Designing an E-Government Portal Accessible to Illiterate Citizens

By
Imane Taoufik
Dr. Hind Kabaili
Dr. Driss Kettani

School of Science and Engineering
of Al Akhawayn University in Ifrane
Morocco
Agenda

- Introduction
- Project’s Requirements
- Software Engineering Process
- Literature Review
- Architecture and Technologies of Fez E-Gov Portal
- Design Approach of Fez E-Gov Portal
- Applying the Design Approach
- Assessment of Fez E-Gov Portal
- Conclusion & Future Work
Introduction

Context

- Sub-project of the "Fez E-Gov" project conducted by the ICT4D lab research group at AUI

- Funded by the Canadian IDRC
Objective

- Improving knowledge about how illiterate citizens in Morocco can interact with E-government services
- Designing a GUI for Fez E-Gov portal that is usable both by literate and illiterate citizens
Project’s Requirements

- **Functional Requirements**
  - Allow citizens to get their official papers electronically
  - Allow citizens to get information about government services

- **Non-Functional Requirement**
  - The system must be easy to use since it is aimed to be usable by all types of citizens: literate, digitally illiterate and functionally illiterate citizens
  - The system should interface with the existing database containing the civil state electronic registers
  - Pilot site: Arrondissement of AGDAL in Fez and its related Office of the Civil State
Software Engineering Process

Evolutionary Development Model

System Requirements

System Design

Evolution 1

Evolution i

Evolution n

Evolution:
- Requirement
- Design
- Implement
- Deliver to citizens
- Gather and study results

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Literature Review

- Architectures to Build an Illiterate User System
  - Server Based Approach (browser programming + speech synthesis)
  - Client Based Approach (custom written web browser based on pictures)

- Architectures to Build an E-Gov System Accessible to Illiterate Users
  - Existing documented experience in South Africa: Telephone-Based Service Delivery
Literature Review (Cont.)

- Interface Design Approaches:
  - Experimental Approaches
    - Holding focus groups with potential users of the system,
    - Observing users of the system working in their current environment,
    - Organizing Wizard-of-Oz tests,
    - Running usability experiments
  - Non-Experimental Approaches
    - Task analysis
    - Structured design
    - Visual or Holistic design
    - Hypothetical design scenarios
Architecture and Technologies of Fez e-Gov Portal

- Hybrid architectural solution:
  - Browser Programming
  - Pictures with speech
  - Pre-recorded words
Design Approach of Fez e-Gov Portal

- **Non-Experimental Approach:**
  - hypothetical design scenarios

- **Experimental Approaches**
  - Organizing Wizard-of-Oz tests,
  - Running usability experiments
Applying the Architecture and Technologies

- **Browser programming**: JavaScript

- **Pre-recorded words**: RealAudio 3.0 to efficiently store and transmit the sounds

- **Pictures**: the choice and the use of pictures based on well defined principles and participatory design sessions

- **Touchscreen**: the interaction technique is based on direct manipulation
Applying the Design Approach

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Applying the Design Approach (Cont.)

Design Decisions

- Highlighting the text that is read in bold
- Hearing the sound will be enabled once we click on the sound icon.
- A demo will be provided with voice explanations
- Sound and image icons will be on the right side of the text.
- Include print function
- Build a convention on the type of symbols to be use
Applying the Design Approach (Cont.)

First Prototype

- Use a numeric keypad for data entry
- More interactive vocal instructions are needed
- The help icon was not used
- The introduction to the GUI symbols should be done gradually at each step
- Base the explanations not only on the vocal instructions
- After finishing the process, tell to the citizen that they have finished
- Wizard of oz testing
Applying the Design Approach (Cont.)
Applying the Chosen Design Approach (Cont.)

- Second Prototype

- Change the function triggered by clicking the pictures

- Incite the citizen to use the ear symbol
Assessment of Fez E-Gov Portal

- Heuristic Evaluation (Expert Reviews)
  - Methodology:
    - 3 evaluators expect the GUI based on rules
    - The 10 Usability heuristics specified by Jakob Nielsen
  - Results

- Usability Testing (User Reviews)
  - Methodology:
    - Testing Form: % error in performing each task
  - Results
Assessment of Fez E-Gov Portal (Cont.)

- Usability testing results
  - number of test cases: 155

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<thead>
<tr>
<th>Educational Level</th>
<th>Percentage</th>
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<tr>
<td>Illiterate</td>
<td>7.1%</td>
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<tr>
<td>Primary School</td>
<td>2.7%</td>
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<tr>
<td>Secondary School</td>
<td>6.8%</td>
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<tr>
<td>High School</td>
<td>29.7%</td>
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<td>University Education</td>
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<table>
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<tr>
<th>Tasks</th>
<th>% Errors</th>
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<td>Recognizing the needed service</td>
<td>29.2%</td>
</tr>
<tr>
<td>Using the ear symbol</td>
<td>8.4%</td>
</tr>
<tr>
<td>Inserting Birth Certificate Year</td>
<td>1.9%</td>
</tr>
<tr>
<td>Inserting Birth Certificate Number</td>
<td>3.9%</td>
</tr>
<tr>
<td>Using the print icon</td>
<td>0.6%</td>
</tr>
<tr>
<td>Choosing the number of copies</td>
<td>1.3%</td>
</tr>
<tr>
<td>Confirming printing</td>
<td>2.6%</td>
</tr>
<tr>
<td>Knowing what to do afterwards (going to the officer to get the printed copies)</td>
<td>11%</td>
</tr>
<tr>
<td>Ability to recover from errors</td>
<td>11.5%</td>
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Assessment of Fez E-Gov Portal (Cont.)

- Illiterate Users’ Usability Results
  - number of test cases: 62

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<td>Inserting Birth Certificate Year</td>
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</tr>
<tr>
<td>Knowing what to do afterwards (going to the officer to get the printed copies)</td>
<td>0%</td>
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<tr>
<td>Ability to recover from errors</td>
<td>5%</td>
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Assessment of Fez E-Gov Portal (Cont.)

- Categories of the findings from the testing results
  - Culture change management
  - Illiteracy Level Definition
  - Learning Curve Discussion
  - Literate vs. Illiterate Citizens’ Experience Comparison
Conclusion

- Design a graphical user interface that is usable by both literate and illiterate people.

- We came out with some design principles that are adapted to the context of our system

- We discovered that the culture change management aspect of the project is very important
Thank You

Questions ?