User Centered process for evolving framework of digital tools for marginalized communities in India

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Abstract

Increasing need to fuel the global economy and rise of cities as economic centers has endangered the way of life of many indigenous and tribal communities who are fighting for their right over resources such as forest land and its mineral wealth, water bodies and agricultural land.There is a loss of identity, loss of social and economic structures either through cultural hegemony or ethnic cleansing. These communities are rarely getting heard and not getting any opportunity to structure and conserve the knowledge systems they had built over centuries. This paper proposes a design process to create a framework of digital tools that communities can use to conserve, curate and apply their knowledge systems, broadcast their concerns and raise awareness about their practices and beliefs. The framework also provides a possibility of digital inclusion in the dominant social structure while securing socio cultural identity of these communities.

Keywords

ICT4D, User Experience, Inclusive technology, IT for All, Design Thinking

Introduction

Rapid and unpredicted growth of Indian cities has created contestations within and around these cities. From infrastructure requirements such as land, water, power, raw and processed material (metal, coal and similar materials) to the workforce that shapes them are being drawn from semi rural/ tribal setups [Patrik Oscarsson, 2007]. This developmental paradigm is being deemed as unjust and non-inclusive and sustained nationwide protests from affected indigenous and tribal communities have brought this issue to national consciousness and debate, multiple times over past twenty years [Ananya Roy, 2009]. Corporation and state have been working to gain a control over these natural resources to fuel urban growth by either marginalizing these communities legally or by force or by a parent child approach showing conditional benevolence if the communities fall in line[Patrik Oscarsson, 2007]. At the heart of this quagmire lies a lack of empathy towards the lives, cultures and knowledge systems of indigenous communities, a clear disregard to the self sufficiency of people in these setups and the increasing global pressure to visualize development only with large scale and centralized projects that have heavy

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dependence on ecology with little to offer to communities which have sustained it over the years [Kinshuk Mitra, Radhika Gupta, 2009]. The legal marginalization has ensured that support system against fighting for this victimization is absent as most of these indigenous communities had their own legal framework traditionally and state's legal language is alien to them and so are the legal frameworks and paradigms. With the natural resources taken away, knowledge systems discredited and the communities fragmented, traditional livelihood ecosystems have disappeared, reducing small and self sufficient entrepreneurs to laborers leading to an economic marginalization of these communities [Bengt G Karlsson, 2004]. With the mainstream local culture coming across as dominant culture, marginalization by cultural hegemony is also an important player. While the indigenous communities feel the need to adopt the dominant culture given their sudden exposure to dominant cultural media, dominant culture often labels indigenous cultures primitive or immoral by holding cultural differences between the two against them, enforcing a sense of inadequateness onto the members of indigenous community, leaving them with a loss of identity and a self inflicted inferiority [Joseph Macwan, 2003].

Depletion of socio-economic structures has meant that occupations that traditionally sustained indigenous communities are no more [Rajeev Sethi, 2005][Down to Earth, 2006]. Agriculture has suffered due to shortage of tillable land, change in climate patterns, introduction of water intensive cultivation and a pushed switch to cash crops. Traditionally grown local varieties are discarded as the technology behind crossbreeding the best locally suited crop is generally indigenous and hence labeled suboptimal. Since the agriculture faces decline animal rearing and husbandry takes a hit as most of the locally provided animal food is agricultural byproduct. Access to fishing and forestry resources have been brought under legal ambit and communities are increasingly denied control over these resources, making them encroachers in their own settlements. This also implies that their livelihood practices are rendered illegal and the knowledge systems that they have built over these resources are reduced to nothing. A lot of communities have either fought legal and political battles to gain some level of control over these resources or have to migrate to another occupation which may take them away from their natural habitat. The non landed members of the community such as artisans, entertainers, clergymen, etc. also loose livelihood if the community breaks and migrates to different locations or the living rituals which required their products or services do not exist anymore. In either case once the community's relationship with local resources is endangered, the survival of community and its people gets threatened [P.S. Ramakrishnan, 2001] [Vandana Shiva,1996].

