"How do human-centred designers currently contribute to Humanitarian Open Source Software (HOSS) and how is human-centred design viewed within HOSS?"

A critical exploration in how human centred designers participate in and contribute to humanitarian Open Source Software.

Eriol Fox, Doctoral Candidate Newcastle University Open Labs

Supervisors: Rachel Clarke, Dave Kirk.

Proposal Approval: 08.08.2021

Contents

Aims

The purpose of this research is to critically explore how human centred design is currently practiced and understood between by the people who create and maintain Humanitarian Open Source Software (HOSS) and users of the HOSS. In addition, how do human-centred designers themselves, engage with and contribute to HOSS and why.

The aim of this critical exploration is to better understand what practices support a collaborative, inclusive and human-centred design process for the HOSS and if the use of the HOSS and relationship to the HOSS, by the beneficiaries, is changed through these human-centred design practices. This research aims to discover insights on the potential impact that collaborative and inclusive human-centred design contributions have on HOSS.

The context of this work will be selected projects in affected, humanitarian crisis or human rights activist locations where HOSS is most in most prevalent use. The HOSS themselves, typically being international and ‘open’ projects used across multiple countries for humanitarian purposes.
Attention will be given to cultural and location specific influence factors for the HOSS and human-centred design methods including the ‘online’ or ‘digital’ location.

Research context and summary

Open Source Software (OSS) developed to support humanitarian projects are increasingly providing much needed technical and collaborative resource that can facilitate global community action during crises. A notable example of humanitarian OSS is Humanitarian OpenStreetMap Team (HOT); online mapping software used to consolidate mapping efforts through crowd-sourcing via a global volunteer base in developed and developing countries (HOT, 2020). HOT has, for example, been used by Médecins Sans Frontières (MSF) and in-country humanitarian responders to locate and map places that lack official or comprehensive mapping of facilities for crises like the 2014 Ebola epidemic across western and central Africa (M Dittus et al. 2016).

Most significantly is how humanitarian open source software (HOSS) can support citizens and activists who have limited access to secure digital tools for achieving social justice work. This means they can reach global audiences while their information, identities and locations are protected. This is particularly important in countries where digital infrastructures can be controlled by oppressive governments. HOSS projects therefore often derive from an egalitarian agenda aiming to equalise a field of software commerce to build technologies that would not be 'commercially viable' for proprietary software.

Furthermore, much of this software seeks to create encrypted secure communications to ensure those who use it remain anonymous and safe, while information is secure (e.g. Arab Spring supported by Signal (Vavra, *'Signal vows to fight blockage in Iran amid newfound popularity'* 2021) and Telegram's (Maréchal, 2018) encryption and journalists in Sudan avoiding using government discoverable Google docs to share information about internet shutdowns and killings). Typically open source software projects involve collective efforts to improve the availability of software, and those that use it will contribute technical improvements by way of 'paying' for their use.

Developing open source software is also now an important aspect of software engineering education and professional development allowing engineers a continuous place to learn, practice, share and collaborate (Yunwen Ye et al. 2003). We can therefore make a reasonable assumption that Engineers/Developers (people who code) have some existing mental models and cultural practices when moving from OSS to HOSS.
Many human-centred designers with hopes of contributing to open source projects have limited prior experience or exposure through formal or informal education and, unlike engineers, self-initiate discovery of OSS against a culture of gatekeeping (Rajanen et al. 2015). Exploring the ways in which

When these humanitarian open source software are not made in a human-centred way, and the people that use them are not involved in a process that centres them, the software could put these vulnerable user-beneficiaries at risk. Previous research has been done to 'introduce' HCI specialists and designers in to OSS spaces with limited success (Hedberg et al. 2009) where designers are the ones asked to modify culture and practices to 'fit' within OSS governance and hierarchy structures (Mikko Rajanen et al 2015) which conflicts with observations outside for the OSS technology space where generally there is an increased recognition for human-centred design (HCD) led technology contributes to business related goals like revenue and growth (McKinsey *'The business value of design'* 2018) (Mohan *'The Growing Importance Of Design In The Tech World'* 2020).

Within the 'social innovation' or humanitarian technology sector, software that is designed in a human-centred way creates a more accessible, usable and relevant experience for beneficiaries of the social innovation purpose (Selloni et al. 2017).
These examples describe when human-centred design is done for beneficiaries in a passive 'receiving sense'. When we begin to explore ideas from authors like Ezio Manzini in the book *'Design, When Everybody Designs: An Introduction to Design for Social Innovation'* we begin to understand how human-centred design processes in partnership (or co-creation) with other stakeholders of the social innovation (or technology) we begin to see connections to how open source software is typically co-created by collaborators.

