



User Experience Evaluation Framework for Malaysian E-government Mobile Applications: A Participatory Design-infused approach

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ABSTRACT

This proposal outlines a research on user experience evaluation frameworks, specifically for the Malaysian e-government mobile applications. The primary objective is to propose a comprehensive framework for user experience evaluation, taking into consideration the cultural aspects. In order to achieve this, the research will employ a mix of both qualitative and quantitative methods, with participatory design infused in the research design. The evaluation framework and recommendations from this research can be used by those who are involved in producing e-government mobile applications.

CCS CONCEPTS

• User experience; • User experience evaluation framework; • UX and culture;

KEYWORDS

E-governments, user experience evaluation for e-government mobile application

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1 INTRODUCTION

This research proposal aims to investigate user experience (UX) evaluation frameworks, specifically for Malaysian e-government mobile applications, taking into consideration cultural aspects. The research aims to address the current absence of a UX evaluation framework for Malaysian e-government mobile applications, intending to offer valuable insights into producing and evaluating e-government mobile applications with good or positive UX. The motivation behind this study stems from the current absence of a UX evaluation framework for Malaysian e-government mobile application (to the best of the author's knowledge), with existing works focusing on usability evaluations and/or e-government websites, and without considerations of cultural aspects. Another motivating

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factor to delve deeper into this study are the personal observations of the challenges experienced by individuals in the author's immediate environments, caused by poor or unfavourable UX – difficulties, frustrations, and inefficiencies. Recommendations stemming from this research are expected to contribute in informing those who are involved in producing e-government services mobile applications – UX evaluators, design and development teams, policymakers, practitioners and researchers, as well as the government, as owner of the e-government mobile applications. This study endeavours to contribute meaningfully to the existing body of knowledge in UX evaluation specifically, and human computer interaction, generally, as well as to the users and stakeholders.

1.1 E-government

E-government is defined as the use or application of information and communication technologies (ICTs) for the access and delivery of government services, the dissemination of government information, and the communication between the government and its citizens, agencies and stakeholders, and for internal government operations. The aim of e-government is to improve efficiency and effectiveness of the operations and accountability of governments, as well as improve the government's engagements with citizens [1], [2], [3]. E-government began in Malaysia in 1996 with the implementation of the Multimedia Super Corridor. The government focused on developing ICT and e-government initiatives, as efforts to recover from 1997's Asian Financial Crisis. E-government was one of the first seven (7) flagship applications created in the 1996 efforts (multipurpose smart card (known today as MyKad), smart school, telehealth, research and development clusters, electronic business, and technopreneur development). Under e-government then, there were seven (7) main projects namely Electronic Procurement (e-Perolehan), Project Management System, Electronic Services Delivery (e-Services), HRMIS, Generic Office Environment (GOE), E-Syariah, and Electronic Labour Exchange (ELX) [4]. Since its inception in 1996, there are more e-government initiatives added to the myGovernment repertoire, and these services are accessible via e-government websites. Today, in keeping up with modern times, technological progress and having a high number of citizens owning smartphones [5], e-government services are also available in the form of mobile applications that can be accessed on portable gadgets such as smartphones and tablets. E-government mobile applications that are available and widely used in Malaysia include MyJPK, MySejahtera, myEG, myTNB, and EPF's i-Akaun from the federal government, and Selangkah and Sarawak Gov applications from the Selangor and Sarawak state governments. Similar to other

applications of information and communication technologies with human users, e-government mobile applications possess UX.

1.2 User experience

User experience is present in every product that is used by people (users); these products range from everyday items such as newspaper, bottles, armchairs, and sweaters etc [6], [7]. In line with this, computing products – systems, applications, websites etc – in various domains, too, including e-government services, have its own UX. The International Organization for Standardization (ISO) produced its definition for the term “user experience” in its ISO 9241-210:2010 standards as “a person’s perceptions and responses resulting from the use and/or anticipated use of a product, system or service” [8]. UX takes into account users’ emotions, beliefs, preferences, perceptions, responses, behaviours, and accomplishments that occur before, during, and after using a product, system, or service; all of these contributes to the user’s overall interaction with the product, system or service. UX extends usability beyond effectiveness, efficiency and satisfaction – because of this, UX is considered to be broader than usability, and usability is a subset or component of the UX [9]. definition of usability is “the extent to which a product can be used by specified users to achieve specified goals with specific effectiveness, efficiency, and satisfaction in a specified context of use”, as stated in the ISO 9241-11:1998 standards for usability [10], [11]. Preceding UX, usability originated from the rise of personal computing at the end of the 1970s and early 1980s, when personal computers were introduced to the market and made accessible to anyone; previously computers were only available to researchers, computing professionals and hobbyists [12]. However, usability, primarily focusing on the product’s effectiveness, efficiency, and satisfaction, is insufficient in the comprehensive quality of the UX [6]. Current trends have shifted the focus from usability to UX instead, as UX provides richer insights into the relationship between users and technologies.