Depleting ethnosphere also means the loss of language. We speak nearly half the number of languages that we used to speak a century before [Wade Davis, 2001]. With the loss of language, a community loses its oral and documented history. Each indigenous community beings with it a different way of perceiving, understanding and relating to the world, living within it with a sense of balance that they have evolved in a very unique way. With the loss of oral and documented histories of these communities we destroy alternatives to a popular dominant way of life and the way we perceive things around us [Luisa Maffi, 2002]. Loss of language for a community also means loss of the ability of communicating and storytelling. This does not just take away the format of presenting or performing the content but also the social

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interaction that builds around the content. A community's storytelling methods build their identity as a collective; help them communicate within themselves and with the outside world and act as a cohesive agent to keep the community together. A community also loses the idioms and metaphors embedded in the language and in the process the ability to code and decode cultural symbolisms. A sharp and fast introduction to the dominant culture's language also induces a doubt within the community about their own language and systems that are built over it. This brings down the social structure on which the daily rituals of living are based. These daily rituals that reflect the community's legal and moral framework and the collective's definition of the right, the wrong and the permissible. Communities manage individualism of their members with the need to sustain the collective with these frameworks. Daily rituals also define the gender roles and thus the entire character of the community. Since a lot of communities come from the stand point that women are responsible for bringing in a new generation and sustain the community, the power equations amongst the genders are often very different from the urban/semi urban setups [Uri Gneezy, Kenneth Leonard, John, 2009]. Daily rituals also define division of labor, structures of occupation and how families as units of production of goods and services serve also as defining units of social structure. These social structures determine the power structures within the family and also between the occupational guilds that each family is associated with; often prioritizing what shall sustain and grow the community. Ceremonies and celebrations become the markers of the community's life and offer moments of collective contemplation and bonding. While these ceremonies keep the community together, they also help the community evolve organically over a much larger period of time, making any kind of change well thought of and detailed.

This erosion is taking away all this ruthlessly, disconnecting people from their communities and the communities from their habitat and belief systems pushing nation towards becoming a one track, monolithic entity.

Digital Inclusion-History and Challenges

Digital divide, a post industrial situation has its roots in the industrial divide which happened in India much later than western geographies. When computer as a tool of production and consumption of knowledge made inroads into India, its usage amongst masses, even in mainstream remained doubtful mainly because its ways of producing intellectual property were alien to the masses here. Computers were considered to be another factory artifact, reducing lead time of a process and human effort required to complete it. Multiple entry barriers such as cost of ownership, non-suitability to the vernacular market, steep learning curve and adaptability, little relevance to their current occupation and to their current knowledge consumption habits prevented initial take off of computer [Kenneth Keniston,2003]. They were majorly used to play entry level games, watch films and other multimedia content and to print cards and letters for official and personal purposes, until low cost internet transformed computers into communication devices. Unlike its western users, Indian computer user was not producing a lot of intellectual property using a personal computer. Manufacturers and assemblers/importers of personal computers made a strong case for computer as a tool for office automation and data storage setting the initial ground for people to start viewing personal computers as objects of utility. This was majorly and urban phenomenon and semirural/ tribal setups not being in the

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service ecosystem that needed computing devices, never saw these devices except for television ads playing on a TV set owned by a rich member of community or occasional booking of a railway ticket at a railway counter. It would be safe to say that mobile and pc revolution met them at the same time despite of over a decade of gap in their introduction. Only in recent past (since around 2009-10) very few communities have had some or other form of limited access to computers and internet, majorly through NGOs. This access has been on similar lines as that of Indian middle class with very little emphasis on computing and computer programming as a base to build products. Broadcasting, learning and staying connected on web had taken precedence over administrative and programming applications of a computer in this context.

However Mobile revolution presents a very different story all together. While the objective of the product was clear to the masses, so was its usage as the concept of a public phone booth was the precursor to the introduction of mobile telephony in India. With little cognitive load in understanding the UI (unlike the modern smart phones) masses took to it very fast once the ownership barriers broke and it became affordable. For indigenous communities, it meant an access to urban centers, to their representatives and supporters, an access to their agricultural produce, animal husbandry and crafts markets [Jan Blom, 2009]. This direct connection of a digital technology with their lives and livelihoods makes mobile the ideal vehicle for empowering these communities, giving them control over archiving, producing, curating and distributing content. Technologies providing internet over mobile have matured and are almost as good as the broadband or dial-up enabled services though their penetration in remote non urban locations remain debatable. While this definitely throws encouraging insights into the access to technology part of the argument, this by itself is not sufficient in acceptance and adaptation of such technologies [K Pitula, T Radhakrishnan, 2007]. A lot of top down interventions of digital inclusiveness have failed because
4.   The communities did not feel the need for any digital tool/s.
5.   There was a steep learning curve in adapting to the digital tool/s.
6.   There was very little connection between the problems that they faced on a day to day basis vis-à-vis solution that these tools offered.

