could help them examine what opportunities were available and could do so immediately. Erica (P8) stated:

> Because a lot of us really don't see what other people see. The skill identifier would break it down to a point where you could see how one job actually relates to another. I like that. Like you might have good customer service skills. That doesn't mean that that can't work maybe in a law office...I think it motivates you to actually see yourself doing other things...

DreamGigs

DreamGigs was the third highest ranked concept, and 6 of the 11 participants ranked it in their top three tools. As mentioned above, job seekers sought a path to reach their desired careers [18, 43], and this was echoed in participants' responses. Most participants liked the transparency of DreamGigs because it provides job seekers with clear steps to build their skillsets.

Erica (P8) saw the similarities between DreamGigs and Skills Identifier and expressed that DreamGigs also enables you to identify the skills you have. Most participants considered skill-building to be essential for individuals looking for high-level positions or those searching for higher-paying jobs. Allynna (P9) stated that DreamGigs could help those who:

Participant	ID	Review-Me	Skills Identifier	DreamGigs	Interview4	We Can Do It	Anon-Interview	Job Score	Forget About It	Vouch For Me	Media Tutorial
Geoff	P1	8	4	10	9	5	7	6	1	2	3
Angel	P2	10	8	9	4	3	6	7	2	1	5
Ignacio	P3	9	8	3	10	1	7	5	2	6	4
Tamara	P4	10	8	9	6	5	7	4	3	2	1
Chelsea	P5	5	9	10	6	7	8	4	3	1	2
Elizabeth	P6	10	6	3	9	7	8	4	5	2	1
Aaron	P7	9	7	10	4	6	3	5	2	8	1
Erica	P8	6	8	9	3	10	4	1	7	5	2
Allyana	P9	5	6	4	2	8	3	10	9	1	7
Jill	P10	10	1	3	9	7	2	4	6	5	8
Chrissy	P11	5	10	2	6	7	1	3	8	9	4
Totals		87	75	72	68	66	56	53	48	42	38

Table 3. Final Ratings. Note that in this table, higher numbers are assigned to top preferences.

> Don't want to settle for low-wage [jobs], and the tool could help these people to go volunteer somewhere and get that job shadowing, and be able to hone the skills.

Job seekers were also looking for ways to get additional support on how to achieve their job-related goals. Tamara (P4) responded to DreamGigs with the following:

> Like, you know there are some sites out there that will give you information on what you should include in your resume that sort of thing. But if you don't have those skills, no one tells you how to get those skills. It just tells you what skills you need to have, but doesn't follow up on how to get them.

On the other hand, it is notable that 5 of the 11 participants listed DreamGigs in their bottom four choices. Most of these participants gave DreamGigs a relatively low ranking because they already received similar training services from different organizations, including their past employers and public job centers.

Next, we discuss the three lowest ranking concepts among our participants.

ForgetAboutIt

ForgetAboutIt was our third-lowest-rated concept, with 6 of the 11 participants listing it as one of their bottom three choices. Participants considered ForgetAboutIt as a useful tool for people who have children and transportation needs, but most of our participants did not feel personally connected to the concept. Ignacio (P3) stated:

> I would say that's definitely realistic as far as the concept of [ForgetAboutIt]. I believe it's a good concept. If I had children, I would use it [...].

However, three of our participants (N=3) who had difficulties with child care and transportation gave ForgetAboutIt a relatively high ranking. Two of these three participants were single mothers. Chrissy (P11) described how ForgetAboutIt could have addressed her childcare needs and benefited her job search:

> I have a child with special needs, and she was having problems with school. That was my main reason for not job searching for at least a year or two to last before now. And a service like [ForgetAboutIt] would be wonderful, [so I can] leave [the] house without any issues and being stressed out, worries, and go job searching.

Vouch for Me

Vouch for Me was the second lowest rated concept, and 6 of the 11 participants rated it as one of the bottom three tools. The key issue regarding this concept was its credibility. Six of our participants (N=6) did not believe Vouch for Me could contribute reliable references for job searching. For example, Jill (P10) stated that testimonials should be made by people who have deep connections with job seekers:

> If a person that you know speaks about you, they're gonna be more passionate and they're gonna talk with care. Versus somebody that's actually somebody you have no idea, and they just read your profile off a piece of paper. It's just based off of what they see, it's not based off what they actually know of you.

