

# Position Paper – Mobile Internet UX for Developing Countries

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## ABSTRACT

Mobile phones are increasingly becoming pervasive in India. Every month more than 5 millions new users are added to the ever growing mobile population [1].

However, in India, for a large group of people mobile phones are the first and only interactive digital media they directly operate and experience. A majority of these phones are based on interaction paradigm that is directly adopted from the realm of computers. We believe, because of this there is huge gap between user's mental model of interaction with the everyday objects and the interaction model of Internet on mobile phones.

It is necessary for us to probe, what happens when a mobile user who has never used a computer, does not know what internet is - wants to access and share content using his Mobile phone. It is also important for us to know factors such as whether the user will be able to use the mobile browser when he does not even have a conceptual model of what a browser is and how to use it. What factors we should consider while designing browser or mobile based internet applications

In this paper we discuss factors that affect mobile user experience and their possible affects in terms of internet services and internet applications.

We propose new interaction model for mobile based browsers in order to provide a good mobile internet user experience and value added interactions and services.

## Categories and Subject Descriptors

H.5.2 [User Interfaces]: Graphical user interfaces, Input devices and strategies, Interaction styles, H.5.2 [Multimedia Information Systems]: Animations

## General Terms

Design, Experimentation, Human Factors and Theory

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## Keywords

User Interface, Design Psychology, User Experience, Interaction visualization.

## 1. INTRODUCTION

According to a report from Telecom Regulatory Authority of India, approximately 5 million new mobile subscribers join the ever growing population of mobile phone users every month [1], as compared to the total PC penetration of 5 million in 2005-06. Because of widely available content and attractive services offered by mobile phone operators, more and more subscribers are signing up for services other than basic calling and messaging. However, for many of them mobile phones are the first and only interactive digital media that they directly operate and experience.

Mobile phones currently available in the market are based on interaction paradigm adopted from the realm of computers, i.e. menus, windows, file systems, etc. Also, factors like screen size and display resolution make mobile phones a unique device to operate

The design approach on Mobile applications for user experience is similar to that of computer realm – using metaphors such as home screen, files, players etc. Controls are also similar - click to open, click to close. Each application has its own navigation schema depending on the nature of that application.

Internet is a huge cluster of interconnected information pages. Computer users have mastered the art of accessing multiple websites using tab navigation or multiple windows. Concepts of hyperlinks, login ID/passwords, dynamic pages are well known.

But what happens when a mobile user who has never used a computer wants to access the internet/internet based services? Will he be able to use the browser when he does not have a conceptual model of what is a browser and how to use it? Once he starts using the internet, how will he react to the slow data transfer? These factors are just the tip of the iceberg. What factors we should consider while designing browser or mobile based internet applications?

In this paper we discuss macro and micro factors of Mobile internet user experience in developing nations.

## 2. Challenges and Opportunities

We believe that true potential of mobile phones as Internet Access devices is underutilized. Even though mobile phones are

constrained by smaller screen sizes, the user experiences need not be a downscale version of a computer like user experience.

We see three major challenges and opportunities in using currently available mobile phones to access internet.

Firstly, due to limited PC penetration, it is highly probable that users will be attuned to interaction model of a mobile phone. These may vary based upon the manufacturer and the model (basic/ mid-tier/ advanced/ touch screen). However the broader interaction model remains the same across the use of phonebook, messaging feature and personalization etc.

This gives us an valuable opportunity to present the internet in the form already known by the user. The face of Internet as we (regular computer users) know might not be the right thing for mobile users.

Secondly, information needs and user requirements of a mobile internet user may not be the same as the computer internet user – how does the mobile user know what he doesn't know, simply put mobile user may not really know what to expect from the internet on his mobile since he has never experienced internet on a computer. In this scenario, services that augment other mediums like TV, Radio etc will be ideal as a starting point for these users till they develop a broader understanding of Internet.