In short most of the digital interventions had tried pushing the community to adapt to the technology, than going the user centered way.

Access and Agency: understanding digital divide in Indian context

While the arguments in access clearly lay the foundations of a digital framework for indigenous communities, the perspective of access remains an outsider's perspective. Unlike physical infrastructure such as water supply or roads a digital framework is not a fundamental need and community has little or no prior experience, nor the contextual awareness for such a framework. Deploying a digital infrastructure in remote locations can be a challenge and making it low maintenance and low cost would require multiple planning and optimization sessions. However it is recommended to address the issues of agency before making any investments in providing access. For a community the question of agency is bigger than that of access. While the access makes available the technological resources to a community, the fact that community will take to it depends on the agency and

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ownership over the content along with the format of the information they are expected to interact with. This question of agency is two folds, the context and the interaction.

Context determines two things, both bringing the community in the centre of the decisions about any digital intervention. These are the "need" and the "fitment of the solution". Some important items to contemplate in this regard are

II.   Does community feel the need for a digital framework. This need can be mapped to various levels drawn out from Maslow's Hierarchy of need-Physiological, Safety, Belongingness, Esteem and Self Actualization [Abraham Maslow, 1943].

III.   These needs must then be mapped to resulting artifacts and validated for fitment within daily lives of the community members. Solution posing an extreme departure from their regular behavior patterns may result in steep learning curve and low adaptation possibility.

IV.   Clarity on how would the community generate content, manage and consume content for such a framework.

V.   Clarity on current comfort level with technological (digital devices) setups available.

The second part of the idea of agency here is the interaction (as in the human machine interaction). Once the clarity on context is achieved, Interaction should be a point of focus for contemplation. Following items can anchor a contemplation exercise.

➢   What kind of interface would be required between the community and the content? What mental models of interaction with the content come naturally to the community. What local metaphors can be used for the user interface.

1.   What kind of a product stance and personality would be easily acceptable for the community [Alan Cooper, Robert Reimann, David Cronin, 2007].

2.   What kinds of visuals are accepted by the community, how they can be utilized and visually coded in the interface both for communication (images as images) and action (images as interface elements).

3.   How does the community react to existing form factors (tablets, smart phones, pc), how do they hold it, does the existing way of displaying and navigating information on these devices evoke unpleasant reactions.

4.   What kind of behavioral changes happen overtime when they interact virtually with textual and emotional (videos and images). How does information change/manipulate the user.

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Stakeholders and their roles in evolving a digital framework

Following diagram proceeds to explain the stakeholders for the proposed framework
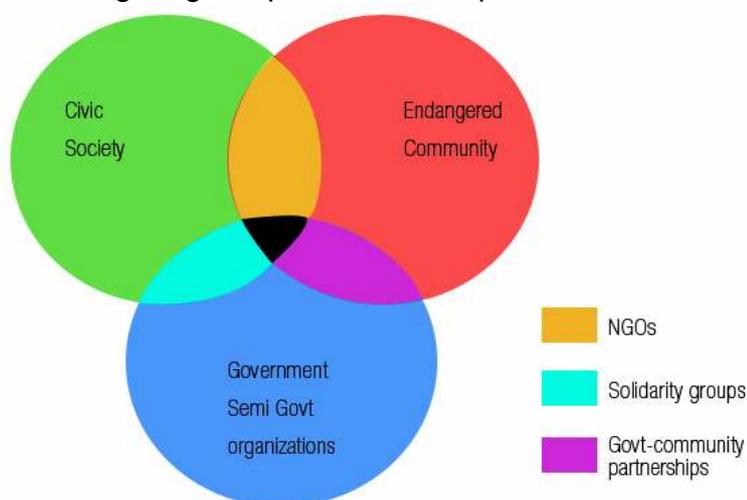

Figure1

As the consumer of this digital framework, the community becomes the first and the most important stakeholder. Not only does it consume and sustain this framework, it also helps provide much needed base to gather data and test the prototypes, both of which are iterative steps. Civic society organizations provide much needed business and technical acumen for building, deploying and sustaining such a framework, they also help raise funds for such a project and help community build solidarity groups for future engagements and evangelizing activities. Government/semi government organizations play a key role in nailing down legal-social aspects of such a framework, help attach other e governance systems and services to such a framework and also provide sustained and non commercial funding for such projects. These three stakeholders need to overlap with each other and form partnerships both formal and informal in nature to build a solution space that been analyzed from multiple vantage points and scenarios. NGO's (or informal community- civic society partnerships), Solidarity groups and Government-community partnerships facilitated at local level by group of Government officials and community representatives can form a core group to anchor and sustain the framework.

