

# A Multi-Method Approach to Assessing the Usability of Mobile Job Advertisements

Stephan Böhm, Susanne J. Niklas, and Wolfgang Jäger

RheinMain University of Applied Sciences

Department of Media Management

Wiesbaden, Germany

e-mail: {stephan.boehm, susanne.niklas, wolfgang.jaeger}@hs-rm.de

*Abstract*—Accessing the Web from mobile devices has become increasingly common even when searching for job information. Nowadays, most job board offerings are mobile-optimized. However, the search results often refer to job advertisements (ads) and external career pages that are not completely optimized for mobile access. As a result, mobile users may be confronted with inadequate usability or a dissatisfactory user experience. In this context, the purpose of this study is to assess the usability of job ads posted on job portals to identify deficits and best practices. This paper is a work in progress and presents the intended multi-method approach as well as some preliminary findings for an exemplary sample of job ads posted on a German job board.

*Keywords*—Usability, User Experience, User Interfaces, Heuristic Evaluation, Mobile Recruiting

## I. INTRODUCTION

Recent studies point out that about 69 percent of all Internet users access the web using mobile devices [1]. In this context, it is becoming more and more common to use these devices in order to retrieve job information as well. In Germany, 58 percent of all online job seekers are already accessing job information via mobile devices; in high-tech industries or the media sector as many as 63 percent browse the mobile Internet for a new professional challenge [3]. Thus, mobile optimization is becoming essential in order to maintain reach among target groups and to keep up with the changing usage of media channels.

According to a multi-year study on mobile recruiting in Germany [5], HR managers attribute a growing relevance to mobile devices in personnel recruiting. In 2011, 95 percent of the participating HR managers stated that addressing potential candidates via mobile devices is becoming increasingly important. The proportion of companies and organizations using mobile recruiting technologies and applications rose from 8 percent in 2009 to 25 percent in 2011. A mobile optimized career website is offered by 17 percent of the companies according to the afore-mentioned study [5]. More recent analyses suggest that 24 percent of all German companies already offer a mobile optimized career website, followed by 17 percent with company-owned iPhone applications by the end of 2012 [3]. A study focusing on large enterprises in Germany revealed that as many as 80 percent of the companies provide a mobile career website and about 30 percent have a mobile career app [14].

Mobile recruiting activities of individual companies are complemented by job boards. Their providers aggregate job ads and career information across companies and sectors. In 2011, an analysis of the Apple App Store already identified ten mobile job board applications for the German market [4]. Employers who place job ads on job boards usually get a package for the online channels supported by the portal. When doing this, job board providers mobile-optimize access to their own portal functions, but may not alter the design of the job ads provided by a company. In that case, the search results of the job board can refer to a career website or a job ad that is not mobile-optimized. Thus, the mobile users may be confronted with inadequate usability or a dissatisfactory user experience.

As a result, all three interest groups are confronted with setbacks concerning their individual goals: The job seeker does not get the information he/she was looking for or has a poor user experience. Consequently, he or she probably decides to discontinue the app usage. The employer placing the job ad may experience a negative impact on the recruiting process, its employer branding, or may even lose a potential applicant. The job board provider, in turn, loses an app user, i.e., reach, which constitutes the basis of the job board business model. But even if a user does not directly discontinue the app usage, the design of the mobile ad and its content does play a major role concerning job ads' efficacy in terms of recall and retention [19]. However, regular usability guidelines for mobile websites cannot be applied directly to mobile job ads. Job ads provide very specific information within a focused area of application and thus require adapted criteria for usability analysis. But, despite the importance of these aspects and their high practical relevance, neither specially focused developer guidelines nor scientific research studies on mobile job advertising exist.

To fill this research gap, the study at hand aims to identify deficits and best practices on a mobile-optimized job ad design, proposing a multi-method approach. The research framework will be described in Section II, followed by the intended research methodology in Section III. Some preliminary findings and an outlook on further research are discussed in the last part of the paper.

