"Unconference" Open Session - explore Opportunities of using OpenHIE in community services referral and case management

Session Name: Designing community based e-refferal tool to improve health systems in Tanzania
OHIE18 Event Page - ohie.org/OHIE18
Time / Room: 2:15 - 3:15 Faru
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Etherpad Link: https://notes.ohie.org/2018-08-01_Unconference_Faru_215

Notes:

Background and Introduction

Tanzania health system is organized in referral pyramid starting from village level where the people we serve are basically located, then at ward level there are dispensaries; at divisional level there are health centers; at district level there are district councils or designated council or district hospitals, furthermore at regional level there are regional hospitals; also at zonal level there are referral/consultant hospital and at national level there are national and specialized hospitals (Tanzania National Health Policy 2003).

Many developing countries are facing various problems in delivering health care and medical services to their population, these includes lack of funds, constraint resources as well as a dramatic shortage of trained healthcare providers (WHO, 2015). Good quality services and medical specialists are often concentrated in urban areas (WHO, 2017). Poor roads, limited transportation facilities, and long distances are severe obstacles to providing health care services to rural communities and remote areas.

There has been a number of initiatives from global, regional and national level which emphasize on the community involvement in enhancing the quality delivery of health services. Community involvements and participation is the key aspect of combating and controlling public health problems through awareness and behavioral change, client's follow up and monitoring, rehabilitative and palliative care for long and chronic illnesses. However even most of hospital based services like treatments, drug administration, counselling, health advise, the enforcement and implementations of these services are normally done while the client has already leave the point of services.

Tanzania (Health Sector Strategic Plan IV 2016-2020) emphasize on preventive services with more focus on strengthening community linkages in complementing and reducing cost of provision of health services to individuals, households and families. In our developing countries there are scientific evidences of declines of new diseases incidence cases to the society that is more informed on their health compared to non informed society whilst social behavioral and communication change (SBCC) approaches plays pivotal role in improving preventative services which directly improves health outcome through citizen science by utilizing the knowledge which people would acquire to change their behavioral for the benefit of their healthy this applies for both communicable and non communicable diseases.

The government of Tanzania, development partners, implementing partners, and other stakeholders understands the role of community healthcare workers and linkages between the community services and formal service delivery at the point of services and there have been a number of initiatives which involved the community approaches and tools in the provision of community health interventions but for some reasons there were not either sustainable or cost effective and the government has directed all partners to adopt, customize, develop and implement using open source solutions instead of closed and proprietary systems.
Approach and Business Process

The referral application enables community- and facility-based providers to exchange referral requests containing pertinent patient information and referral results using health data exchange standards and technologies supported by the Tanzania Government. The application also support the transmission of event-triggered reminders via text messaging to patients and providers. The system aims to address a number of things including linkages of clients from community to facilities, facilities to facilities, follow-up, new TB case findings, follow-up, lost to follow-up etc.

Referral Initiators and Referral Recipients

Referral application can be initiated as follows:

i. CHW may refer a patient to a health facility (an intermediary facility that doesn't provide CTC or TB services
ii. CHW may refer a patient to a facility
iii. Health facility may refer a patient to another facility
iv. Health facility may found lost follow up after extracting through CTC-2 database and send back to the facility app for follow up and reminders
v. Facility may refer back to the community

Health facilities and CTCs may also refer a patient or send a specimen to a laboratory. However, tracking these actions are beyond the scope of this referral application and will be handled by a different application.

Methodology
This project used mixed methods designs combining software engineering approaches to ensure that the development and customization are done systematically and adhering to the principles and standards. Appreciative Inquiry (AI) methods were used, a form of action research, through a series of stakeholder involvements such as meetings, focus group discussions, and forums related to e-referral analyzing current and potential situation).

The situational analysis involved feasibility study, requirements gathering, business process analysis, business process mapping, design and development, testing and commissioning), and an assessment of the developed product (e-referral for the chronic illness in the selected facilities in United Republic of Tanzania.

Appreciative Inquiry: AI involves the art and practice of asking questions that strengthen a system's capacity to apprehend, anticipate, and heighten positive potential. AI uses a change framework known as the 5-D Cycle (Definition, Discovery, Dream, Design, and Delivery) based on the foundational assumption that change occurs through thoughtful inquiry and dialogue about affirmative life-giving forces within the program.

