

Making and Breaking the User-Usage Model - WhatsApp Adoption Amongst Emergent Users in India

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ABSTRACT

The recent and significant growth of WhatsApp, the social media platform, in India, is driven by the ‘Emergent Users’. This phenomenon challenges the User-Usage Model by allowing the Emergent Users to operate accounts, a difficult task according to the model. Looked differently, WhatsApp actually supports the model by being the exception that proves the rule. However, it is also true that, in spite of its empowering attributes, its usage varies across different user types. We investigated how WhatsApp was able to circumvent the rules of the model to help the Emergent Users take great leap in spite of their limitations. We conducted a contextual inquiry with 110 emergent users, who used WhatsApp, and found that simplification of registration process and interaction mechanisms, reduction of choices, freeing users from cognitively intensive chores, sacrificing features that were less relevant in users’ contexts, and, lowering operating cost were some of the ways it achieved that. This also helped us identify the design exemplars that could be used in order to make applications easier to adopt by the Emergent Users.

Author Keywords

Human Computer Interaction; Interaction Design; Technology Adoption; Technology Acceptance; Technology Diffusion; Low Literacy; Model; User; Usage; Emergent Users; Development; Information and Communication Technology;

ACM Classification Keywords

H.5.m. Information interfaces and presentation (e.g., HCI): Miscellaneous;

INTRODUCTION

Devanuj et al. described ‘Emergent Users’ of Information and Communication Technologies (ICTs) as those from developing countries who are less educated, economically

disadvantaged, geographically dispersed, and culturally heterogeneous [4]. In this paper, we investigate the rapid adoption of WhatsApp amongst the Emergent Users in India.

The year 2015 perhaps is an important landmark in terms of technology adoption by Emergent Users. Smartphone sales are rapidly increasing and have achieved between 10-30% penetration in many developing countries [6]. At the end of 2014, it was estimated that more than 150 million smart phones were sold in India so far [11]. This is approximately the number of users who have had 12 years of schooling or more. This means that a large number of the 60 million people in India, who bought their smart phones in year 2015, perhaps had 10 years of schooling.

Within the last two years, WhatsApp is one of the applications that became popular very quickly in India. India has become the largest market of WhatsApp, with 70 million active users in 2014 [9]. The more interesting fact is that it grew at the rate of 250% over previous year [9]. From our experience, we know that Emergent Users in India prefer WhatsApp over other social networking applications (such as FaceBook, Twitter, Google+, or just plain SMS). Though SMS had many advantages—it has been available to people in India for over 20 years and its costs have been reasonably low—, and though India has enjoyed more than 150 million+ mobile phone penetration since year 2007, it never really became as popular as quickly amongst the Emergent Users.

What explains this rapid adoption of WhatsApp? We believe that certain inherent design features of WhatsApp help the Emergent Users to fulfill the communication needs more effectively than other platforms. We try to support this hypothesis by presenting our findings from a user study with 110 Emergent Users in India.

The next section summarizes some background related to technology adoption, including the User-Usage model. We then explain the method used for the user study and the participants. In the fourth section, we discuss the findings. The fifth section analyses the findings with respect to the User-Usage model. The last section presents the conclusions of the study, and generalizes the design features of WhatsApp that can be used by other applications.

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BACKGROUND

Technology Adoption

The Technology Adoption Model (TAM) [3] sought to investigate the mechanisms of improving “user acceptance” of information systems in order to design them better. It considered the user as an active entity in the technology adoption process, and that was a key strength. In fact, the relationship between the user and (computer) system is considered to be a stimulus-response (S-R) pair. The system offered stimulus in the form of its various characteristics and the response was in terms of user behavior. Within the above mentioned S-R relationship, it particularly focused on the role of human intention. It was based on an earlier Theory of Reasoned Action (TRA) [1], which postulated that any behavior was result of an intention to operationalize it. Intention was operationalized in TAM by two variables, namely perceived ease of use and perceived usefulness. The rest of the model, and its later avatars, TAM2 and TAM3, quantitatively measured how various other factors (e.g. self-efficacy and computer anxiety) fed to these two variables [12] [13].

