A Streamlined Interface Documentation Methodology for Mobile User Interfaces

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ABSTRACT
In this paper we describe a methodology for specifying a user interface application for mobile handset interfaces. This was derived from a design project in which Human Factors International worked together with one of the world’s largest handset manufacturers on supporting the development and documentation of the user interface for one of the major US carriers. The methodology arose as a result of the challenges that the design team faced during the course of the project. Key goals of the resulting tool and process were to be as lightweight as possible, to cater for the different information needs of the various Stakeholders, and to be easy to create and update. The resulting tool was PowerPoint based and divided documentation into high and low level descriptions to meet the needs of both product management stakeholders and the development stakeholders. Overall, the improved documentation creation process and the clearer documentation which results have the ability to significantly accelerate the development process.

Categories and Subject Descriptors
H.1.2 [User/Machine Systems]: Human Factors.

General Terms
Documentation, Human Factors

Keywords
Mobile, Interface Documentation, Stakeholders, Project Management

1. INTRODUCTION
Design documentation is an integral part of the mobile User Interface (UI) design process. Its purpose is to clearly specify how an interface should function in terms of the structure, components and interactions for a mobile platform or a particular handset. This serves to create a point of communication and common understanding between the various stakeholders during product development.

The mobile market is fiercely competitive. Manufacturers are therefore required to integrate new features and functions into their handsets in order to distinguish them from the competition on a frequent basis. This integration is usually set to extremely tight timelines leaving designers with very little time to generate and iterate the UI. In such a situation, designers need a means by which they can generate designs quickly, update them throughout the development process, and communicate them effectively to other members of the product team.

In this paper we present the interface documentation challenges faced during a real engagement in which Human Factors International partnered with the design team of one of the world’s largest handset manufacturers in order to design screens for multiple applications for a carrier specific platform. We present our response to these challenges and describe a documentation methodology which addressed many of the issues we encountered throughout the course of the engagement.

2. INTERFACE DOCUMENTATION
2.1 Challenges
In CDMA dominant markets, most of the UI is driven by carrier requirements or features (not always, but mostly with the established carriers). Manufacturers usually accept these requirements/features in order to be able to sell their handsets through the carrier. On top of carrier requirements, the manufacturers have their own design requirements in order to distinguish their handsets from the competition. This sets a backdrop for an extremely demanding development environment in which there are a number of challenges for documenting and communicating designs.

The first is that there are typically many members of a team with different levels of interest in the interface. Design documentation ideally will allow the information needs of each group to be quickly met. A second challenge is to cater for multiple versions of the mobile carriers platform. During the engagement it was necessary to write documentation for three versions of the platform, bringing with it the need for designs to be revised. A third challenge is the mobile interface itself – limited screen space and the need for softkeys, mean that a frequently changing set of labels, menus and options are required creating the potential for complicated documentation. Finally, there is the challenge of...
providing appropriate types of documentation at different stages of the design process. Earlier on in the project it is important to communicate what is being designed at an overview level. Later, the focus of description moves to precise screens and behaviours. All of these challenges need to be met according to a highly pressurised timeline which leads to the need for process and methodological innovations whenever feasible, to accelerate the design process.

2.2 Users
In any complex interface design project, there are a number of different groups and roles who are responsible for bringing an interface from requirement through to implementation. These groups can typically be characterised by having different backgrounds, responsibilities and information requirements. Ideal interface documentation will allow each of these groups to identify and take in the information that they need to understand, and produce the relevant outputs required by their role, whether this be requests for changes, approvals, or actual implementation of a working interface. The challenge of facilitating this is not trivial as the needs are usually widely different between groups.

Within this engagement there were three main groups of interface documentation ‘users’ –The first – the Technical Marketing team was responsible for liaising with the mobile carrier and producing the requirements. Their primary concern from the documentation was to understand that a given requirement has been met, and that the design solution was adequate in the context of all functionalities, guidelines and other restraints which are placed on the interface. This can usefully be described as seeking to understand ‘why’ a particular design decision had been taken and ‘what’ it means in terms of screen appearance and behaviour, without needing to go into excessive detail about ‘how’ it was to be implemented.