II. RESEARCH FRAMEWORK

Requirements for the design of mobile-optimized job ads can be found in guidelines for the user-interface design of mobile applications or mobile websites, e.g., the well-known *Best Practice Guidelines* of the World Wide Web Consortium (W3C) [24]). Here, recommendations are given regarding image format support, style sheet support, page weight, or color usage. However, two problems exist concerning the usage of such guidelines: firstly, the development as well as improvements of modern smartphones are occurring at a furious rate. As a result, guidelines on principles for mobile development rapidly become outdated [9]. Secondly, those guidelines merely refer to technical capabilities and do not address the importance of different design aspects from the user perspective or usage context [15]. Some existing approaches, such as Nielsen’s usability heuristic [18] or the adapted metric of the Microsoft Usability Guidelines (MUG, [22]), present a more holistic view on aspects influencing system usability. The MUG guidelines are based on the ISO 9241 usability definition, defining usability as the “Extent to which a product can be used by specific users to achieve specified goals with effectiveness, efficiency, and satisfaction in a specified context of use” [13]. Besides structural evaluation in the form of heuristic analysis, user-oriented usability tests constitute an important evaluation method in order to measure efficiency, effectiveness as well as user satisfaction [12, 13]. User satisfaction can be measured by experience-based rating scales, product liking, or level of acceptance of the task solving effort [13].

As this study aims at giving practical recommendations for the design and development of mobile job ads, a multi-method approach with regard to both –structural evaluation as well as user based testing of usability aspects– will be adopted. In order to not just ensure success in terms of usability, but also in terms of a company’s communication success, research on design aspects influencing the reception of job ads’ content will be conducted additionally. The intended research approach will be described in the next section.

III. METHODOLOGY

Usability analysis can be classified in empirical and analytical methods. Empirical testing can comprise user and task observations of prototypes and final products by field or laboratory studies, including walk through and thinking-aloud analysis [2, 7, 18]. Heuristic evaluations, in turn, refer to assessment by a small group of evaluators according to a predefined set of usability guidelines or criteria [18]. As described above, mobile development often draws on technical guidelines and best practice standards, leading to the problems of being quickly outdated as well as not seeing the goal of overall usability concerning user satisfaction and usage acceptance [9, 15]. Heuristic usability evaluations however, by implementing a systematic inspection of user interface design aspects, enable the identification of usability problems to which special attention should be paid [18]. Here, two main methodologies are available for evaluation. Firstly, validator tools offer a standardized evaluation and in-depth analysis of websites determining how well the site

performs on mobile devices. Secondly, a heuristic evaluation can be carried out by looking at interface design in accordance with certain rules as listed in the guidelines. Here, a small number of evaluators (at least three) assess the compliance of a user-interface with usability principles, the so-called heuristics [18]. As presented in Figure 1, phase 1 of the study at hand implements two methods of usability evaluation for an exemplary set of mobile job ads: (1) A tool based usability evaluation by the *W3C mobileOK Checker* [25] and the *mobiReady testing tool* [17] validator. Both tools provide an overall value of “mobile fitness” as well as a detailed report on specific technical checks. (2) A heuristic analysis by evaluators, i.e., usability experts. The evaluation heuristic was defined by considering usability criteria of common standards, e.g., the W3C guidelines [24], the BBC Mobile Style Guide [10], the mobile applications of the MUG [22] or the Microsoft Mobile Design Guidelines [16].

1st Phase	<b>Usability (Design/System Perspective)</b>		Sample of Job Ads
	Tool-based Validation	Heuristic Evaluation	
2nd Phase	<b>Usability (User Perspective)</b> (User Walkthrough, Thinking Aloud)		
	<b>User Satisfaction</b> (User Questionnaire, Ranking of Job Ads)		
3rd Phase	<b>Design Best Practices</b> (A/B Testing, Variation of Design Elements)		Prototypes
	<b>Visual Perception and Effectiveness</b> (Eye Tracking, Recall Test)		

Figure 1. Study’s Multi-method Approach

In phase 2, empirical user testing is carried out to consider how users perceive mobile job ads and to identify usability issues and misconceptions from the user perspective [18]. Here, test subjects are asked to search for a job on the job board and to utilize presented job ads for this purpose (user walkthrough) by applying a thinking aloud approach for the analysis. This enables us to identify the job ads’ major aberrations and drawbacks with which the user is confronted when attempting to achieve his or her goal and to evaluate design aspects within an actual usage context. Following this procedure, the test users will be asked to rate the likability of the observed job ads as well as to rank them in order of their preference to get a measure of the users’ final satisfaction with the ads [13].