Along the same lines, participants expressed the need for access to social resources; some received this from their external networks and local job organizations, while others did not have access to either. Not having access to networks put our participants at a disadvantage, and caused participants to rank certain concepts lower than others. For example, while we anticipated Vouch for Me to raise job seekers' self-efficacy, some participants thought that this tool could be discouraging if they had limited connections. Erica (P8) mentioned that she had a hard time building a solid and reliable friend circle to get support. Allynna (P9) described similar experiences:

> [...] they always say it's not what you know, it's who you know, and if a person don't know nobody, how can they get out there and network with people, and get a job.

> [Vouch for Me] depends on how you network with people out here, because with *my* experience, it's like I done been around a lot of stuff where you're dealing with the human trafficking, where they will work you for free, and they would get in your mind, and brainwash. And [Vouch for Me] would probably go good for people that got good friends and [a] good network.

MediaTutorial

MediaTutorial was the least preferred concept among participants. While eight of our participants (N=8) believed that building a professional online image was a common need for general job seekers, most of our participants did not feel personally connected to the scenario and only saw the need for this tool among those who were looking for "decent" and professional jobs, and those who owned small businesses. Given that this did not represent our population, MediaTutorial was the lowest ranked concept for our participants, with 7 of the 11 participants ranking MediaTutorial among their bottom three choices. Most participants believed that MediaTutorial could be more beneficial for people and groups who needed online marketing or were looking for professional jobs. They believed that traditional job seekers would not benefit from this type of tool. For example, Erica (P8) stated:

> [MediaTutorial] is useful for people in a professional field, but [not useful] for getting a dishwasher job and stuff like that. I have never had no one look at my Facebook to my knowledge. But I would think in the medical

field and social work and lawyers and different things like that, it would be useful.

In addition, the limited accessibility to information technology and the relatively low level of computer literacy reduced job seekers desire to develop an online brand. Two participants (N=2) expressed never having used social media platforms. Chrissy (P11) raised general concerns about the limited digital literacy among job seekers:

> [MediaTutorial is not helpful for] people who are not computer literate. I believe [MediaTutorial] will be eventually needed by a lot of people, [because] everything is gonna be [online]. I think more computer training is needed in society, because a lot of people are not [computer literate] and that puts a lot of fear when you're job searching.

MediaTutorial's evaluation demonstrated that many of our participants did not perceive a need to curate their online identity.

DISCUSSION

We would like to first acknowledge that the aim of this work was not to contribute a ranking of employment tools among our job seekers, but a discussion about *why* our participants liked or disliked some of the concepts, and how this fits into the the broader employment literature. To maintain this goal, we discuss three key findings of this work. First, the most salient result was the overwhelming preference for employment tools that immediately address job seekers' *personal* and *social* needs—resume feedback, support for articulating job skills, and help determining concrete paths to achieve career goals. Second, we discuss our findings around the importance and challenges of social networks and maintaining an online brand for employment. Finally, those tools addressing *societal* needs were not ranked highly among our concepts.

Our top-rated concepts supported job seekers' self-efficacy and addressed their immediate and practical needs: resume feedback (Review-Me), and support for articulating job skills (SkillsIdentifier) and providing concrete paths to achieve career goals (DreamGigs). These concepts supported job seekers' *social* and *personal* needs and confirmed past findings that job tools should provide transparency and feedback during the job search process [43] as well as self-efficacy [32]. Further data solidify the need for immediacy. For example, ForgetAboutIt's results were somewhat polarized because the tool was ranked highly among those participants who had children and ranked lowest by those who did not. Although issues of discrimination were not salient in our main findings, some of our oldest participants ranked Anon-Interviews higher than others, reflecting the pervasiveness of age discrimination in employment [7].