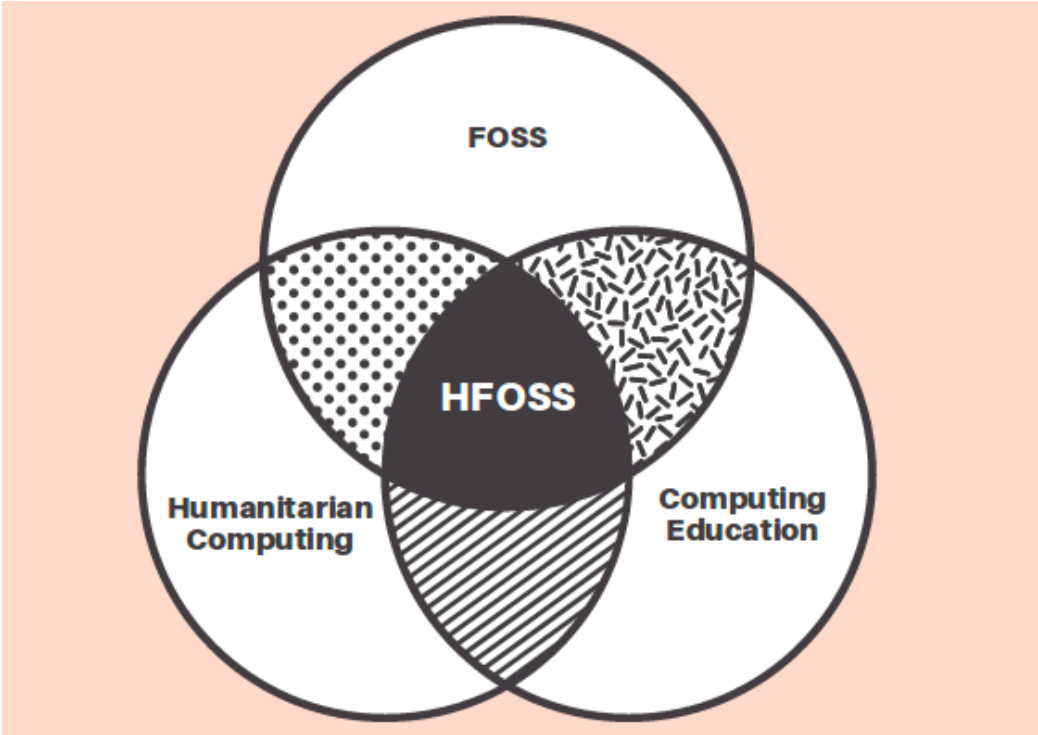
"Social innovation refers to changes in the way individuals or communities act to solve a problem or to generate new opportunities. These innovations are driven more by changes in behaviour than by changes in technology"

Initiatives like Access Now and Electronic Frontier Foundation, have supported access to HOSS that protect vulnerable people and now include human-centred design as part of their expanding focus (Abu-Salma et al. 2015) (Postigo 2008). HOSS maintainers benefit through collaborations with designers by gaining critical, expert insights from diverse, distributed designers that facilitate and focus the needs of the users (Raza et al. 2012). These initiatives allow increased understanding of the need for human-centred design in the humanitarian space but have many barriers including IP, ownership, data protection and security. These can impact on overall contributions and risk becoming 'closed projects' where design input is rarely sustained beyond specific events and projects (like with social innovation design involvement) with an ultimate goal as a commercial or fundable venture.

My research therefore aims to explore these connections around 'successful' human-centred designer involvement in social innovation, human-centred design involvement in non-humanitarian OSS and the collaboration between human-centred designers, people who manage Humanitarian Open Source Software (HOSS) and user-beneficiaries of the software work towards inclusive, collaborative, socially-innovative contributions on specific humanitarian needs expressed through the HOSS.

What is HOSS?

"Humanitarian Free and Open Source Software (HFOSS), or sometimes called Humanitarian FOSS, is open source software that somehow benefit the human condition in areas such as health care, economic development, disaster management, ecology, education and more."



Research key questions

The objective of this research centres primarily around understanding the current state of play with how HOSS organisations and beneficiaries of that HOSS currently engage and whether those engagements could be described as ‘human-centred design’. Continuing then on to understanding the human-centred designers perspective (including myself as a human-centred designer) when engaging with HOSS and how.
Ultimately leading to an analysis of ways in which human-centred design is practiced within the HOSS and beneficiaries ‘environment’ (both physical location and the digital ‘online space’) centred around which are ‘inclusive’ and ‘collaborative’ and the subsequent affects on the HOSS and beneficiaries relationship with the HOSS.

1. How do humanitarian organisations, NGO's and actors currently describe and practice their engagements with HOSS?

1a. How do their 'beneficiaries' currently describe and practice their engagements with HOSS? (if at all)

2. How do activists, communities and designers experience and envision collaborative and human centred design approaches in humanitarian spaces for HOSS?