As mentioned above, the aim of the study is not only to evaluate pure usability aspects but also to assess the communication efficiency of the job ads. For this purpose, A/B testing will be combined with an eyetracking and a recall analysis in phase 3. Within the so-called A/B testing, various user interface design alternatives are analyzed to obtain design recommendations, i.e., design best practices. Here, only one single design attribute is varied and evaluated, like typeface or button design. Analysis of the different versions can either be done in a live setting by, e.g., tracking conversion rates of design alternatives or within an experimental laboratory environment [11]. An experimental setup enables a

combination of A/B testing with other types of analysis, e.g., to better understand user interaction and visual perception of the presented job ad [6]. For this purpose, one of the most advanced usability testing methods is the eyetracking technique, which can be conducted directly on a mobile device (using head-mounted systems) or based on a simulation/representation of the design artefact on a desktop-based configuration. Thus, researchers are able to gain information on unconscious perception and information processing, which can be used to optimize user interfaces [6, 20]. As it has been shown that content related design aspects like structure or visual design have a major influence on user perception and comprehension [8], these aspects were included in the study. To allow for aggregated group analysis and because the focus of this part of the study was on visual perception and not on user interaction, the study incorporates a desktop-based test configuration. Factors for design variation to be considered are, i.e., length and complexity of job description, single column vs. two column layout, or media richness. Aspects for such a variation can be identified within the preceding heuristic analysis and usability testing as well. The eyetracking analysis will be followed by recall tests on the user perception of the job ads' content. Here, users will be asked to name companies, job titles or to recall employer brands in order to measure ad efficacy [19]. The combination of the results from the eyetracking and recall testing is intended to gain recommendations for improving both, usability as well as communication effectiveness of the job ads. Aspects of the information quality [21] provided in the mobile-optimized job ad and its implications on the ease of finding appropriate job information in job portals is not analyzed but might be subject to future research.

#### IV. STATUS QUO AND PRELIMINARY FINDINGS

The implementation of the multi-stage research approach to assess the usability of job ads within the research project is a work in progress and not completed yet. As a first step, the heuristic evaluation was applied to a sample of 13 exemplary job ads from a German job board. As mentioned above, available mobile design guidelines were analyzed and consolidated to define an appropriate heuristic. By doing this, e.g., the formerly advised maximum page size of maximum 20 KB [24] was identified as no longer being up to date, since processing power and data transmission have improved tremendously [9]. Therefore, some more recent studies suggest that mobile pages should ideally not exceed 50 or maximum 100 kilobyte [23]. Other criteria refer to more detailed aspects like touch screen optimization, automatic redirects to mobile sites when accessed by mobile, the integration of inbuilt mobile functions like click-to-mail/-call, design aspects like font, contrast and images, as well as content related aspects concerning the appropriateness and relevance of information, e.g., job description, company, qualification or application. As shown in Table I, a catalog with criteria subdivided into the categories access/navigation (ACN), design (DES), content (CON), and interactivity (INT) was derived. The catalog contained more than 30 criteria for the evaluation of the job ads and was intended to complement the tool-based assessment of "mobile fitness" mentioned in

the preceding section. The tools calculate the mobile fitness as a percentage of mobile optimization. Likewise each category of the heuristic evaluation was measured by a percentage representing the extent to which the job ads comply with the criteria in the category as well as from an overall perspective.

TABLE I. AREAS OF HEURISTIC EVALUATION

Category	No. of Criteria	Areas of Analysis (No. of Criteria)
ACN. Access/Navigation	9	Mobile accessibility (3), use of mobile technologies (2), mobile optimized navigation (2), ease of access to additional sources (2)
DES Design	12	Layout and structure (3), text and readability (3), mobile optimized embedding of media (6)
CON Content	10	Corporate identity, appropriateness and relevance of employer and job information (8), contact channels
INT Interactivity	5	Click-to-mail/-call, social media integration, locate job on map, option to apply mobile

The sample of job ads was assessed by eight evaluators using these heuristic criteria. An overall result was calculated based on the ratings of the two validation tools (VAL) and the consolidated heuristic evaluation (HEU). At this stage of the study, no weighting of the criteria, categories or types of tests was applied. This means the overall result was calculated as the arithmetic average of the partial results. Table II shows the preliminary results for this analysis in phase 1 of our study. The table also shows the lowest (Min.) and highest (Max.) rating as well as the difference (Diff.) between the highest and lowest ranking job ad within each category and for the overall result.