The top-rated concept, Review-Me, provides access to a *social* resource; however, the tool mediates this interaction and removes the onus from job seekers to find a person who can provide this level of service. We discuss why this mediation of social resources might have been important to our job seekers next. Findings from our literature review support social capital theory and, particularly, the strength of weak

ties [23]—social ties and connections are critical in the job search process. In fact, as quoted in [29], according to Matt Youngquist, the president of a career coaching outplacement firm, between 70-80% of jobs are not published and are filled via trusted friends and acquaintances. Such statistics are the impetus for professional networking sites such as LinkedIn.

LinkedIn assumes that individuals have professional networks that could benefit them in the job-seeking process. While professional networking sites are beneficial for job seekers, most of our job seekers were discouraged by the Vouch for Me concept, which was rated second to last overall among our job seekers. Our participants had limited education and did not experience networking among college friends, professors, or career counselors, who are often called upon when individuals look beyond their own personal connections for job leads [9]. Further, long periods of unemployment remove an individual from social environments and from social networks populated with people who have higher social and human capital [9, 21]. Therefore, our job seekers might actually be disadvantaged by a concept like Vouch for Me.

Interestingly, Erica (P8) and Allynna (P9), who discussed the overall importance of having strong social networks, were supporters of Vouch for Me, which addresses a social need, yet ranked WeCanDoIt among their lowest concepts. WeCanDoIt, however, was ranked much higher than Vouch for Me among our job seekers overall. WeCanDoIt, contrary to Vouch for Me, provides a supportive network and addresses a social *and* a personal need to job seekers without a strong social network. Could a tool like WeCanDoIt provide the forms of support needed by those who lack access to strong social ties? Future research should investigate this question.

Another salient finding among new job-seeking literature is the rise of social media for branding and social identity, particularly among white-collar workers [22]. According to CareerBuilder's annual social media recruitment survey, 70% of employers use social media to screen candidates, 58% of employers are less likely to interview a candidate they can't find online, and 54% had decided not to hire a candidate based on their social media profiles [1]. Yet, the MediaTutorial, a concept aimed to support job seekers in developing a professional online brand, was ranked the lowest among participants. There were concerns of limited digital literacy [14, 15, 16, 38] around the ability to manage their social media in this way. However, our participants were perceptive in their realization that this tool was not useful for the types of jobs that they were seeking. In fact, Gershon found that identity branding is not as effective as some white collar workers believe, and less effective than social ties who can vouch for one's ability to be an effective employee [22]. This work supports our participants' belief that there is little value for them in social branding.

Finally, tools addressing societal needs (ForgetAboutIt, Anon-Interviews, and JobScore) were not ranked highly among our concepts. Our current results show that these concepts were preferred by some job seekers and not others. ForgetAboutIt, the only service concept, did not address the im-mediate needs of childless job seekers; Anon-Interviews was preferred among older adults. Although these results are reflective of the limitation of our small corpus, our findings suggest opportunities for employment tools to be more inclusive of the various barriers job seekers face (e.g., limited access to daycare, transportation, digital literacy, social networks).

Future research should investigate interventions that support other stakeholders in the job search, such as employment agencies and workforce development centers, whose existing efforts to support specific job-seeker needs could be amplified by technology. Future research should also investigate commonalities among these findings and those found in information and communication technologies for development (ICTD) literature. Despite the differences in geographic and work context (i.e. formal versus informal labor economies), the individual focuses on the discontinuity in employment, the importance of informal networks, and the existing structural barriers to seeking jobs are similar (e.g., [4]).

CONCLUSION AND FUTURE WORK

To conclude, we contributed a literature review of HCI research investigations of underserved job seekers and a set of ten tangible design concepts for future employment tools. We conducted a needs validation and speed dating study with underserved job seekers and found that the three most preferred concepts immediately address job seekers' most practical needs. These concepts provide job seekers with resume feedback, assist job seekers in articulating their skills based on their past jobs, and provide job seekers with a concrete path to achieve their goals.

There are opportunities for future researchers to validate the findings of our study across a larger and broader set of job seekers, and understand the potential for these tools to support external stakeholders such as career counselors, employers, and employment agencies. These questions could be addressed via a large-scale survey.

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