3. What human centred design mechanisms and resources could support more inclusive collaborative HOSS in humanitarian spaces (for 'users' and human centred design contributors)?

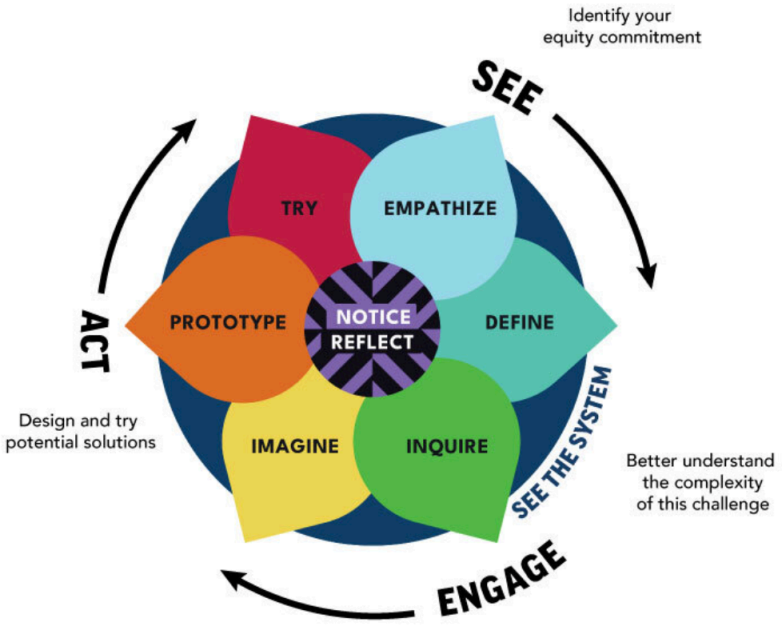
Methodology and modes

This research will follow three different methodologies dependant on the activity. For self-reflective work I will being referencing both Liberatory Design and intersectional Feminist principles and values in research.

For external engagements with participants I will be combining Liberatory Design with Living Labs methodology.

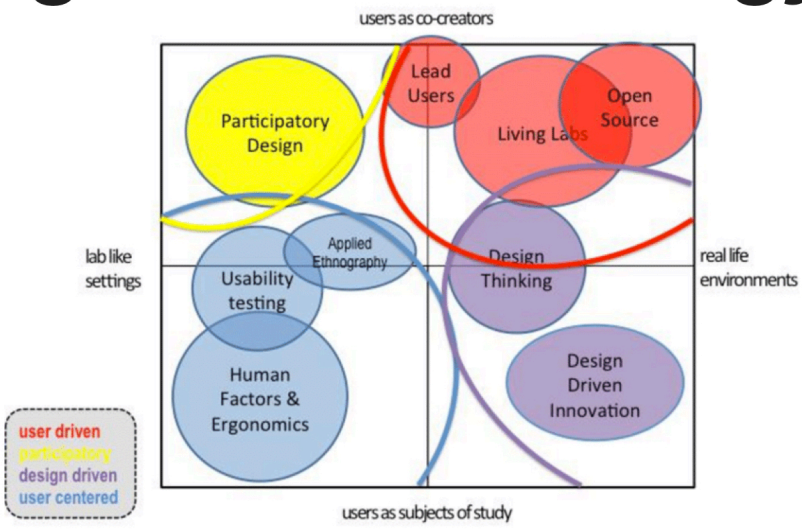
Intersectional feminist principles and values challenge existing status quo in research and technology and have surfaced in open source investigations literature in recent years. The core question within a human rights or humanitarian context asks - power, who has it and who does not?
When approaching human rights and humanitarian technology I want to look towards intersectional feminism, that in turn *"looks beyond gender to ask how race, class, sexuality, religion, ability and much more, determine our total experience of the world."* (Dyer and Ivens 2020)

Liberatory design is utilised due to it's intentions to *"...help us better understand challenges in highly complex interconnected systems, to see ways systems of oppression are impacting our context, to root our decision-making in our values, to combat status quo"* along with Liberatory designs focus on equity, liberation and power structures within a design process.



Living labs is a methodology which sits close to open source software processes with co-creation and collaboration at the heart of its processes.
"A Living Lab is a design research methodology aimed at co-creating innovation through the involvement of aware users in a real-life setting"

Living Labs Methodology.



Observations will be made consistently throughout the period of research to monitor changes. HOSS (like much of OSS) has ‘peaks’ and ‘troughs’ dependant on a number of factors including: Volunteer numbers and coordinators, current political and environmental climate, funding, advocacy and technical trends. Longer term consistent monitoring of human-centred design within projects will be able to account for these variations in activity.