1.3 Evaluation

Evaluation in the context of this research, is the process of collecting and analysing data about users’ or potential user’s UX when interacting with artifacts – screen sketches, prototype, components of a system, a particular function, the whole workflow, the complete system or application, safety features, etc. It is crucial to conduct evaluation, for the following reasons: rigorous evaluation helps to enhance the overall quality, understanding users’ expectations so that the product aligns with their needs and preferences, ensuring products are well-designed because good experiences lead to sales and continuous use, and to identify and rectify any issues before the product is released to the market [6]. Evaluation is directed, and one of the ways to guide the evaluation is by using evaluation frameworks. In the context of UX evaluation, an evaluation framework is a structured method or a set of guidelines that offers a systematic and organized way for planning, assessing, measuring, and analysing the UX of a product, service or environment [13], [14].

2 KEY/RELATED WORKS

There are numerous e-government mobile applications in Malaysia, including but not limited to MyEG, MySejahtera, Selangkah, the Sarawak Gov App, etc. However, a review of existing literature reveals a notable absence of prior works on UX evaluation frameworks for e-government services in Malaysia, where existing evaluation efforts predominantly focused on usability and/or websites [15], [16], [17], [18], [19], [20], [21], [22]. A closely-related work is the usability evaluation framework for mobile applications, by Rahmat [33]: the framework, taking into consideration viewpoints of multiple evaluators with different usability evaluation skills levels and perceptions, consists of usability features, usability criteria, and interface features tiers and a usability checklist with 373 paired items. These usability evaluations do not adequately address UX aspects, which are more than the effectiveness, efficiency and satisfaction aspects that usability evaluations are typically concerned about, and consequently this may lead to potential oversight of valuable and rich insights that could be extracted from the more holistic UX evaluation. Furthermore, these works do not consider cultural aspects as a component of the UX. To the best of the author’s knowledge, a study that addressed UX evaluation for e-government services in Malaysia; [23] conducted an exploratory, investigating the UX of e-participation services in a Malaysian e-government website by administering the think aloud method in a laboratory setting and a set of interaction experience questionnaires on ten participants. In using the think aloud method, the participants explicitly expressed their thoughts while using the website, enabling the researchers to gain rich insights into the users’ mental processes and understand the reasons for their behaviours, while the questionnaire was adapted from existing research that have been validated to measure UX dimensions of perceived enjoyment, perceived aesthetics, intensity of flow and perceptions on hedonic and pragmatic qualities. In the international context, several works on UX evaluation on e-government services exist. [24] examined the UX (UX) of Indonesia’s e-health mobile application, PeduliLindungi, utilizing an adapted version of the meCUE 2.0 questionnaire. [25] introduced the AIT2-UX framework for assessing the UX of Brazil’s Federal Revenue Board website. [26] employed a questionnaire to explore the UX of the Nigerian Immigration Services website. [27] conducted interviews to investigate a range of India’s e-government websites, while [28] conducted a comparative analysis of the UX of Kuwait’s Ministry of Public Works’ portal before and after a redesign. There are also existing UX frameworks and standards, such as the UK’s Digital Service Standard, the US Digital Service and Malaysia’s KRISA [29], [30], [34]. The UK’s Digital Service Standard ensure all digital services including mobile applications meet certain standards, quality and UX while the US Digital Service is a guideline for designing mobile applications for government services. The Malaysian Administrative Modernisation and Planning Unit (MAMPU) has produced several guidelines for public sector applications design and development by government agencies, including KRISA (Application Engineering Guide for the Public Sector in Malay language). KRISA phases are initiation, analysis, design, construction, testing and implementation. Phase 3 (design) includes the steps for interface design that has UX

considerations – attractiveness, user-friendliness, and trustworthiness. Evaluation is carried out in phase 4 (testing by developers), and phase 6 (user acceptance test and provisional acceptance test). Adnan et al [35] conducted a systematic review to examine the challenges of e-participation, a component of e-government and recommended that further research is required to probe deeper into UX and preferences across various contexts, as majority of the research focused on user interaction and satisfaction. In light of Malaysia's high power-distance index (PDI) in government agency setting, Ghazali et al [36] proposed securing agreement first from respective decision-making government agencies, before commencing any project with UX embedded in it – the researchers suggest a participatory design method in the form of workshops with respective agencies to achieve consensus on the UX details and disseminate genuine information. The researchers in Hussein et al [37], thirty Malaysian participants aged between 18-65 and of different abilities were subjected to a participatory design session with the aims to identify insights into the service design features and frustrations when using government online services; findings revealed that there is absence of systems that support users with impairments; one-size-fits-all approach do not work as users have different requirements, indicating accessible and inclusive designs are essential; there is an absence of engagement platforms for both citizens and government agencies, necessitating the need to establish policies for a co-creation space; and comprehending the personas of Malaysian citizens could be a game-change for digital government design.