TAM has been an influential work in the sense that it highlights many important predispositional human variables of technology adoption. However, TAM may not be the most suitable model to explain technology adoption by Emergent Users, and particularly in the context of WhatsApp. TAM and its related instruments have been devised in a western context and that too, predominantly in an office environment. The complexity of Emergent Users is different. For example, the low literacy would require that any question on ease of use needs to be related to the capabilities arising out of literacy levels. The perceived usefulness needs to be related to the user's exposure to technology in her social context. Additionally, WhatsApp is basically a social-networking tool, which is very different from office tool such as a word processor or a photocopier. Therefore, outcome or effectiveness related questions need to take perspectives other than strictly economic ones. Thirdly, TAM considers its users as a one monolithic whole, whereas in case of the Emergent Users, it is not so. The interpopulation variation does not allow a single answer to the question of whether a technology will be accepted or not. Fourthly, restricting the answer to simply a ‘yes’ or ‘no’, results in the loss of the actual usage details.

The other work of interest is the Roger's Diffusion of Information Theory (DIT) [10]. It divides the user population into different categories based on how early or late they start using a technology. It also characterizes each of the user class in terms of who they are and their behavior with respect to technology. The strength of this model is the cognizance that there is no one user type. One of the criticisms [7] against DIT is that it is a ‘push’ theory of Innovation Diffusion. It has been mainly used by those in power to push what they already deem to be a good innovation. In other words, it has an ‘innovation bias’. In

case of WhatsApp adoption in the Emergent Users space, the diffusion has happened rather spontaneously. Moreover, compartmentalizing population in groups like early adopters and laggards is simplistic because it fails to take note of the situational context, which can be complex and nuanced.

The User-Usage Model

We choose to discuss our findings related to WhatsApp in relation to the User-Usage model [4]. The model has two dimensions. The first dimension, called the *user* dimension tells us something about who the user is. The second, called the *usage* dimension tells us how her behavior relates to the usage, her conceptual model of the product, and what the user does with the product and how that varies over time.

The user dimension categorizes the emergent user population into archetypes. Each archetype is defined in terms of the potential to accomplish tasks of a particular complexity. There are six types of Users: Basic-Users, Navigators, Text Inputters, Savers, Account Holders and Transactors.

A Basic User does the most simple of the tasks that only requires her to press physical buttons. There is very little, if any, recognition or abstraction process. On the other hand, a Navigator can navigate through the menus. She can do this because of her ability to abstract and categorize information. A Text Inputter can manage applications that require typing, editing and arranging the text on the screen. As discussed elsewhere [5], this has been a particular challenge in Indian languages. Often the task of text inputting requires that a typing-space be managed (e.g. a message screen or a field for entering a contact name). The text input is often followed by closing, saving, or sending action. The fourth type of user, a Saver is the one who has a sense of a ‘virtual space’ in her device that is made up of the file system. She can not only navigate the folders in this space, but needs to also retain the conceptual model of that space when it is not present in front of her. A Saver knows how to name the folders and design the folder structure according to her needs. An Account Holder can operate accounts of email or social networks. Account holding is cognitively intensive task that requires awareness of one's own personal identity in a virtual space as well as that of others. An Account Holder needs to bound, secure and name her own piece of this virtual space, so that everyone is sure who they are talking to. She also understands offline communication and the importance of logging in regularly. A Transactor is able to carry out e-commerce transactions over the Internet. She has enough trust in a virtual system and its security mechanisms to not fear a financial loss. She also needs to have infrastructure support such as a bank account.

The *usage* dimension maps the users' journey of developing competency while using the product. Early on, a user would be unsure, error prone, and will struggle while doing a task. Gradually, she will become faster, more accurate, better at

recovering from errors, and more capable of applying her ability into new situations. The progress of a given user along the usage dimension is punctuated by certain barriers. Sometimes, the user is able to cross over these barriers easily. At other times, the user may stay behind one of the barriers for a certain period of time, or until triggers move her on. Thus, these barriers divide the usage dimension into distinct *stages*. Each stage of usage is defined by salient behavioral pattern vis-à-vis technology usage. Devanuj et al. define four distinct stages of usage for Emergent Users - Novice, Rote Learner, Fluent, and Competent.

