# From Paper to Mobile: Design Considerations for Field Level Worker Programs

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## 1  Abstract

Field-level workers (FLWs) deliver outreach services in remote communities. For example, community health workers (CHWs) visit pregnant women or agricultural extension workers provide support to farmers groups. An increasing number of development organizations are turning to mobile platforms to develop job aids for FLWs. These groups are often unprepared for the change management process that comes part of the switch to technology.  In spite of the diversity of projects that use CommCare, the lessons we learned from the design process are common.  Efficiencies gained from the mobile tool go beyond the frontline users and can reach the supervisory and program management levels, in retrospect, achieving systems-level improvements as well. Gathering this experience, we present a simple design framework for thinking about the tools and associated processes for effectively integrating mobile tools in a program.

**Key Words**: m4d, ict4d, mobile phones, mobile job aids, design, community health workers, field level workers

## 2  Mobile Tools for Field Level Workers

### 2.1  Challenges for FLW Programs

Community outreach programs target underserved communities through field level workers (FLWs). Often selected and trained in their own communities, FLWs may be responsible for making routine visits to beneficiaries for counseling and collecting household level indicators. FLWs are the first line of support, connecting services of a program to beneficiaries at a community level. However, they may be geographically dispersed from their beneficiaries and burdened with infrastructure challenges to reach them. Aside from physical challenges, often FLWs experience difficulties in managing large numbers of beneficiaries, prioritizing activities they must carry out for them and providing appropriate and relevant counseling. These challenges contribute to poor quality of service. There are also delays in reporting to program administrators. Little or no access to timely data from the field therefore limits visibility into the overall quality and delivery of services by FLWs, not

to mention results in poor monitoring of indicators. Decision makers therefore lack tools and information to make evidence-based decisions for program improvement. Many organizations turn to mobile technology to address these challenges.

## 2.2 CommCare: A Mobile Job Aid for FLWs

CommCare is an open source case management tool that runs on mobile phones. [1] Developed by Dimagi, a mobile technology firm [2], CommCare is used worldwide by upwards of 2000 FLWs across 30 countries. The mobile platform is used for data collection, case management and decision-making support (Figure 1). The accompanying web tools, allow program managers to view reports about FLW performance and download data collected in the application. Dimagi has designed and implemented hundreds of applications for FLW programs namely in health, agriculture and is beginning to explore new sectors like education. Much has been written about CommCare in previous literature.[3,4,5,6]
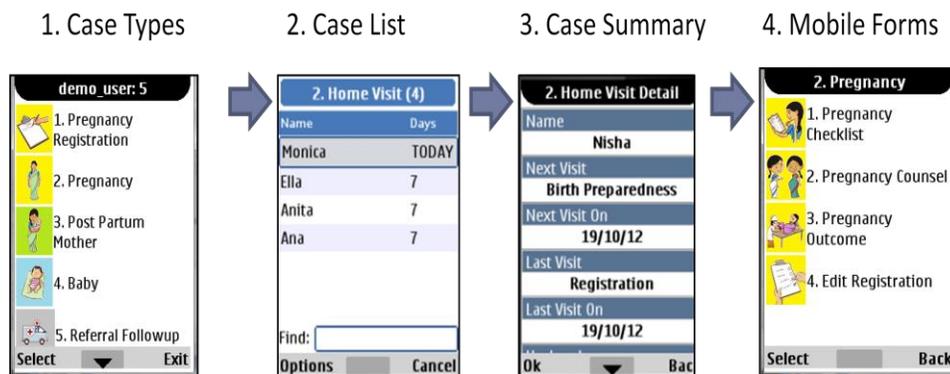


Figure 1 A CommCare application for maternal and child health, showing from left to right, a modules screens for different types of beneficiaries (i.e. cases), the list of cases due for follow-up, information about individual cases and a list of forms or activities to be completed for each case.

