Ph.D. Thesis

Anticipated User Experience (AUX) Framework for Using Mobile Phones for Voting in a Developing Country Context

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Abstract

A high voter turnout in free and fair elections defines the basic foundations of a good democratic process which develops and strengthens good democratic institutions. By participating in a free and fair election, the electorate holds within their authority the supremacy to accord political legality or withhold it from any leader, institution and regime. Since democracy in its most fundamental sense is the rule by the people, the number of citizenries expressing their preferences through voting is of significant interest to the very core definition of democracy. However, voter turnout in general elections for many African countries is normally low. In 2009, the African continent was reported to have a voter turnout of 65%, the lowest in the whole world. In some countries, voter turnout has even been lower. For example, the 2010 general elections in Tanzania registered a 43% voter turnout while the Ugandan presidential elections of 2011 registered a 57% voter turnout. In Nigeria, the 2015 general elections registered a 43% voter turnout. The low voter turnout in African countries has been attributed to violence, intimidation, and rigging, delays in the voting process and apathy among certain categories of voters such as women, youth and the elderly. Hence, there was a need for research on how voter turnout in countries facing this problem can be increased.

Information and Communication Technology (ICT) particularly mobile technology has been given as one of the tools that can contribute to addressing this problem. Using mobile phones for voting has a great potential to increase voter turnout given the accessibility, cost and reliability advantages they have over other voting technologies. However, mobile phones have not yet gained much acceptance and satisfaction as voting tools in developing countries because of the negative perceptions and responses people have towards the use of mobile phones for voting. The negative perceptions and responses are referred to as User Experience (UX), a field in Human-Computer Interaction (HCI). ISO defines UX as the perceptions and responses that result from the use (during use) or/and anticipated use (before use) of a product or service. From the ISO definition, UX is associated with a person's perceptions and responses that arise when a particular product or service is being used (during use), and secondly, UX is also associated with perceptions and responses that arise as a result of anticipating the product use (before use). The second part of the ISO definition is closely related to the perceptions and responses that result from the anticipated use of mobile phones for voting-referred to an Anticipated User Experience-AUX (before use experience). Ideally, any user experience model or framework could be used to address the negative perceptions and responses that result from the anticipated use of mobile phones for voting. However, existing UX models and frameworks provide very little on how AUX (before use experience) can be attained. Many of the existing models and frameworks focus on how user experience during and after use of a product can be achieved. The AUX

framework by Yogasara (2014) provides guidance on how AUX can be achieved but suffers several limitations key of which include: it is a high level and generic framework, it does not show how each of the components/characteristics of the framework can be achieved and the representation of the relationship between the components/characteristics is complex, making the framework difficult to understand and apply. The general objective of this research was to develop an AUX framework for using mobile phones in voting in a developing country context. The specific objectives included:

1. To ascertain perceptions and responses towards the use of mobile phones for voting in a developing country context
2. To elicit requirements for influencing positive perceptions and responses towards the use of mobile phones for voting in a developing country context
3. To design an AUX framework for influencing positive perceptions and responses towards the use of mobile phones for voting in a developing country context.
4. To evaluate the designed framework validate

To address objective one, literature review method was used to establish the perceptions and responses towards the use of mobile phones for voting in developing countries. This review revealed a high negative perceptions and responses toward the use of mobile phones for voting. In order to validate and supplement the findings from the literature review, a survey was conducted within Uganda. The survey finding indicated that 58 percent of the sampled population had a negative perception toward the use of mobile phones for voting. These results confirmed findings from the literature review.

The second objective was addressed using three methods. Literature review, survey, and Focus Group Discussion. First, a literature review was used to obtain requirements that would influence positive perceptions and responses towards the use of mobile phones for voting in developing countries. The research was able to elicit 11 requirements. A survey and FGDs were thereafter conducted to determine the extent the requirements identified using literature search would influence positive perceptions and responses towards the use of mobile phones for voting. The survey and FGDs showed that the requirements could positive perceptions and responses towards the use of mobile phones for voting to a considerable extent.

The third and fourth objectives was addressed by a combination of methods. Using the obtained requirements, an AUX framework for using mobile phones for voting in a developing country context was developed using the design science approach particularly the 'build and evaluate' stages of the approach. The choice of design science over other information systems/information technology research methods was based on its rigor in building and evaluating artifacts and its innovation leaning approach of iterations of build and evaluate. Within the framework of design science, a four-step process was used to design the AUX framework namely: Identification of a knowledge gap; identification of variables, classification and building relationships between variables, justification of variables, their classification, and relationships. The purpose of following the four steps was to enhance the contribution of the research to knowledge, an aspect where the design science research approach is weak. The AUX framework for using mobile phones for voting in a developing country context was then developed through the extension of the AUX framework by Yogasara (2014) following the extension method of building research theories. The choice of

Yogasara's (2014) framework over other UX frameworks was based on the fact that compared to other UX models and frameworks, it met majority (8 out of 11) of the AUX requirements for using mobile phones for voting in a developing country context. To make the extended framework more informative and practical, the AUX requirements for using mobile phones for voting in a developing country context were classified into three broad categories using principles of persuasive technology and technology adoption. The categories include: contextual requirements, human requirements and product requirements. On the other hand, the principle of cognitive psychology was used to simplify the presentation of the relationships between the components/characteristics of the AUX framework. The use of the three stages of the principle of cognitive psychology namely: stimuli, cognitive process and behavior, was used to simplify presentation of how AUX requirements (stimuli) can influence AUX (cognitive process) which in turn causes a behavioral change in form of perceptions and responses towards use of mobile phones for voting. The developed AUX framework was evaluated through a mobile phone voting prototype developed based on the AUX framework, use of experts and user studies.

The key contribution of the research is a demonstration of how a user's UX before using the given product or service can be achieved in the design of a product or service in general and a mobile voting service, in particular, can be achieved. The other contributions include:

- The new AUX framework also demonstrates how an established theory in psychology like cognitive psychology theory can be used to explain in practical terms- how AUX occurs, an approach that had not been used before.
- The new AUX framework also provides guidance on how AUX in a product/services in general, and in using mobile phones for voting in a developing country context in particular, can be achieved
- A mobile phone voting prototype developed based on the extended AUX framework.