A Competent user is the one who has crossed all of the barriers, and has formed a good conceptual model of the product. She will be very fast in her tasks, will be able to recover from the errors, and will be able to apply her understanding to novel situations. Before becoming Competent, though, the user should have been through the Fluent and Rote-Learning stages. These stages are explained as follows. When a user is at a stage, where she has not yet formed a good conceptual model of the product, she can still accomplish many tasks by following instructions or memorizing the steps involved. In the early phase of such a stage, the user would be a Rote Learner. As a Rote Learner, the user would do tasks very slowly, and if she makes an error, she will almost always need external help to recover from it. With practice, the Rote Learner becomes a Fluent user. Her speed increases, she completes tasks with a lot of confidence, and her errors reduce, though she may still struggle to recover from errors as she still lacks the conceptual model. Novice, as can be expected, is usually a very rudimentary stage. Here, the user is often afraid of the unknown, and may need much hand-holding, instructions, and motivational triggers to start using the product.

The stages of *usage* are, too, related to the inherent *user* characteristics. For example, an Account Holder may start out as a Novice, go through the stages of being a Rote Learner and a Fluent user, and gradually with practice, may grow his conceptual understanding of the product to become a Competent. Now, predisposing factors such as age, education, income, prevalence and gender can have an effect on where the user starts out and how far and how fast she can cross the stages.

METHODOLOGY

While mobile applications have been evaluated for usability and user experience in rural contexts, sufficient attention has not been given to investigating why certain applications, for instance WhatsApp, are being used extensively in rural context. Research has not been conducted to understand the User-Usage relationship in the context of ICT usage in rural settings. Such research would benefit designers and researchers to design effective intervention and would lead to better usage of their applications.

The objective of the research project was to investigate WhatsApp usage in Rural India and its features which had led to increase in its user base and penetration. Further, the objective was to investigate potential of this application to act a design exemplar.

Method

Data collection was performed over a period of two weeks in August 2015. Fifteen Design students visited urban, sub-urban and rural areas in the states of Maharashtra and Madhya Pradesh in India. The locations were chosen so as to accumulate variety of users ranging from urban to rural areas. Semi-structured interviews were conducted. Each interview lasted for around 30-45 minutes. Interviews were taken in Marathi, Hindi and Telugu language. Out of the total of 110 users, About 48 belonged to urban area and 59 users belonged to rural area. We recruited 89 male and 21 female users. About 19 users were below 25 years of age and about 25 users were above 45 years of age. Education was decided based on the fact that the next billionth customers/users will belong to rural areas within the low-income category. All the users had education level below or equal to 12 years of education. 6 of the users had not undergone any formal education. About 47 participants had 10 to 12 years of education.

The professions of the users were - Shop Owner, Rickshaw and Truck Driver, Tailor, Cattle Owner, Homemaker, Peon, et cetera. A significant number of rural participants had Samsung smart phone, whereas urban counterpart had Samsung, Micromax, Karbonn and Lemon smartphones. Many of the users had WhatsApp already installed in their handset and some of the participants had intentions of installing WhatsApp in their smart phone. About 49 participants were WhatsApp users, about 51 had their account on FaceBook and 15 participants were email users.

As we wanted to understand the penetration of WhatsApp as a technology feature we conducted interviews with the following focus:

- The capabilities that is required of the user while accomplishing different tasks.
- The inherent user characteristics like age, literacy and income, and their contribution to the above mentioned capabilities.
- Text inputting mechanisms.
- Use of WhatsApp as a mode of communication
- User adoption of WhatsApp, and the triggers for starting.
- WhatsApp installation and registration.
- Contacts
- Awareness of features and options.
- Study of user chats and group chats.
- Comparison with other similar platforms

We used Contextual Inquiry method to analyze the interviews [2].

FINDINGS

Too much of 'much-much': Finding ways to avoid task complexity

In Mumbai Hindi, the expression of “much-much” is akin to the colloquial usage of the word “headache”. It is used to denote cognitive complexity. It is used in the sense of avoidance. This term appropriately describes the Emergent Users’ state when they encounter cognitive complexity. The resultant attitude is often expressed as reluctance, as one of the users did:

“...Only one with the button, just pick up the phone, and then cut it back...listen to the music...no ‘much-much’ beyond that”

WhatsApp has compromised a set of features, that would seem essential otherwise, in order to reduce cognitive complexity—‘much-much’—for the user.