# 3  Mapping Program Processes to Technical Features

## 3.1  Framework

Through the rapid iterative experience of designing case management applications for diverse use cases, we developed a basic framework to facilitate the transference of programmatic processes to technical features supported in CommCare (Table 1). For example, common FLW activities include: (1) collecting data about beneficiaries, (2) making home visits, (3) facilitating counseling. Typical CommCare workflows that match those activities include: (1) forms for registration and checklists, (2) case lists and summaries and (3) media facilitated counseling as described in Table 1. Applicable for many use cases, the framework consists of key questions that essentially guide an organization to define their project objectives, user personas, and basic program workflows. In practice, the framework is followed through a set of sequential worksheets that are completed by organizations and discussed with Dimagi.[7].

**Table 1 Framework for Mapping Key Program Processes to CommCare Features**

| Key Processes | Programmatic Questions | Technical Features (CommCare specific) |
|---|---|---|
| Program Objectives | 1. What programmatic challenges does the organization want to improve with the mobile tool? | Multiple, |
| Personas | 2. Describe the age group, education level and literacy of the FLWs? | Use of multimedia; Local language input and displays; Login systems |
| | 3. What training has been provided to FLWs on protocols to be included in application? | Questions; Instructional prompts |
| | 4. What challenges do the FLWs face in carrying out their work? | Length of surveys; Use of multimedia; |
| | 5. How many beneficiaries is the FLW expected to reach? | Modules; Case list display (searching, sorting); Case summary display; Device type |
| | 6. How do FLWs manage and prioritize their activities? | Case list display (late flags, scheduler), SMS |
| Program Workflows | 7. What are the critical indicators for data collection and for program monitoring and evaluation (M&E)? | Questions; |
| | 8. What major activities are carried out by the FLW? | Forms; |
| | 9. What actions or behaviors are beneficiaries expected to take? | Questions (i.e. for follow up); Cases summary (i.e. shows history) |
| | 10. What supervision support is provided to FLWs? 11. What are the expectations for M&E? | CommCareHQ FLW performance reports; CommCareHQ data exports |

## 3.2 Program Objectives

Applications can be designed differently to serve different objectives. In the health systems context, there could be multiple systems strengthening effects a mobile intervention could have as described by DeRenzi et al.[8] The organization should begin by identifying the goals to be achieved by the mobile intervention including expected outputs at all levels for all stakeholders. A broad range of goals could be: to strengthen monitoring & evaluation, improve efficiency and timeliness of field reporting, improve supervision of FLWs, better monitoring of productivity and/or performance of FLWs, or improve the quality of service delivery by the FLW to their beneficiaries. We conducted a baseline survey of 34 organizations in India piloting CommCare in 2013. Figure 2 shows the diversity of goals for these CommCare pilots. Over 80% of these programs targeted more than three objectives for their mobile intervention, demonstrating that the purpose of the entire mobile system can be cross-cutting

.

### 3.3 Personas

In the transition to mobile, the FLW should always be at the center of the design. There are challenges when tools are designed by decision makers disconnected from field realities. Instead, the mobile application allows an organization to shift focus, and first consider the capacity, strengths, and limitations of their FLWs. The end users should be familiarized with the protocols prior to implementing the mobile tool. In lieu of previous training, programs should allocate time and resources to provide content training prior to introducing the mobile component. Recommendations for using multimedia in mobile applications are often dependent on the FLW's literacy, education and training backgrounds. [9] In another example, an organization developed a checklist which was combined with
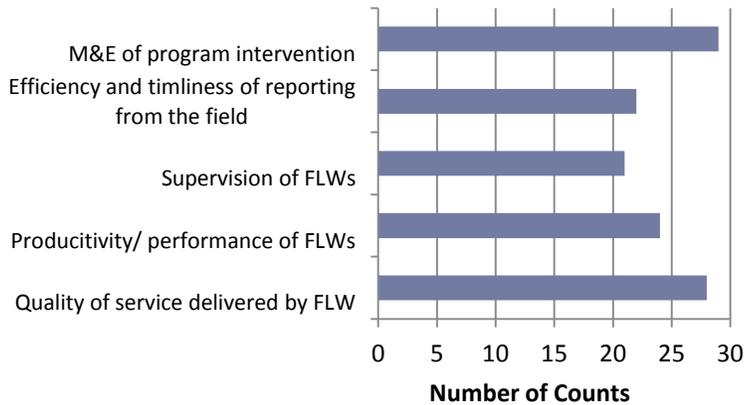
**Objectives of CommCare in Pilot Programs (India 2013)**



