A semi-automatic approach to evaluate the usability of Italian Public Administration websites on mobile

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I. INTRODUCTION

In recent years, mobile devices, specifically smartphones and tablets, have increased considerably, surpassing laptops' availability and frequency of use. Moreover, the portability of smartphones enables faster content access compared to laptops. In this context, the usability of websites and applications accessed via mobile devices has emerged as a pivotal aspect in ensuring favourable user experiences and attaining desired outcomes. The distinctive aspects of mobile devices, such as smaller screens, touch-based interfaces, and diverse connectivity conditions, present specific challenges to usability. Websites and applications designed for desktop platforms may not seamlessly adapt to the mobile environment, leading to potential issues such as navigational complexities, information overload, and sluggish loading times. Hence, evaluating the usability of websites and applications specifically tailored for mobile devices becomes imperative to identify and rectify any prevailing usability deficiencies.

This problem is amplified in small and medium Italian Public Administrations, for example, schools, small municipalities, and agencies, which struggle daily with a shortage of financial and personnel resources and thus cannot tackle the problem of website usability either on their own or through outside consultancies. These websites serve as platforms that offer essential public information, including details about public office locations, operating hours, and contacts. Moreover, they provide online services to citizens, holding the potential to reduce costs and waiting times significantly. Surprisingly, only 37% of Italian internet users actively engage with Public Administration (PA) websites [7]. This concerning statistic can be attributed to two key factors: the incomplete digitization of PA services and a lack of trust in the websites. Frequently, individuals encounter incomplete and outdated information, compounded by usability issues such as confusing page layouts and intricate navigation paths.

The Department of the Public Administration of the Italian Government has recognized the need to enhance PA website quality and has established a dedicated Working Group on Usability (in Italian Gruppo di Lavoro per l'Usabilità – GLU) [1]. This group emphasizes improving website usability in small municipalities, which comprise many PA organizations in Italy. Unlike larger organizations with sufficient resources to involve experienced website designers and evaluators, small municipalities often rely on editorial web staff with minimal to no experience in usability and user experience (UX) evaluation. Consequently, novice evaluators require straightforward evaluation methods that demand minimal time and personnel resources. Additionally, the availability of suitable tools to aid in usability and UX evaluation would greatly support their efforts.

This article addresses the pressing need to evaluate the usability of Italian PA websites used through mobile devices. Specifically, we present *eGLU-Box mobile*, a platform designed to allow PA web admins in Italy to assess the usability of their websites used by mobile devices. This solution is one of the results of the eGLU-Box Mobile project, supported by the former Ministry of Economic Development, now the Ministry of Enterprise and Made in Italy (MiMIT), in collaboration with the Universities of Perugia and Bari. The project aimed to create a new mobile application allowing users to use the eGLU-Box on smartphones and tablets. In the following, we report on some details of the eGLU-Box mobile application, describing how it supports a semi-automatic evaluation of websites on mobile devices.

II. EGLU-BOX MOBILE

eGLU-Box mobile has been developed to assist Italian PAs in the usability evaluation of their websites when used on mobile devices. This platform is based on the eGLU-Box LG Protocol: Universal Usability Guidelines. Version 2018.1 of the eGLU-Box LG Protocol outlines a standardized procedure for investigating the usability of various products. This technology-agnostic protocol can be applied with minimal adaptation to multiple products and services distributed through different channels, such as information websites, online services, paper documents, desktop applications, and mobile applications for smartphones and tablets. The primary objectives of this protocol are twofold: (i) to establish a procedure that promotes direct user involvement and observation in the evaluation of online sites and services and (ii) to encourage public operators to prioritize usability considerations. The user observation process involves five key steps: (i) *task definition*, in which the observer specifies the tasks to be performed by the participants, such as searching for specific information, filling out online forms, or downloading documents; (ii) *user selection*; (iii) *user task execution*, in which the observer refrains from asking direct

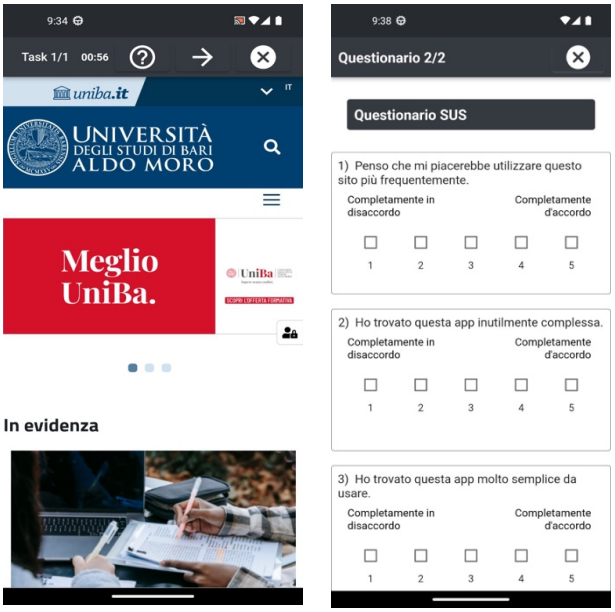
questions; (iv) *questionnaires administration* after task completion; and (v) *data analysis* based on the collected quantitative or qualitative data. When done correctly, this procedure can be considered a basic yet simplified usability study conducted by individuals without extensive expertise. In addition, the protocol provides PA web admins with insight into potential interaction problems with their websites and online services.

eGLU-Box mobile extends the already existing eGLU-Box PA platform, which aims to bridge the gap between theory and practice [2-4]. By following the comprehensive guidelines outlined in the eGLU LG Protocol, the eGLU-Box PA platform enables even non-experts to successfully conduct usability studies in a simplified and semi-automatic way. To initiate a usability study with eGLU-Box PA, an observer, such as a web admin or experimenter, assumes the role of "evaluator" and accesses the Web platform through a browser. The evaluator has to define the tasks the study participants will perform on the specific website to be evaluated. In addition, the evaluator has to select one or more self-report questionnaires, such as the System Usability Scale (SUS) [5] and UMUX-LITE [6], to be completed by the study participants at the end of the tasks. Once the evaluator has configured the study, each participant receives an email with an invitation to access the eGLU-Box mobile app as a user study participant. This app provides step-by-step instructions on how to navigate through the website to be assessed, displaying the designated tasks and questionnaires created by the evaluator. User actions are automatically recorded by eGLU-Box mobile through webcam footage, screen recordings, and microphone input and sent to the platform web server at the end of the study. After the participants' study executions, eGLU-Box PA automatically analyzes the collected data and generates comprehensive reports that include task durations, task success rate, questionnaire results, participant registrations, and more. This data analysis allows evaluators to identify usability errors in the website.

An experimental study was conducted in which the participants were divided into two groups: an experimental group, which used the new mobile application from a smartphone, and a control group, which used the desktop application from a computer. The participants' behaviour was assessed using explicit (e.g., self-report questionnaires) and implicit measures (e.g., eye movement data). The results were encouraging and showed that the mobile and desktop versions of eGLU-Box enabled participants to test the usability with a similar level of UX, despite some minimal (although significant) differences in satisfaction of use. More details about this study are reported in this paper [7].

III. Conclusion

This paper presented eGLU-Box mobile, a mobile app that assists in evaluating websites when used on mobile devices. It has been developed to foster the usability evaluation of Italian PA websites, but it can also be adopted with all the websites when used on mobile devices. More details about the eGLU-Box PA platform and its mobile app eGLU-Box mobile will be presented at the conference.



a b

Figure 1. Task execution (a) and questionnaire accomplishment (b) on eGLU-Box mobile.

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