TABLE II. PRELIMINARY RESULTS OF USABILITY ANALYSIS

	VAL	HEU	Heuristic (HEU) by Category				Overall
			ACN	DES	CON	INT	
Avg.	27%	50%	43%	56%	77%	24%	38%
Min.	12%	38%	22%	37%	45%	3%	26%
Max.	54%	69%	74%	83%	98%	48%	48%
Diff.	42%	32%	51%	46%	53%	45%	22%

The key finding is that each of the examined job ads needs to be improved in order to provide an acceptable mobile user experience. None of the thirteen tested job ads achieves an overall rating of 50 percent. This is mainly caused by the dissatisfactory results for most of the job ads in terms of technical validation. However, the results provided by the validators and the heuristic rating differ greatly in the majority of the cases as presented in Figure 2. Many of

the job ads achieve results between 10 and 20 percent in validation; only two of the job ads rated 50 percent or more. For the heuristic evaluation, all job ads reached 38 percent or more; five of them even achieved 50 percent or more. This is due to the fact that the validators are somewhat outdated (feature phone focus) and do not consider the context of use as does the heuristic evaluation. Over all, the weakest category of the heuristic criteria is “interactivity”: not one of the examined job ads fulfilled half of the criteria. In contrast, the majority of the job ads achieve quite good results in the area of “content”, but this was also the category with the biggest difference between the lowest and highest ranking job ad. The job ads with above-average heuristic results lose their top positions in the overall rating because of their low score in validation. The top positions in the overall rating have only average scoring in heuristics which is bolstered by a good validator score, possibly indicating a kind of trade-off between technical optimization and adoption of the technical capabilities of up-to-date smartphones.

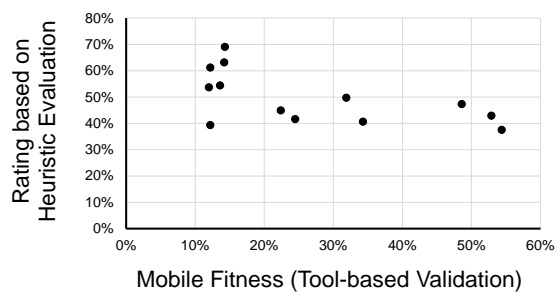


Figure 2. Usability Validation vs. Heuristic Evaluation

Overall, each of the analyzed job ads has plenty of room for improvement. In most cases, the technical “mobile fit” in terms of validation turns out to be poor. The performance of the mobile job ads in the areas of “content”, “design” and “navigation” is better, but far from good. Most notably, all of the tested job ads fail in the area of “interactivity”, where a good concept could really set a mobile job ad apart from the competitors. Next phases of the research project will contrast these results with the findings of assessing usability and effectiveness of the job ad design including the user perspective. Considering the deviations between tool-based validation and heuristic validation, it will be interesting to see whether the results from the heuristic perspective can be supported by the findings of the empirical testing. The relevant research progress will be presented at the conference.