**Figure 3 Objectives of CommCare pilot programs in India (2013)**

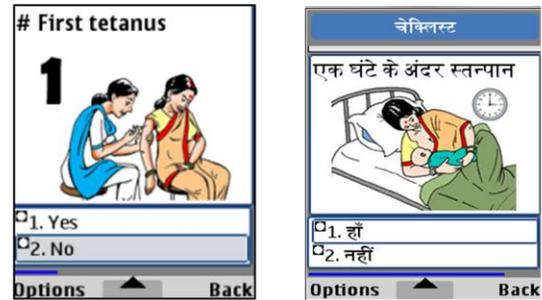1. Checklist Protocol    2. Counseling Message



**Figure 2 Different question types in CommCare** Question 1 (left) asks whether pregnant woman has received her second antenatal check-up. Question 2 (right) counsels on importance of breastfeeding colostrum immediately after birth. Text can be displayed in different languages.

counseling prompts and questions about completed antenatal services (Figure 3). During the testing phase, FLWs suggested that the checklist was too long to use at a home visit. Based on that information, the organization created separate forms for the checklist questions and counseling messages. User-centric design is imperative for building effective tools.

### 3.4 Mapping Program Workflows

The switch from paper based tools to mobile systems requires an in-depth exercise where organizations map supervision and monitoring processes, as well FLW activities. Going beyond the mobile tool, the design work engages organizations on important issues related to program monitoring, feedback loops, evidence based decision making, and organizational management. These components are equally important for an effective mobile intervention. This design process often highlights programmatic gaps obscured by the paper-based system. A common realization is the amount of redundancy in processes that are paper-based. Ultimately, along with the development of a mobile application, unanticipated efficiencies are also achieved in program mechanisms many levels above the FLW.

Program workflows comprise activities and communication sequences between the beneficiaries, FLWs, FLW supervisors and program managers. A mobile system creates direct visibility and accountability in the work of each stakeholder at each level of the program hierarchy. In the field, FLWs use the mobile application as a guide for all components of their work; in the office, supervisors monitor the FLWs work; elsewhere, program managers monitor indicator data. During the design phase, the organization is encouraged to map the activities of all the stakeholders and the flow of information between them. Precise and accurate mapping exercises result in the effective design of the mobile application, strategic integration of the accompanying web-based reporting features and clear feedback loops for FLW supervision and processes for data monitoring.

More often than not, organizations encounter difficulties in this mapping process. It may be the first time a program inspects the details of these workflows, including identifying the people in responsible for supervision, data monitoring and the frequency of these activities. The workflow practiced in the field may be different from the expected behavior assumed by decision makers supporting programs remotely. Gaps in the staffing structure and staff capacities become evident. In light of new data the system generates about FLW performance, organizations often begin thinking about performance metrics and feedback processes for the first time and need support for benchmarking. For example, the data will show differences in workload per worker and highlight low performers. Thus, the process of automation itself is acts as a forcing function for organizations to streamline and specify protocols carried out by the FLWs and their supervisors more precisely. DeRenzi et al. have previously published on CommCare-based supervision programs. [10] The exercise may also lead organizations to revise staffing structures (i.e. hire a data specialist), the use and flow of data (i.e. data transcribers begin analyzing data) and communication lines (i.e. technical staff become more connected with field work than ever before).

## 4   Conclusions

When a mobile tool is deployed, the effect on the program extends beyond the tool, acting as a forcing function for wide program and organizational level change. Benefits of mobile system include: near-real time access to field data and information about FLW performance. However, this also means, organizations have to (re)-invent feedback loops to act on data generated by the system, in order to effectively improve FLW performance and adjust interventions to meet program goals. Organizations naturally go through a process wherein they analyze their staff support mechanisms, staff capacities, clarity around management, review and flow of information in their program.  Though mobile job aids are designed for a particular user in the field, the way resulting information from the system is used across the organization leads to improvements in other processes. In retrospect, the

level of readiness to adopt mobile technology is reflective of how well organizations adapt to the resulting changes technology introduces within their programs.

## 5   Acknowledgements

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