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Roadmap for the development of the framework of digital tools

Following diagram proceeds to explain the stakeholders for the proposed framework

	Contextual immersion and need definition	Prototyping and Acceptance testing	Sustaining the framework	Build and Deploy	Mentainance and scalability
Community	████	████	████		████
Architects and engineers		████	████	████	████
Solidarity groups	████		████		████
UX Designers	████	████	████		████
Govt Agencies			████		████
Business Consultants			████		████

Figure 2

Evolving a framework of digital tools can ideally be done in 5 steps, (1) Contextual Immersion and need definition (2) Prototyping and acceptance testing (3) Sustaining the framework (4) Build and deploy and (5) Mentainance and scalability.

The Actors involved in these activities (drawn out from earlier pool of community, civic society and governance) are (1) Community representatives (2) Software architects, software programmers, engineers (for any custom device) (3) Solidarity groups, community- civic society partnerships (4) User experience(hereafter referred to as UX) designers and researchers (5) Government agencies and (6) Business consultants.

The first step towards building the framework is the process of contextual immersion where User experience researchers interact with the community representatives who are drawn out meticulously to have representation from each social strata, gender and age group. Interactions are directed towards understanding what has changed for the community after repeated outside contact and threat being posed to their way of life. An understanding of what changes would trickle into their idea of future and what changes are being seen as forced. This helps evolve a clear storyboard representing their idea of the future as a collective with a clear understanding of the role digital devices can play in it and what are the possible intervention points. A detailed interaction from solidarity groups can also help the UX team understand the relationship shared between the community and the civic society and how the framework can help strengthen these lines of communication. A sketch of personas of stakeholders at various levels and their goals from the framework can be listed to keep the efforts focused.

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The next activity of prototyping and acceptance testing starts with user experience and architects to finalize the device ecosystem based on the storyboard. This will imply what form factors (smartphones/ tablets/ personal computer/ custom devices, etc.) will be the target devices. Another investigation area here is to find which devices are easily acceptable with lesser learning curve (or is there a case for a custom device). This is followed by detailing out task flows and information exchange between the devices. UX designers then collaborate with engineers to develop "fail fast" low fidelity prototypes to test them with the community and finally evolve a prototype that should go in the 1st production version, also simultaneously keeping an eye on the scalability of the framework. This version can play a key role in helping stakeholders focus and provide non ambiguous suggestions. It can also be instrumental in raising funds for the development, deployment and sustenance of the framework.

Before efforts are put into executing the framework, the clarity on funding and sustaining such a framework must be obtained. Important stakeholders for this activity would be Business consultants, government agencies, solidarity groups, software architects and programmers and the community itself. This team should be able to identify the activities required to create, deploy and scale such a system and then sustain it in long term. It should then identify the expenses involved and the sources of income including the possibilities of making it a partially or completely self financed effort.

This is followed up with the built and deploy phase which is moderated by Software architecture and development team. This phase, as defined is dedicated to developing, testing and deploying the digital artifacts for the framework. Apart from doing software centric testing such as load testing, care must also be taken to ensure that usability testing with end users (giving due representation to all user groups) must be done to ensure that the product made is easily accepted and used by the end users.

A continuation of this phase (and conclusive) is the activity of maintenance and scalability. User experience and Software development teams collaborate with the community to understand and scope the work on scalability and maintenance of the deployed framework. They can be assisted by Business consulting professionals and solidarity groups in isolating action points. Trainings and simulations catering to maintenance and scalability can be developed for system administrators drawn from local technology savvy volunteers.

Proposed design involvement for the development of the framework

A User experience researcher brings the focus to the community in the process and helps the framework thus created stay relevant and useful to the end user. It becomes then, increasingly important that there be a process outlined to for a UX researcher to look at (and add to, from his/her own experience) to keep such an engagement user centered. Here is such a process task list that chronologically narrates the UX engagement towards developing a digital framework for marginalized communities.