Bypassing Information Security

Maintaining, remembering and Inputting logins and passwords have been difficult tasks for the Emergent Users. A major factor in this is the inability to read/type. Even, if a person is able to read/type, he is often forced to do so in English, not in an Indian language. The first reason is the difficulty to operate keyboards, which has been a difficult task especially for Indic scripts. This is due to the structural differences between Roman and Indic scripts. The second contributor to this phenomenon is the semantic content. Often the Indian language interfaces are classical in nature, and formal translations of their English versions. In this way, they disregard the usability aspects. The result is that remembering of the passwords is extremely effortful.

Account opening is a barrier

Opening account in WhatsApp is considered easy as it needs just the user’s phone number. It does not involve any kind of ID authentication. There is also no need to set up a password. Users find the password recovery procedure tedious and tiresome. We found that the users were more comfortable with WhatsApp rather than any other social networking application; the reason being WhatsApp automatically synchronizes all the phone contacts. Also there is an absence of procedures such as adding a friend or sending a friend request from the contact list. A user reported, *“I find FaceBook very interesting but I often spend more time on WhatsApp; as I have only 36 friends in my FaceBook friend list but on WhatsApp all the contacts can be reached.”*

Simplification or Avoidance of Text input

Newer touch screens have improved the typing ability. We have observed users using a variety of keypads. Icon representation is another text free input method. The advent of voice message has reduced the need to type to a great extent. Being able to use WhatsApp (or any other apps) in English interface boosts the confidence of the user: *“I now use WhatsApp keyboard only in English, I am learning*

English and using mobile in English helps. I now use other difficult apps like YouTube, Tubemate and IMO.”

Language familiarity plays a vital role. Unfamiliarity with language is very fundamental issue when it comes to using a Smartphone for the first time. Many users stay unaware about setting their interface to native/desired language being easily available for them. Not being confident about English often causes a misunderstanding in users that Smartphones could only be used with English language and are meant only for people who are educated or at least know English really well. Lack of technological awareness is associated with the lack of English fluency. *“I am not good with English, How will I use the technologically updated Smartphone?”*

Purposeful Usage

WhatsApp is considered a necessity for business purposes. The group feature is unconventionally used for marketing. WhatsApp enables one to one contact for seller to customer and seller to dealer and effortless exchange of data between the loops. Many business users are able to differentiate among applications. E-mails are classified as formal communication and FaceBook is considered as social and informal data and communication. Still other people are using the same platform of WhatsApp for both threads of communication giving the user full degree of freedom to find harmony between the two. *“Business has become very easy since I started using WhatsApp. I and Dealer, We share photos of new stock on WhatsApp; we also send Images of Bills and Quotations through WhatsApp. There is also a group of Shop owners and Dealers as per the locations.”*

Always Ready

We found that users like the fact that WhatsApp is always hot\active (even when offline). As a user put it – *“Just open the app and the message is transferred, but in FB we have to login and be available to me online and receive messages.”* The notification system also helps in keeping the user aware of the new messages. Another user said *“Messages are delivered very fast, the we get alert as soon as message comes, as soon as the phone is on we get messages from WhatsApp”*

Designated App Usage

DISCUSSION

We use the User-Usage Model to understand the success of WhatsApp in case of Emergent Users in India. To do this, we firstly explain the complexities of various tasks that the different User Types can do. We also map these complexities to the capabilities of the User Types. The capabilities are mapped to the attributes of the User Types. The model is, actually, based on these mappings. For example, an illiterate user is unlikely to do Text-Input task. However, if a design solution could drastically reduce the cognitive capabilities required for text input, or it can creatively circumvent it completely and still allow people to communicate, it can deemed to have broken the User-

Usage model. In concrete terms, it means that the solution has made users leap over their incapacities to meet their objectives. In the rest of this section, we shall demonstrate, how indeed WhatsApp has broken the User-Usage model. In the section subsequent to that, we also look how, in spite of empowering the Emergent Users, WhatsApp usage varies across the user types. This understanding leads to a discussion about design for Emergent Users.