Speaking of user experience– It has been suggested that the key to user experience evaluation is to analyze whether the product met the expectations that the user had before starting to use it [2] We feel the statement has an important extension – user's direction of expectations should be gauged first and followed by evaluation. User's expectations may be in a different direction because of the lack of knowledge about the medium. He does not know if 10 sec wait is faster or slower (while using internet), his comparison of the internet user experience is with the SMS feature he uses daily, which also shares similar asynchronous nature (of data sending and receiving). So question here is should we find out user expectations and design what is expected, or should we probe the nature of expectations itself to see if design could influence them.

Thirdly, mobile based browsers today provide linear navigation– When user clicks a hyperlink, the status bar displays the message “Contacting server” (what does it mean to mobile user? Why contacting server? Is it really informative?) And user has to wait for the next page to load. Once the page is loaded user performs the required task and gets back to homepage (where he started), waits for homepage to load again (or it may be cached), then clicks another link to explore another page. This is mostly time consuming and frustrating experience for users. Minimap visualization [10] has successfully solved half of the problem by maintaining history as visual pages for users to go back.

Can we design visualizations that would help users navigate the mobile internet non-linearly? Obviously users can use multiple windows but then given the screen size limited control mechanisms on the phone, it may not be a very palatable experience.

### **3. ELEMENTS OF MOBILE USER EXPERIENCE: DESIGN DIRECTIONS**

Apart from the universal factors of internet user experience, we think that the user experience depends on a lot of factors specific to the mobile as a medium.

It is important for us to look at not only HCI issues but psycho, economic and social factors as well, while designing for mobile internet user experience in developing countries – we call them design directions.

Design directions are not requirements for designing user experiences but are focus areas through which designers and technologists can enhance mobile internet user experience.

Although Design directions mentioned here can be used all over the world, but many of them have special importance in developing countries-their significance is mentioned with example(s) below.

#### **3.1 Design for the “user” in developing countries**

This may sound very obvious, but user's motivations and goals related to his information and interaction requirements should be considered, because mobile phone has become the most popular device to access information, it is important that we not only look at what information users require but also how will they access it. Services or applications that satisfy user's information needs with minimum effort will hold a high value.

Unlike the developed world, which has experienced a rich, high bandwidth internet with a desktop experience, large parts of developing world is experiencing internet first time on a mobile phone. Information which is so easily available in developed world is hard to receive by common citizens in developing world. This could provide us an opportunity since they do not need to unlearn the old style internet and can leapfrog to a more non-linear user experience.

For example, we think that a good starting point for internet services in developing countries will be to provide information related to popular existing media, like television, radio, newspaper etc. Other internet based application/service could be based on user's information requirement depending on users context and surrounding like: what is the status of traffic? Is it raining there? Where (geographical location) is the bus/train my daughter is traveling in? What is the temperature now (it's so sunny)?

#### **3.2 Design for emotions and interpretations**

Humans are emotional beings; we experience a number of emotions at various instances. The mobile internet experiences are mostly fragmented because of a lot of delay factor is involved. It is but natural for the users to get frustrated when the perceived delays are beyond user's tolerance threshold. We can balance the experience by using “Action/Reaction” approach- either the (actions) Applications and Services can be designed to increase user's delight, happiness or (reaction) possibly let us vent out anger and frustration

Let users give meaning to the “items: they encounter in their mobile phones. This will give them a feeling of being in command and also they will be able to relate to the interfaces better. One of the important factors is “continuity”. The state changes should not happen abruptly by an event, rather there should be continuous

transformations (or morphing) that takes the user from one state to another. It helps the user anticipate and adapt to interaction requirements in small chunks. Perception of continuity helps reducing cognitive load since the reactions of an action (state changes) come in gradually and not all at once.