The second group was the development team. Their primary concern was to produce a working version of the interface described in the documentation. They therefore required every aspect of every screen to be explained in sufficient detail so that implementation decisions could be made or where necessary – request for changes raised given the programming restrictions inherent in the interface creation environment. The developers had little interest in the ‘why’ behind the designs, but were concerned with understanding ‘what’ and ‘how’ down to the finest detail.

The third group were the interface designers who were responsible for designing the interface and creating the documentation. The requirements of the designers were more one of ease of documentation creation and alteration. The documentation format also needed to clearly cater for the information needs of the developers and the marketing team, in order to avoid lengthy meetings simply to explain what was meant in the documentation. Clarity of documentation was particularly important in this case as project stakeholders would often attend meetings remotely. The documentation therefore needed to be easy to understand with minimal additional explanation.

3. DESIGNING THE METHODOLOGY
3.1 Original Situation
At the start of the project, a documentation tool – a high end customisation of MS Office- was already in use by the handset provider. This tool required a given set of inputs which were then translated in to a Microsoft Word document. The advantage of this was that the documentation was provided in a consistent format. However at the same time, it possessed a number of disadvantages, which were key drivers of a new solution. One of the most important was that it took a long time to prepare and update designs. This was particularly important given the fact that there were often a large number of iterations required before designs could be agreed upon. There were also a large number of redundant inputs required – where information global to the applications was repeated in the documentation for every screen whether relevant or not.

3.2 Defining Requirements
Given the tight timelines within which the design process was operating, there was a clear need for an improved tool which could help reduce the amount of time required to create, update and read documentation. In order to work out an optimal solution, the team held a brainstorming session to work out the requirements for a new tool according to a number of aspects:

- Objectives for the tool
- Positives of the current tool (in order to retain them)
- Negatives of the current tool (definitely to be excluded from the new concept)
- Characteristics/Features of the new tool
- Medium (paper, cloth, soft copy etc.)
- Methods (printing, sketching, etc.)
- Output (print, simulations etc.)

Figure 1 – Brainstorming Board used to generate solution

4. METHODOLOGY DESCRIPTION
4.1 Key Characteristics
In the brainstorming session it was established that the key goals for the tool were to improve the design process, the ability to provide “the bigger picture”, to be visually appealing and to able to integrate diverse input documents (requirements, guidelines, etc.). After considering the set of constraints facing the tool and the process as a whole we decided to develop a documentation format in Microsoft PowerPoint. The advantage of using PowerPoint as a medium was that the application is widely available, no training would be required, and its graphical abilities would allow task flows as well as detailed designs to be quickly and easily represented. This being said however, documentation
outputs – especially graphical images – can be formulated in a wide range of tools. Depending on the competencies and tools used among the design team, a variety of tools might be used before the images are typically assembled into PowerPoint.

Regarding the process, it was found useful to divide up documentation into high level and low level descriptions addressing the requirements of different target audiences at different stages:

High Level:
- Requirements – What are the technical requirements that need to be captured in the task flow?
- Task flow – What is the broad navigational flow for primary tasks that users will perform?

Low Level:
- Task Flow – What is the navigational flow at a detailed level? Which buttons are relevant and lead to which options?
- Screen elements – What items should be visible on a given screen? How should those items appear?
- Softkeys – How should the softkeys be labeled on a given screen and what options / behaviours should be available?

The high level approach would allow the Technical Marketing team to gain an idea of the length, complexity and broad path of the task flow. It also clearly summarized which requirements had been taken into account. The screen elements at the low level were also relevant for this group as they provided a description of the general screen appearance. The low level description was of most relevance to the developers as it incorporated all the detail necessary in order for implementation to take place. Each of these components will now be described in more detail.