Complexities: User Types: Capabilities

The capabilities of the User Type increases in the following order Basic User < Navigator < Text Inputter < Saver < Account Holder < Transactor. Most of the communication platforms require that a User Type belong to Account Holder. Users using FaceBook and emails are the prime examples. Our experience shows that these types of Emergent Users need to be fairly well educated (around 11 years of education suffices), low in age (we have not found any FaceBook user more than 30 years old), and, likely to earn high income. Compared to the basic user, who is likely to be least educated, old aged and low income, Account Holder has good education, tends to be young and is from middle to high income groups.

The five user types mentioned above could be mapped to the corresponding task families: Basic Usage, Navigation, Text Input, saving, Account Holding and Transaction. The complexity of the task families also increase in a fashion similar to that of the capabilities of User Type. It is: Basic Usage < Navigation < Text Input < Saving < Account Holding < Transaction. We introduce a term, Task Demand, which tells the cognitive effort needed from the user for accomplishing a task. As we build a typology of Task Demands, we also, simultaneously, paint a typical portrait of corresponding user type in the next few paragraphs.

The task demand for Basic Usage is minimal. The user only recognizes a state and presses a hardware button to change it. The final step is to recognize if the state has indeed been changed. Picking up a phone call is a common example. There is hardly any demand of literacy as the tasks are rudimentarily simple. Basic-Users are, essentially cognitive misers. Emergent Users are highly likely to belong to this category. The reasons could be repeated here: inability to read and write inability to abstract information, and difficulty in forming right conceptual models owing to reduced access to /ownership of technology. The Emergent Users, therefore, have to put much more effort in dealing with a given level of complexity than their non-emergent counterparts. This makes them more likely to be Basic-Users. If the disadvantages of age, literacy, income etc. occur together, the Basic Usage is more probable.

Navigation requires ability to abstract the concepts into classes. This can happen if, firstly, a user can read, and secondly, can understand the concept behind the term. Many a times the concepts are far removed from a users' social context and the meanings are not understood. In case of the absence or low level of literacy, these two

capabilities are severely compromised. In such cases, a user often memorizes the navigation which is an error prone strategy. In other words, Navigation tasks have a barrier of mental model formation. This results in Navigators belonging to Competent and Rote Learner/Fluent stages of Usage. Navigators are only slightly better than Basic Users. The ability to Navigate occurs when the literacy levels improve. In case of lower literacy levels, it has to be compensated by good company of tech-savvy people, who are willing to teach (we term this as 'prevalence').

Text Inputting demands a fair degree of literacy. The issue is of writing, which firstly demands writing comprehension. However, text input itself is a cognitively demanding task. Especially, in the case of text input in Indian languages, forming the conceptual model of a keyboard itself has a steep learning curve. Text input also requires adding the names of recipients which could be either a typing or a search operation. Also, formatting the text on the writing space is, too an activity that requires some effort. Text input requires a good degree of literacy. The Emergent Users do not take to typing tasks without necessity. Often, it is forced by the demands of job. In that case, if the literacy is low, then the users tend to send only token messages. In any case, a job where messaging is needed signifies better literacy and income levels. The second facilitating factor for Text-Inputting is the presence of other Text-Inputters (often in the form of a peer group) with whom one can communicate electronically. This is more evident in younger users (likely below age of 30 years).

A Saver also does navigate hierarchies, but the process is much more complex than that accomplished by simple navigators. Navigation (as done by the User Type - Navigator) is a passive process, where a user navigates a pre-defined structure. In case of a Saver, the user has to design a structure for herself. In case of the former, the ability to comprehend the structure suffices. In case of the latter, she designs her virtual space within the bounds of the device in a manner someone designs the interiors within the confines of a house. The salient aspect is a sense of belonging or ownership of one's virtual space. In case of simple Navigator, it is more akin to moving in a predesigned apartment. The cognitive work involved in Saving tasks include the effort needed to formulate the structure. Additional effort may go in creating, naming and rearranging the folders. Saving is a relatively complex task. Here, not only a high level of literacy is needed, but also income levels should be good enough to be able to own/access better phones. A high level of prevalence (having tech-savvy friends) is advantageous. The most important aspect is the internal motivation. Saving does not serve an immediate need in modern phones, because of the hidden file structures in mobile interfaces. Often a user is satisfied with direct access to songs and pictures. Therefore, saving requires a fair degree of motivation.