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[12]   Build a team with representations from all strata of the community. Each representation should consist of an old person, a young person and if unrepresented, a women.

[13]   Work with the elder representative to sketch the life of a typical member of his strata as prevalent traditionally. This can be done using storyboards.

[14]   Work with the younger representative to sketch the life a typical youth of his strata may want to lead, carefully ask unguided questions to obtain information to record change in cultural-social and economic patterns of the community. Use storyboards and photo journals (ask the representative to click pictures to build/narrate his environment, Ask him to choose between a set of pictures that best describe his future/ or ask him to make a collage.

[15]   Work with the women representative to sketch the life of typical women in her social strata. Carefully ask unguided questions to understand gender based power equations, gender based roles and decision making. Use Mind maps and storyboards.

[16]   Show these notes to community members on an individual basis (do not attribute the work to the representative to eliminate any guided response) and get their validation/ comments. Iterate all the notes.

[17]   Compare the notes of the elderly and the youth to understand the changes in the community's way of life (changing role of social institutions, loss/change in language and expression, economic conditions and self sufficiency, other parameters discussed in the introduction of this paper). Contrast them with the notes obtained from women representatives to obtain a balanced gender perspective and women-centric understanding on community's way of life.

[18]   Extract clear and non overlapping Persona descriptions and the issues that concern them, their insecurities at both personal level and collective level and what according to them would make a good tomorrow and how would it look like. You can call them persona goals.

[19]   Evolve community goals out of Persona goals, look out for conflict in goals (are interests of one strata adversely affecting another). Discuss with community representatives and find what goals can be agreed upon as being the goals of the community.

[20]   Pick community goals that can be met using a digital framework (hardware+software) either directly or indirectly. Create a story (visually represented) with personas as actors achieving the community goals using digital artifacts. Isolate areas which put cognitive and cultural load on these communities and may reduce the acceptance and adaptation of the solution provided. Possible areas to look at are the form factor of interactive devices, interaction and representative metaphors used. Interactive metaphors for the activity should replicate or match their natural behavior for doing a similar activity, representative metaphors must be in agreement with the symbolic representations and should not accidently offend or annoy the user.

[21]   Start moving away from the context into the product; build storyboards, workflows, information architecture, low fidelity wireframes etc.

[22]   Take into account their exposure to existing digital products (computers/tablets /phones etc). it will be a good idea to circulate few devices to gain an understanding of their comfort and learning curve.

[23]   Run validation exercises with multiple community representatives. Exercises based on validating context can be focused on storyboard while low fid wireframes can be validated for usability.

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[24]   Close the high fidelity prototypes validated with the community. Start moving away from product to the context and implementation.

[25]   A detailed discussion with Software architects will help understand how would such a framework function, what are the costs involved (human effort, financial), how will the system be scaled in the future. What is needed in terms of both skills and resources for the community to own, manage and sustain such a framework.

[26]   The feedback received from the software architects on the management and sustenance of the framework can be discussed with the community representatives, support organizations (govt/non govt). Expected deliverable from the meeting can be a business model /social model to sustain the frame work, a plan to fund the framework development activities.

[27]   Deploy the framework, build digital tools and run with a limited pilot. Validate it with the community at multiple checkpoints to find out any issues/improvements. Keep iterating till a basic stable version is ready.

Conclusion and future scope of work

The paper attempts to introduce a process which can be used to evolve a framework of digital tools (on one or many form factors) for marginalized Indian communities mainly indigenous in nature. These digital tools intend to help community build and use an archive of knowledge systems social, economic, political and technological in nature. These Digital tools can also help the community broadcast its concerns and build solidarity amongst decision makers.

The next obvious step would be to understand and isolate challenges that emerge from actual implementation of such an engagement. Studies towards understanding what kind of interfaces would be easily accepted and learnt, also alternate possible utilities of such visual media platforms for marginalized communities would also enrich this direction of work. Moving away from content consumption and documentation to creating digital tools and artifacts to help the community could also be a potential extension, and what will make it more challenging would be rethinking coding languages and programming metaphors to build a set of easy to assemble, easy to use digital toolkit /IDE. However the need, yet again for activities like these would be to be anchored in and stay relevant to the needs of the community.

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