3 RESEARCH QUESTIONS

The findings from this literature review shows that currently there is no UX evaluation framework specifically for Malaysian government services mobile applications, that also takes into consideration the cultural aspects in UX. The study by [31] provided valuable insights on how user interfaces that are developed with cultural considerations, contributes to positive and better UXs, which is also echoed by [32]. Thus, this research asks the following research questions:

- What are the key UX elements that should be measured in evaluating UX of Malaysian e-government mobile applications?
- What is the extent of the relationship between cultural aspects and the UX of Malaysian e-government mobile applications?
- What are the components that must be included in the framework for evaluating UX of Malaysian e-government mobile application?

4 PARTICIPATORY DESIGN METHODS

Given the involvement of end-users, designers, experts, and stakeholders in e-government service mobile applications and the significance of their perspectives, participatory design (PD) is considered appropriate to be incorporated into this research's methodology. PD gives the author the opportunity to gather insights from the various people involved, including the end-users, allowing this research to be user-centric. PD methods that are planned to be used include, but not limited to, surveys and interviews, contextual inquiry and

observation, prototyping, and co-design sessions. Integrating these methods will facilitate a robust and holistic UX evaluation framework. The research methodology combines both qualitative and quantitative methods employed to comprehensively analyse the data. The decision for selecting the mixed-method approach is due to the nature of the data – this research will examine data from both qualitative and quantitative sources, as well as this research hopes to obtain a more holistic, nuanced and robust understanding of its research questions. The sources of the data are identified to be from interviews, focus groups, and open-ended surveys (qualitative methods), as well as close-ended surveys, usability testing, and statistical analyses (quantitative methods). These data will then be analysed using methods such as (potentially) content analysis, text analysis, and statistical analysis.

5 INTENDED CONTRIBUTIONS

The intended contributions of this research include a comprehensive UX evaluation framework tailored specifically to the needs of Malaysian users, considering their cultural nuances and preferences. This framework aims to be robust and holistic, encompassing various aspects of user interaction and satisfaction with e-government mobile applications. By integrating cultural considerations into the evaluation process, it seeks to enhance the usability and effectiveness of these applications within the Malaysian context. Furthermore, the knowledge generated through this research will be valuable to those who are involved in the production of e-government mobile applications, providing insights and guidelines to improve UX and overall effectiveness of such platforms in serving the needs of Malaysian citizens. Simultaneously, other nations have the opportunity to tailor the framework according to their specific requirements and preferences.

6 PROGRESS AND PLANS

To date, the research is still in the literature review and designing research methodology stages, in preparation for a proposal defense at the end of the author's first year of study, and a comprehensive examination (with formal written and oral components) in the second year of the study. Moving forward, the research will focus on deepening the literature, designing the research methodology, and completing the research proposal, followed by data collection and analysis, and writing and submitting the doctoral thesis.

7 MAIN CHALLENGES

The main challenges in this research are the limited availability of scholarly works directly addressing the UX evaluation of Malaysian e-government services, and the diversity and breadth of the UX elements and metrics. Identifying the specific UX elements and metrics suitable to the evaluation process requires meticulous scrutiny and discernment amid the vast array of potential variables. Therefore, navigating through these challenges to pinpoint the most relevant elements and metrics for the evaluation framework demands careful consideration and strategic selection. This challenge underscores the importance of methodological rigor and precision in delineating the key factors that contribute to a comprehensive understanding of UX evaluation within the Malaysian e-government context.

8 INQUIRIES

The inquiries the author wishes to pose are:

- i. What are other perspectives that should be considered in this research?
- ii. What are insights from other fields that could potentially enrich this research?
- iii. What are the perspectives or ideas that the author has overlooked in this research?

9 EXPECTATIONS FROM PDC2024

The author hopes to gather feedback, recommendations and insights from fellow peers during the doctoral colloquium. Additionally, the author aims to forge connections that might pave the way for future collaborations, all within the ethos of participatory design. The author is confident in her ability to contribute to the discussions and sessions at PDC2024, through this research and past experiences as an academic. The author believes that participating in PDC2024 will offer significant benefits both in the present as a doctoral candidate and in the future trajectory of her academic career.

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BIOGRAPHY

Born and raised in Kuching, Sarawak, Emmy Hossain is a first-year and first-generation doctoral candidate at the Faculty of Computer Science and Information Technology, Universiti Putra Malaysia (UPM), under the Human Computer Interaction research group. She holds a Master of Science degree from Universiti Sains Malaysia (USM), under a Government of Malaysia scholarship. Her research interests include, but not limited to user experience evaluation, ICT4D, and culture and heritage preservation through ICTs. Prior to pursuing her PhD, she spent 7 years as a lecturer and research fellow at Universiti Malaysia Sarawak (UNIMAS). She has presented

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