Account Holding has many sub-tasks. The operation of an account, firstly, requires loading of the application. This is followed up by signing up. Many a times, the login and password is remembered by the application and a user is able to start without bothering about checking in. Here, the process can be divided into reading and writing. Reading is a simple affair that involves navigation and actual reading. Writing (or, Replying) requires starting up of a writing environment, adding the recipient and putting the text. It is followed by sending of the text. In case of an Account Holder, the advantages in terms of literacy, age, prevalence and income have to be good simultaneously. This is because access and exposure to good devices, personal capability to abstract and form right conceptual models, and access to technology hand-holders are all needed. Emergent Users are very unlikely to be Account Holders.

Transaction tasks require all the capabilities needed for Account Holding tasks. Additionally, as it is highly risky activity involving possible loss of money. The issue of trust becomes paramount. From a cognitive point of view, trust is an efficiency building mechanism. It reduces the extra cognitive load for an individual regarding projection of all the scenarios that might happen. Because the stakes are high, absence of trust means that a user has to project all the scenarios that involve loss or harm in every transaction. A Transactor should have all the attributes of Account Holder plus the ability to trust the online transaction. Trust is built on a fair degree of exposure to online transaction, which itself depends on high prevalence, high income and high literacy - unlikely to be present simultaneously in Emergent Users.

Having explained the mappings between User Types, their capabilities, the task demands and the user attributes, we are in a position to discuss how WhatsApp has been able to help the Emergent Users leap far. In other terms, how the users that were more likely to belong to the types of Basic-User and Navigator can accomplish the task associated with Account Holders. We briefly mention the Account Holding tasks: Registration and Maintenance of the Account, Securing the Account, Typing and Reading, Sending and Broadcasting messages, Navigating, Uploading and Downloading media content.

Breaking of the User Usage Model

Ease of Registration: Breaking the First Barrier

The registration process is a big barrier in Account Holding. This is because it is an intensive and multistep task. Additionally, it requires many pieces of personal information, some of which may not be present at all. For example, email ID is required by many platforms, which many Emergent Users do not possess. Because of the complexity and due to the fact that it is a onetime activity, often the registration process is delegated. However, the delegate is also likely to be an Emergent User, though slightly more capable than the delegator. This does not mitigate the barrier of registration greatly. Though a

onetime operation, ease of registration is important because it acts as the first barrier and affects the initiation of the application. The tight integration of a WhatsApp account with the SIM card number is an advantageous strategy. Firstly, it reduces the number of information artifacts that are required to just two - phone number and name. This has a direct effect on number of steps required. Additionally, both of these things are very basic in nature, in the sense that they will be always present. The things are further simplified by the fact that first is a number, which are easier to remember than spellings. The second is a personal name, which is highly recallable. The other thing that facilitates registration is the automatic authentication. WhatsApp confirms the account directly from the SIM, thus forgiving the requirement such as accessing emails or sending SMS codes. This translates into avoidance of one whole cognitively intensive task. In the process, it sacrifices the portability of the account across devices. However, Emergent Users have mobile phones and that too the sole devices in their hand, and therefore this disadvantage is of not much consequence.

Simplifying Interaction

WhatsApp simplifies interaction. It is done using simpler conceptual models. For example, in WhatsApp, the individuals and groups occupy the same space, that is, they appear in the single list. Moreover, posting to the group or messaging to an individual entails the same process. Thus, there is a single conceptual model for the two. In contrast, in FaceBook broadcasting and individual messaging have two distinct conceptual models. Reducing number of conceptual models means user has to learn lesser number of them.

Often, just flattening the Navigation hierarchy serves greatly in simplifying of interaction. A prime way in which that happens is in the inputting of the content - both text and non-text based. The traditional effort of reaching up to the screen where the actual input happens is reduced to a single step instead of a hierarchy of menus.