### 3.3 Design for biases

Biases can be defined as a prejudice in a general or specific sense, usually in the sense for having a preference to one particular point of view or ideological perspective. [9]

Majority of people have these biases:

#### 3.3.1 *Self serving bias*

If something good happens I did it, if something goes wrong its God's will/other's fault. This bias provides a huge opportunity to designers in order to enhance the feel good factor in mobile internet user experience. One may wonder what use would be to design for biases. We feel it is a subtle but important factor; For example when the user accomplishes a task successfully, a message can be displayed rewarding the user by giving him credit for his interaction. While if something goes wrong, the tone of the message could be simply that it is the devices fault and not that of the users'.

#### 3.3.2 *Even world bias*

If I am good, good things will happen, bad things happen to bad people, I am good because I m with good people, we like to associate with "lucky" people coz we desire to be like them.

This bias can be used by designers to increase user's confidence on the interactions. For example the browser experiences can be created in such a way that users should feel "if I am able to do all these tasks easily and successfully, I have gained expertise on it" - rather than projecting an image of the application/browser having "simple UI for dummies" – people don't want to be "Dummies", they always want to be "in control"- identity nurturing approaches can be very valuable in experience design.

### 3.4 Design to connect and share

Applications and interactions that help initiate new dialogues, attract new friends, help meet interesting people, strengthen existing relationships are a definite part of a desirable user experience.

Researchers suggest that as a group-living species, our minds are tuned to be socially adaptive [3]. The motivation behind sharing is expectancy of reward - be it (direct or indirect) monetary, social, spiritual, emotional/personal or mental satisfaction. Designing applications and interactions can provide a positive user experience. For example, shared phone application, (for sharing talk-time), wherein user allows his peers to use his talk-time to make calls but collects money for the same, could help maintain user status as very helpful guy who cares for someone in need – "of course he charged, but he readily offered his Mobile phone to make a call when I really needed to make a call" like image.

### 3.5 Design to demonstrate

People make a statement every time they wear certain style of clothes, use mobile phones, ride bikes, go to a certain class of restaurant and so on. Research shows that "an individual who, while performing a social action, learns or imagines that the object of this action has a good or a bad opinion of him personally" [5]. It is very important to look at design for

demonstration in developing countries- for example in India mobile phone has been associated with ones social status from a long time now.

Hence the internet user experience could be extended to attract others attention, make the user feel important, help in display of glamour and intelligence (i.e., design for "I have got'em both - Beauty and Brains").

### 3.6 Design for Affordability

Affordability is a crucial factor in developing nations. Pricing is the major influencing factor when it comes to total cost of mobile / service ownership. User's choice of a particular application/ service ultimately results in the type of interaction model he will encounter. Hence mobile internet services should be affordable and designed to assist him in making conscious decisions. For example a service that would indicate the user an approximate cost or waiting time when users selects a particular link. This would enable him to make a informed choice.

## 4. EXPERIMENTAL DESIGN: SMS LIKE MOBILE INTERNET EXPEIENCE

Messaging is one of the mostly used features on mobile phone in developing countries like India.

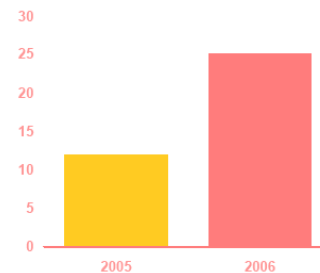


Figure 1: (SMS growth in billions in India, Source: Telecom Regulatory Authority of India)

In fact SMS is one of the good examples Design to Connect & Share (3.4), and Design for Affordability (3.6). Due to low costs, it has become the most preferred way of passing on some information to others. Most of the users of mobiles have developed a fairly clear understanding of how SMS (Short Message Service) works.

It could be a potentially valuable opportunity for us, if we could provide a mobile internet experience similar to the SMS experience. This would be a good start for the user in using mobile internet.

One could argue that connectivity technologies such as GPRS has good enough bandwidth and why should the internet experience should be compared to a SMS experience.

We agree that GPRS has higher data transfer capacity and in fact when we say "SMS like" experience, it is the user experience we are referring to the "Experience" and not the "SMS" technology. Mobile internet experience today is very fragmented as the delays involved are high; the wait factor is almost unavoidable.