4.2 High Level Description

4.2.1 Summary of Requirements

<table>
<thead>
<tr>
<th>Feature Brief</th>
</tr>
</thead>
<tbody>
<tr>
<td>* CallHistory MUST support 4 different categories of call in call history: Outgoing Calls, Incoming Calls, Missed Calls, and Recent Calls.</td>
</tr>
<tr>
<td>* CallHistory: The subscription terminal MUST support 4 different categories of call in call history: Outgoing, Incoming, Missed, and Recent.</td>
</tr>
<tr>
<td>* The subscriber terminal MUST display the phone number or a name (if available from phone book matching) and time and date of each call in view or placed, if outgoing calls, incoming calls and missed calls.</td>
</tr>
<tr>
<td>* Screen message MUST be supported for each call history entry.</td>
</tr>
<tr>
<td>* All time under Call History should show numeric duration.</td>
</tr>
<tr>
<td>* While no entry is in focus, a single press of the [Talk] button will display the entry in focus.</td>
</tr>
<tr>
<td>* If the entry in Call History is a phone number and that number can be found in the Phone Book, the contact name MUST be displayed with First Name, Last Name instead of the phone number.</td>
</tr>
<tr>
<td>* The order entry in the Contact List is the phone number and that number can also be found in the Phone Book.</td>
</tr>
<tr>
<td>* There MUST be an option for users to access details of that Contact.</td>
</tr>
</tbody>
</table>

Figure 2 – Example of Requirements Summary

The first step was to document the requirements that needed to feature within the application. This provided a clear point of reference for the technical marketing stakeholders so that these could be clearly compared against the high and low level task flows.

4.2.2 High Level Task Flow

![High Level Task Flow Diagram](image)

Figure 3 – High Level Task Flow

The high level output sought to provide a concise representation of the particular feature being described. This could be generated quickly and easily and provided the ‘bigger picture’ of the steps that were involved. The focus of this level of description was on the primary use case to provide a basic picture of the path most users would follow. This then allowed rapid feedback from technical marketing stakeholders before excessive effort had been expended in describing the screens in detail at a low level. Once this flow had been agreed on by the technical marketing stakeholders, more detailed design work could proceed and documentation produced at a more detailed level.

4.3 Low Level Description

4.3.1 Detailed Task Flow

![Detailed Task Flow Diagram](image)

Figure 4 - Detailed Task Flow
The low level description then went on to describe the high level flow in more detail and described interface content, presentation and interaction. This featured high fidelity screens which clearly showed the navigational flow for the selected task and clearly illustrated the most important keys for the task flow and the screens to which they lead. At this stage the scope of the high level description was expanded to include exceptions and variations from the primary use cases.

The screens at this level were high fidelity and therefore showed all the graphical elements on the screens and exactly where they should be positioned and how they should behave.

4.3.2 Screen Details

Figure 5 - Possible Branch Screens for Step 2: Recent Calls_Main_SM

Much of the information which needed to be described was documented in the task flow. There were however a number of important aspects which it was found better to illustrate separately for space reasons. In particular where there were several potential branches at a given point along the task flow which lead to similar screens with similar behaviours. In theory each of these could have been represented as a separate branch in the task flow, however this would have lead to an extremely complicated flow which would have largely defeated the purpose of clear documentation. Instead we chose to document the possible options at a given step of the process by displaying the screens in a separate slide and listing the softkey menus underneath the key they applied to.

As the primary flow had already been agreed on at a high level, the number of changes required (which required more time to implement at this level) were markedly lower.

5. CONCLUSION

The resulting methodology was far more lightweight than the original tool and process, while at the same time catering for the needs of all Stakeholder groups within the project. It was easier to both create and update documentation, while at the same time easier for the readers of the documentation to identify and read the information about which they need to know. In general we would advocate documentation which is as graphical as possible and which is as brief as possible, given the needs and knowledge level of the relevant Stakeholder groups. Removing unnecessary time and effort involved in the document creation process, has the potential to significantly speed up the overall design process. We estimate that this methodology had the potential to save approximately 30% of the time spent on the documentation process in comparison to the original tool used on this project, as well as significantly improving the satisfaction levels of those working with the documentation.

6. REFERENCES