The third way simplification happens by making interaction as direct as possible. The more steps are there and the more screens appear, the more cognitive effort is needed to process the information and take decisions. Often the users have expressed that viewing the videos is more 'direct'. On probing, we found that users could directly download videos shared by friends and once the video is downloaded they could watch the video anytime they want, whereas in FaceBook the video is loaded on pressing the button/making request. The video takes some time to buffer and then "loads". Besides, they have to request to watch the video every time they want. Uploading videos on WhatsApp is also "direct" as image, whereas FaceBook requires the user to perform many steps before they upload a video. The second instance of simplification of conceptual model is happens because Flattening of navigation is another strategy that reduces the cognitive load.

Reducing Choices, Simplifying Things

Less number of choices means less effort in recognition/recall and decision making. To non-Emergent Users lesser number of options might appear as shortcoming, but for the Emergent Users use this means less information processing and decision making. WhatsApp drastically reduces the number of options. Restriction on the file types that could be sent is a good example of reduction. Doing so does not greatly affect the Emergent Users, because they do not deal with a large variety of file formats in the first place. Another way to reduce option is to fuse many categories into one by making them similar. It is no surprise that multicasting to a group and messaging to an individual not only appears in the same list, but also behaves in the same manner. In some cases it sacrifices one thing for another. A good example of compromise is where portability has been sacrificed for ease of use. Therefore, the user is not left with a choice of accessing their messages on different platforms, which non-Emergent users find unacceptable [Techcrunch, 2015], but for Emergent Users, who often have a single device, this is not a pressing issue.

Taking up the matter

WhatsApp takes many a processes in its own hands and relieves the Emergent Users from many chores. These tasks might be found essential to the non-Emergent Users, but for the Emergent Users, they add to the cognitive burden. The ease of use is achieved by sacrificing flexibility and control. For example, WhatsApp has completely done away with signing-in and thus removed a cognitively intensive task. It is also true that other platforms have the ability to remember login/passwords and one can bypass the signing in process in their case too. Still, WhatsApp lack of signing-in could be treated as an exemplar. In this regard, the issue of privacy would be raised in non-Emergent contexts. However, in the Emergent context studied by us, the privacy issues were not apparent to be crucial to us. One of our users was operating WhatsApp account of his own brother. They had common friends. One of the reasons for low need for privacy is absence of critical content. WhatsApp is often used for connecting with the peer group and the content is mostly 'fun' video clips and images. The other instance where the automation of tasks is visible is in the case of creating contacts. As it automatically reads up contacts from the phone's address book and creates profile by visiting each users WhatsApp account, the user only has to watch the list being populated.

Saving Money

Lower income is a defining variable for Basic Users and Navigators. The Emergent User in general is highlight price sensitive and has been expressive about this issue. WhatsApp helps here too. It reduces the data consumption because it does not allow the voluminous data like images, video and sound automatically. It shows the thumbnails as placeholders for images (and videos) which aid the

usability. In this way it gives some control to the user regarding his spending on the data.

The Role of Touch Screens

A particular mention should be made to the fact that lowering of cost of Touch Phones has a relationship with the WhatsApp usage. In case of non-touch screen phones the interaction is indirect. It increases the gulf of evaluation and execution. For example, instead of selecting a post, a user simply touches. Another contribution to WhatsApp usage from touch screens come from the fact that touch screens, being free from the limitation of physical buttons, allow for innovative text input methods. It In any case, the directivity of touch interaction works in the favor of Emergent Users here too. It is beyond doubt that inputting text is easier in WhatsApp, both in terms of reaching to the input screen and input mechanisms itself. However, it goes a step ahead by doing away with the need to type. The ease of use of adding voice and video to the conversation results in users relying more on these on these modes.

Making the User-Usage Models

We have seen how WhatsApp challenges the User-Usage model by creatively bypassing many of the task demands that are placed on the Emergent Users. Still, there is evidence where users' capabilities (rather lack of it) modulate the way different Emergent User types use WhatsApp. True account holders, users who are better educated and have better incomes, and can handle e-mails; do use WhatsApp differently than those with less education and income. This proves that in spite of WhatsApp extending account holding offering to Basic-Users and Navigators, they still lag behind the true Account Holders in their usage. For example, a true Account Holder would be able to make group, while Basic Users and Navigators were incapable to. True Account Holders had good conceptual understanding, and thus, were also aware of the strengths and weaknesses of different platforms. They often limited the casual social communication to WhatsApp, while taking the more important ones to e-mails. Good mental models are also evident when the users can efficiently put their devices to achieve their objectives. We have seen often that Account Holders put WhatsApp for business purpose, while for the Basic Users/Navigator it is relegated to casual conversation.