## V. REFERENCES

- [1] Accenture. Mobile Web Watch 2012. Special edition: Germany, Austria, Switzerland, 2012.
- [2] R. Agarwal and V. Venkatesh. "Assessing a firm's Web presence: A heuristic evaluation procedure for the measurement of usability" *Information Systems Research* 13, 2, 2002, pp. 168–186.
- [3] BITKOM. *Mitarbeitersuche per Smartphone*, Berlin, 2012.
- [4] S. Böhm, W. Jäger, and S. J. Niklas. "Mobile Applikationen im Recruiting und Personalmarketing" *Wirtschaftsinformatik und Management* 3, 4, 2011, pp. 14–22.
- [5] S. Böhm and S. J. Niklas. "Mobile Recruiting: Insights from a survey among German HR managers" in *Proceedings of the 50th ACM SIGMIS annual conference on Computer and People Research (ACM SIGMIS CPR'12)*, Milwaukee, Wisconsin, 2012, pp. 117–122.
- [6] P. Chynal, J. M. Szymański, and J. Sobiecki. "Using eyetracking in a mobile applications usability testing" in *Proceedings of the 4th Asian conference on Intelligent Information and Database Systems (ACIIDS'12)*, 2012, pp. 178–186.
- [7] C. Coursaris and D. J. Kim. "A meta-analytical review of empirical mobile usability study" *Journal of Usability Studies* 6, 3, 2011, pp. 117–171.
- [8] E. Cuddihy and J. H. Spyridakis. "The effect of visual design and placement of intra-article navigation schemes on reading comprehension and website user perceptions" *Computers in Human Behavior* 28, 4, 2012, pp. 1399–1409.
- [9] English, E., 2012. W3C Mobile OK Checker and Mobile Web Best Practices – a bit outdated? <http://www.pijnz.com/blog/w3c-mobile-ok-checker-and-mobile-web-best-practices-a-bit-outdated/>. Accessed 28 May 2013.
- [10] B. Guyer, R. Puustinen, and C. D. D. Urschabch. *BBC Mobile Style Guide LI – Global visual language for the mobile Web*, 2009.
- [11] Hampson, M., 2010. A/B testing. <http://www.bbc.co.uk/blogs/webdeveloper/2010/01/ab-testing.shtml>. Accessed 29 May 2013.
- [12] A. R. Hevner, S. T. March, and J. Park. "Design Science in Information Systems Research" *MISQ* 28, 1, 2004, pp. 75–105.
- [13] ISO – International Organization for Standardization, 1998. *Ergonomic requirements for office work with visual display terminals (VDTs) -- Part 11: Guidance on usability*, 9241-11.
- [14] *JobStairs. Bewerber und Unternehmen setzen schon heute auf mobile Jobangebote*, Bad Nauheim, 2012.
- [15] A. P. Massey, V. Khatri, and V. Ramesh. "From the Web to the Wireless Web: Technology Readiness and Usability" in *Proceedings of the 38th Hawaii International Conference on System Sciences*, 2005, pp. 1–10.
- [16] Microsoft, 2010. *Design Guidelines*. <http://msdn.microsoft.com/en-us/library/bb158602.aspx>. Accessed 29 May 2013.
- [17] mobiReady, 2013. *mobiReady testing tool*. [http://ready.mobi/launch.jsp?locale=en\\_EN](http://ready.mobi/launch.jsp?locale=en_EN). Accessed 21 August 2013.
- [18] Nielsen, J. *Usability Engineering*. Academic Press, Boston, 1993.
- [19] M. de Sa, V. Navalpakkam, and E. F. Churchill. "Mobile Advertising: Evaluating the effects of animation, user and content relevance" in *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems*, 2013, pp. 2487–2496.
- [20] C. C. Seix, M. S. Veloso, and J. J. R. Soler. "Towards the validation of a method for quantitative mobile usability testing based on desktop eyetracking" in *Proceedings of the 13th International Conference on Interacción Persona-Ordenador (INTERACCION '12)*, 2012.
- [21] Shirlee-ann Knight and Janice Burn. "Developing a framework for assessing information quality on the World Wide Web" *Informing Science Journal* 8, 2005, pp. 159–172.
- [22] V. Venkatesh and V. Ramesh. "Web and wireless site usability. Understanding differences and modeling use" *MISQ* 30, 1, 2006, pp. 181–206.
- [23] Virginia Commonwealth University, 2011. *VCU Web Standards & Guidelines. Mobile Sites*. <http://www.webstandards.vcu.edu/mobile/>. Accessed 2 June 2013.
- [24] W3C, 2008. *Mobile Web Best Practices 1.0*. W3C (World Wide Web Consortium). <http://www.w3.org/TR/mobile-bp/>. Accessed 12 September 2011.
- [25] W3C, 2013. *W3C mobileOK Checker*. <http://validator.w3.org/mobile>. Accessed 21 August 2013.