## 4.1 Browgets - Proposed experience

Browgets are extensions of the mobile browser. They are browser based widgets, which basically sit on the browser environment and user the underlying functionalities but provide a new interaction model.

We propose an experience approach with the following UI and Interaction behavior

### 4.1.1 Core UI and Interaction behavior

The following are the core user interface and user interaction behavior

- When user clicks a link, sending a request, the UI behaves like it is sending a message (animation on the link clicked)
- User can click multiple links on the same page (status animation will play on all the links- if the page is downloaded or not)
- This is synonymous to a multi-window experience but the advantage being that user does not have to switch between windows (multiple window model may not exist in users mind, and even if it does, it is hard to manipulate with limited controls on mobile phones)



Figure 2: User can click multiple links and explore the ones which are downloaded

- Once the requested page(s) are downloaded on the browget, it does not automatically display its contents (only if more than one links are clicked); rather it shows a small "New Message received" like icon next to the link user clicked.
- User will have a single screen view of all the links clicked and download status for each link (through icons). When users click a (downloaded) link, the page slides to the left and the new page is shown to the user- this way user will have a feeling like browsing physical pages.

### 4.1.2 Value added service(s)

Value added services are reflection of Design for Affordability (3.6) approach. They are the ones which either save money, show an approximate cost involved in terms of money and time or try to maximize the returns of user's money and time.



Figure 3: Pressing "P" or Key 7, displays the costs involved in downloading that content

User can also enable a mode (by long press "P", key 7) where in an icon appear next to selected hyperlink indicating the approximate cost (price) in terms of money, so that user can make a conscious decision.



Figure 3: Pressing "T" or Key 8, displays the time it will take to that content

- Another mode (long press "T", key 8) informs the user of the probable time factor to download the page related to the selected link. (the calculations can be done based on what is the current bandwidth capacity for the user and the size of the page user is about to download)

## 4.2 Leveraging existing technologies

In order for us to realize proposed interaction behavior as discussed in 4.1, we need to change the way mobile internet

browser processes and renders existing content. By leveraging concepts like AJAX we can come up with a new visual model for browser. The type of user interaction that we have discussed requires following modifications to standards and behavior.

#### 4.2.1 Style sheets

Most modern browsers use cascading style sheets for to render the content. These style sheets would require additional properties to support the interaction that we have discussed.

- We need to enhance the CSS box model to support for different types of horizontal scrolling. As specified in 4.1.1, we need the capability to scroll horizontally to left or right with a sliding animation. This can be supported by adding a new property related to horizontal scrolling with values related to “appear”, “slide”, “accelerate”, “fade”.

#### 4.2.2 Background content download

We need to support the download of the content without changing the context of the document that is still displayed. This would help in starting multiple document downloads and at the same time add the newer information to the document DOM[8] tree as and when the download completes.

- We need to use AJAX[7] model of pulling the fragment of HTML documents to enhance the behavior of the browser while the document is being browsed and user interacts with it. For example when the user presses the key “T” a request is sent to the server with the URL of the link and server responds back with the time remaining to download the link. Similarly other use cases discussed in 4.1.2 by a combination of HTTP request using XMLHttpRequest[9] object and a CSS property that would show the returned value as a callout.
- In low end phones, which generally do not have AJAX supported browsers, only background content download could be supported without any JavaScript execution which require higher end devices.

## 5. CONCLUSION AND FUTURE WORK

We have discussed elements of Mobile Internet user experience in developing countries in the paper in view with domains like HCI, psychology, Social psychology, Economics etc. which is in a way

just the tip of the iceberg. We need to carry out research within each domain to gather valuable understanding. The experimental SMS like internet experience is a small step and just one of the ways to apply design directions for designing for the developing countries. It is a way to make the transition to mobile internet easier. It may not be the ultimate experience but a good starting point for the user to develop conceptual clarity.

As the appetite for mobile internet grows in developing countries, we should design keeping in mind not just user experience design theory but also what is actually happening on the ground.

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