Interviews will be conducted with three key stakeholders, Humanitarian open source software maintainers or ‘owners’, human-centred designers involved in HOSS and the user-beneficiaries that used the HOSS that were interviewed as ‘maintainers’ and, preferably the same that human-centred designers are involved in. The interviews will follow a contextual inquiry format and aim to understand how engagements between these three stakeholders are currently conducted and how they might envision collaboration that is inclusive and supportive through mental model mapping.

Diaries and auto-ethnographic processes will be used to document my own experiences and observations of how human-centred designers in HOSS support inclusive and collaborative ways of engaging with HOSS maintainer organisations and user-beneficiaries.

Fieldwork 1 will comprise of predominantly observation, support and limited participation in existing human-centred design processes in identified HOSS organisations. Ethnographic observations, shadowing and design ethnography.

Fieldwork 2 will comprise of the above along with a participatory approach that tests what mechanisms and resources could support further inclusive collaboration in the HOSS with user-beneficiaries and human centred design contributors. Here the researcher will take a more active and ‘exploratory research’ role. Auto-ethnographic and design ethnographic observations will be utilised.

The humanitarian projects I intend to study and work with (pending agreement for non-observational and integrated engagements) are 3

of the following: Ushahidi, HOTOSM, Chayn, StoryWeaver, Linux Public Health, Unicef Innovation Office OSS, OCCRP Aleph, Open Archive, KoBo Toolbox, HURIDOCS:UWAZI, Tella, Signal app.

HOSS organisations are cautious with who they engage with and include in their activities for a variety of reasons including but not limited to: Time cost for salaried staff to engage, sensitive information and domain, unstable funding or operating conditions and high-staff turn-over for projects.
These reasons and more are why I've listed potential projects to approach. Given optimal conditions I will be able to choose which projects to work with that meet a set of criteria for this research, that criteria being:

1. Are engaged in at least one Humanitarian or Core International Human Rights Instruments described by UNHR.
2. Follow OCHA's Humanitarian Principles.
3. Actively maintain an open source software project within the last 10 years.
4. Have engaged with 'design' either in the past or currently.

I will engage with each selected organisation as a researcher and as an 'open source design contributor'. Becoming part of the team in order to fully understand the open domain context and any 'closed' context relevant to this research.

Key Milestones

Situating, defining and interviewing		
Reading and situating research	2/9/21	2/9/22
Project approval	2/9/21	8/8/21
Preparing and testing interviews	9/1/21	12/31/21
Observation of design in chosen OSS & HOSS projects	9/1/21	1/31/26
Interviews: Humanitarian orgs	1/9/21	31/09/22
Interviews: Designers in OSS	9/1/21	9/30/22
Interviews: Designers in humanitarian org	9/1/21	9/30/22
Interviews: Beneficiaries of chosen humanitarian OSS	9/1/21	9/30/22
Coding and analysis of interviews	10/1/22	11/30/22
Coding and analysis of HOSS observation	10/1/22	11/30/22
Annual progression	12/1/22	12/31/22
Fieldwork 1		
Prepare fieldwork 1	1/1/23	5/30/23
Fieldwork 1	1/6/23	03/30/24
Fieldwork 1 analysis	04/01/24	07/30/24
Coding and analysis of HOSS observation	04/01/24	07/30/24
Annual progression	08/01/24	09/01/24
Field work 2		
Prepare fieldwork 2	07/01/24	11/30/24
Fieldwork 2	12/01/24	08/30/25
Fieldwork 2 analysis	10/01/25	01/31/26
Coding and analysis of HOSS observation	10/01/25	01/31/26
Writing up		
Writing up thesis	02/01/26	01/31/28
Thesis submission	02/01/28	02/29/28
Onoging tasks		
Literature reviews	2/9/21	12/31/27
Diary and autoethnography	2/9/21	12/31/27

Full Gantt chart viewable online here: https://docs.google.com/spreadsheets/d/1fBI2u6ieR-6ngHIJruJ-m4Qy9izo1GwHMQXwBiY6MOs/edit?usp=sharing

Ethical review

I am currently awaiting a response from the Ethics Committee on my application.

The general considerations for the ethics involved in this project centre around the agreed humanitarian open source software projects. These could include subjects and material around crisis response and disaster response, human rights abuses, media freedom, domestic violence, immigration, refugee and migrant cases, peace building and education and other relevant humanitarian contexts.

The biggest risk to both participants and researcher are:

1. Risks to safety around disclosure of identity or PII in certain contexts e.g. unresolved domestic violence, political or cultural taboos or illegal behaviour.
2. Trauma and vicarious trauma of engaging with these subjects.

Data Management plan

I am currently awaiting a response from the DMP team on my proposed methods of keeping open source data, of anonymised PII on a personal GitHub account, in a specific repository (https://github.com/Erioldoesdesign/Design_HOSS_PhD) under a CC0 license (https://creativecommons.org/choose/zero/).