According to Watkins and Mohr 3, the cycle "encompasses a series of dialogues, interviews, innovation mapping, goal setting, and self-organizing `122' implementation" (p. 112).
The technical team analyzed the requirements and the suggestions from the government and stakeholders on the platforms and technologies to be used in developing Tanzania Referral Management Information systems (TRMIS) we customized "OpenSRP" generic version from the sourceforge which was used "enkerto forms" with very minimum technical documentation and support, OpenMRS were used as backend for team and user management functionalities.

Business process and technologies analysis (BP&T-A) were used to determine the proper method to customize and develop the application which would suit our local needs but also could be used to other countries with minimum customization. During (BPA&T-A) we discovered that the role of CHW which the generic version provide in developing the user role, personas and workflow is quite different from the role of CHW have in Tanzania while CHW role in some Asian countries like Bangladesh could go further up to the role similar to a nurse or any mid-level health care provider in Tanzania, the role of CHW in Tanzania have limitations and ends up when have identified, counsel, advice and refer the client to the formal health service provision points such as dispensaries, HCs and Hospitals.

Technology analysis were used to determine the effective technologies that should be used to customize and develop the e-refferal application we started with User Interface and the team decided to customize "enkerto form" to native "android forms" reason being the native android technologies have more large community of developers in Tanzania than "enkerto" while applying the principle of simplicity and technology commonalities.

Development approach
The initial version of the system was based on the initial set of requirements and further requirements were gathered in parallel with the development process.
The team used pivotal tracker in managing various tasks of the requirements to make sure that all tasks are delivered on time but also tested and functional as were supposed to be, source codes after the development of each functional requirements were tested in the staging server before pushed to live server, all of the source codes were stored in the GitHub account which all team members had the access, each developer have to synchronize with the changes that commit and the changes should apply for specific specified component. Our analysts had responsibilities to test all functional and non functional requirements to ensure that features are user friendly, intuitive and interactive but the most important mimic the actual process.

User/Client Participation (testing & design)
In order to ensure that the analysed requirements and system designs reflects the need of the clients and users, our team worked very closely with them from the very beginning of the project. Users and clients participated in regular meetings that were conducted for the purpose system demonstrations and testing system's modules. During the system demonstration meetings, users and the client were able to provide feedback for further improvement and enhancements of the system. At the level of system testing all stakeholders were involved so as to avoid basis from technical side only. The users represented like a second eye to the developers and system designers. The participation approach enabled to create the capacity and ownership of the users, and at the same time, to ensure that the system addresses their actual requirements.

Results
The process and UI design and technologies were both changed. OpenSRP Server was redeveloped to handle more processes to accommodate the new redesign and workflows, the architecture of the new design server side is the power house of the whole application and all of the requests have to be tunneled through it before being sent to other points for processing, analysis or visualization.

The generic application uses 'OpenSRP mobile client' to send the referrals or service to OpenMRS web application in the facility, new approach needed to use the referrals and send them to the facility mobile client but still maintaining the same back end 'OpenMRS back end'.
We discovered multiple navigation of the user through different applications during configurations, or assigning user roles so we developed new reporting tool that enables users to configure and maintaining the whole application from OpenMRS, OpenSRP server through the web based User Interface that were built using AngularJs 5 that calls requests from all back ends in exchanging data using application programing interfaces (APIs).

The same User Interface was designed to develop aggregated data reports from DHIS engine that will help the users to reconfigure monthly aggregated data reports without needing high knowledge of DHIS that was needed before, next milestone for the application will be to integrate TRMIS and DHIS-2 if the need will arise but meanwhile reporting tool can generate mobile reports that pulls from 'OpenSRP server' and push to the developed AngularJS 5 dashboard. Since refferal could be linked with any third party application we are set to provide APIs that could be integrated with any application which could need to use community data in the future. The application have already being tested internally and now await for Proof of concept for 30 days then rolling out to several regions

Next steps
After the initial prototype the team will go to the field in the next few weeks to come for the proof of concept(PoC) for a month then after move to the roll out to all selected facilities. Government of Tanzania through PORALG and MoHCDGCE have tabled the discussions for further integration with other legacy systems. Integration with other applications that are used with other service providers apart public systems.