CONCLUSION

Our findings highlight how WhatsApp was able to leap over the rules of User-Usage model. We also have presented how, in spite of its empowering attributes, the usage does vary across the user types. We interacted with the Emergent Users in their natural contexts in order to gain insights regarding how WhatsApp helps them start and hold an account, a task considered too complex for their capabilities. We were able to identify the mechanisms thereof, which could help form design exemplars for other applications that could be easily adopted by Emergent Users. These design exemplars could be explained as follows:

Keep delegates in mind

Less frequent but critical tasks, like registration are often delegated. However, the delegates usually themselves are Emergent Users, though slightly better than the delegators.

Balance Utility with Usability

Often many things that are demanded by the non-Emergent Users are either too complex or non-critical for Emergent Users. They need to be moved out in order to reduce the number of choices. Too many choices only increases the complexity of the system

Automate

Automate the tasks that are complex and non-critical for the users.

Simplify Interaction

This can be done by constructing tasks that have simple conceptual models. The number of different models that a user would need to learn, need to be reduced. It can be achieved by making single conceptual model for much class of tasks. The navigational hierarchies should be reduced to minimum. Another way is to design the tasks that take minimum number of steps.

Help Users Save Money

Help users to save money in terms of cost of device, data and battery usage. This will help them get more exposure.

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REFERENCES

1. Ajzen, Icek. The theory of planned behavior. *Organizational behavior and human decision processes* 50.2 (1991), 179-211.
2. Beyer, H and Holtzblatt, K. Contextual Design: Defining Customer Centered Systems. Morgan Kaufmann Publishers, San Francisco, 1997.
3. Davis, Fred D. Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS Quarterly* (1989), 319-340.
4. Devanuj and Joshi, Anirudha. Technology adoption by 'emergent' users: the user-usage model. In *Proceedings of the 11th Asia Pacific Conference on Computer Human Interaction* (2013), ACM, 28-38.
5. Ghosh, Sanjay and Joshi, Anirudha. Text Entry in Indian Languages on Mobile: User Perspectives. In *Proceedings of the India HCI 2014 Conference on Human Computer Interaction* (2014), ACM.
6. GSMA, Mobile Economy 2015. Retrieved September 24, 2015, from GSMA Mobile Economy: http://www.gsamobileeconomy.com/GSMA_Global_Mobile_Economy_Report_2015.pdf
7. Melkote, Srinivas R and Steeves, H. Leslie. *Communication for development in the Third World: Theory and practice for empowerment*. Sage, 2001.
8. Natasha Lomas, Telegram Now Seeing 12BN Daily Messages, Up From 1BN In February. Retrieved September 24, 2015, from Techcrunch: <http://techcrunch.com/2015/09/21/telegram-now-seeing-12bn-daily-messages-up-from-1m-in-february/>
9. Neeraj M, WhatsApp Growth In India: 20 Million To 70 Million Users In Just One Year !. Retrieved September 24, 2015, from DazeInfo: <http://dazeinfo.com/2014/11/03/whatsapp-growth-india-20-million-70-million-users-just-one-year/>
10. Rogers Everett, M. *Diffusion of innovations*. New York, 1995.
11. Statista, Total number of smartphone unit shipments in India from first quarter of 2011 to second quarter of 2015 (in million units). Retrieved September 24, 2015, from Statista: <http://www.statista.com/statistics/298097/smartphone-shipments-india/>
12. Venkatesh, Viswanath and Davis, Fred D. A Theoretical Extension of the Technology Acceptance Model. *Management science* 46.2 (2000), 186-204.
13. Venkatesh, Viswanath and Bala, Hillol. Technology acceptance model 3 and a research agenda on interventions. *Decision sciences* 39.2 (2008), 273-315.