Initial experiments on the effectiveness of telephone access to government services

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Abstract. We report on research aimed at gaining an improved understanding of how issues such as language, literacy and previous exposure to technology affect citizens' ability to access government services of different complexity via ordinary telephony. We discuss user interface issues in conditions of low literacy and where previous exposure to technology is low. The results are based on field experiments with citizens using a real government application. The experimental set-up is described and the experimental procedure and results reported.

1 Introduction

Full access to government services require alternatives to web based e-government services. In the developing world, access through ordinary telephones are particularly important due to the relatively high levels of access to telephones as well as the relatively low levels of infrastructure and user sophistication at which such services can operate [1]. We are researching electronic service delivery in a developing world context. Our research is aimed at understanding how to implement telephone based services in a multilingual, multicultural environment with varying degrees of literacy, numeracy and technological sophistication. To this effect we are conducting a series of field experiments based on a government application.

2 Experimental approach and results

The objectives of the experiments were to improve theory on the use of user experiments, develop design guidelines and develop an ability to predict the success of voice based government services based on biographic details of target populations and complexity of the application/service. The experiments were based on telephony interfaces to an application forming part of the Unemployment Insurance Fund (UIF) claim process [2]. Dual Tone Multi Frequency (DTMF) and Wizard of Oz [3] based voice recognition system versions of the system were implemented in English and two indigenous local languages: IsiZulu and Setswana.

Each experiment consisted of pre- and post-experiment interviews and an observed experiment. The experiments were performed at the Department of Labour in Pretoria, South Africa, in November 2003. Unscreened participants were solicited from the queue of UIF applicants. 14 callers used the speech-input system, and 16 callers used the DTMF system. The majority of the participants were home language speakers of the Sotho family of languages (Sesotho, Sepedi or Setswana) preferring to use the Setswana version of the systems. Male and female users with various educational levels ranging from 25 to 54 years in age participated. Most participants had previous exposure to technology.

The experiment did not lend itself to detailed statistical analysis of system usage and success. However, a number of conclusions were reached. Although transaction-completion rates were comparable for the speech-input and DTMF systems, users were much more comfortable with the speech-based system as reflected in somewhat higher user-satisfaction scores for that system. Transaction times and the number of user errors were not significantly different between the two experimental conditions. Many users had significant difficulties with the entry of long numbers. Most users found the applications challenging to use resulting in significant baseline cognitive loading, especially in the DTMF application. Even though the experiment had been designed for users with limited literacy, the design was still too complex for most users.

3 Conclusion

Our experiments suggested enhancements to our experimental procedure, and we are currently designing a follow-up experiment that will be used to investigate the validity of the conclusions derived, as well as other issues. From these experiments, we hope to derive a general model that will allow us to predict the success of telephone-based applications for various classes of users. This research will hold application not just for government service delivery but also in financial and other services sectors. This research will stay relevant due to the continued importance of speech interfaces and the fact that speech access is likely to remain easier than other forms of phone-based Internet access.

References

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