HUMANITARIAN INNOVATION FUND
Early Stage Innovation Final Report
- Please try not to exceed 5 pages (Arial, 12pts) excluding attachments –

Organisation Name	Sahana Software Foundation

Project Title	**Pictographs in support of disaster information communication for linguistically challenged**
Partner(s)	Microsoft Research India, Extreme Citizen Science University of London.
Problem Addressed / Theme	Present day ICT-driven disaster and climate change communication does not provide the means for sharing risk information with and receiving risk information from the marginalized low-literate or linguistically challenged populations. There is no established pictograph dictionary and semantics.
Location	Colombo/Ratnapura - Sri Lanka and Cebu - Philippines
Start Date	01 July 2016
End Date	01 August 2017

Total Funding	GBP 47,393.00
Total Spent	GBP 47,401.78

Innovation Stage	Recognition
Type of Innovation	Disaster Preparedness, Resilience and Risk Reduction
Project Impact Summary	Our challenge was to validate the concept of pictographic disaster communication and to stimulate feedback on design requirements. This was done by developing a first version of a dictionary and semantics for initial testing and confirming with communities and practitioners their requirements for national implementations. The low-literate communities are eager to see the tools develop fast. Other practitioners have expressed the desire to use Pictographs in communicating scientific climate change information in a comprehensible, useful and simplified way.

ACTIVITIES CARRIED OUT

1. Describe all the activities carried out. Please attach a workplan or log frame, if these were used.

- **Partnership development:** We established a network of partners we collaborated with and had frequent online consultations. This included our project partners: Muki Haklay (UCL), Indrani Mehdi (MSRI), Elizabeth Klute (USA), Rodrigo Ramirez (Chile), and Emma Calgaro - University of Sydney (USyd)) and our partners for ground work: Stockholm Environment Institute (SEI) Asia, Sarvodaya Shramadana Movement, Sri Lanka, and Deaf Disaster Assistance Team - Disaster Risk Reduction (DDAT-DRR), Philippines. Additionally, the Asian Disaster Preparedness Center (ADPC) and Philippine Atmospheric Geophysical and Astronomical Service Administration (PAGASA), after sharing our knowledge, expressed interest in making use of Pictograms in their disaster and climate change information sharing.

- **Workshops:** We worked with disaster communication experts at the 2016 CAP Implementation Workshop (Aug 2016) in Bangkok, also presenting our project there. A partner meeting took place at MSRI, Bangalore in September 2017, to define the research agenda. In June 2017 we discussed results with SEI and DDAT-DRR partners at a workshop in Bangkok. Sarvodaya could not attend as they were responding to the 2017 Sri Lanka Floods.

- **Development of a prototypical pictograph dictionary:** We prepared a design grammar and prototypical event pictographs for hydrometeorological events, both for alerting and reporting, including severity and response action indicators. The UN-OCHA Noun and the Guemil projects were instrumental to making use of available disaster communication symbols. Additionally, We cross examined the ability to align the information elements with interoperable International EDXL-CAP and EDXL-SITREP international content standards.

- **Field Studies:** We conducted a large user-centered field study in March (part 1) and May/June (part 2), in Sri Lanka and the Philippines, with around 60 participants each time. While part 1 was predominantly to assess the participants' needs and preferences, part 2 focused on understandability studies. Results are very promising and strengthen our approach, but clearly indicate the need for further research and development.

- **Communication and Dissemination:** We established a website under the Sahana Research and Action branch. There, we documented our work through regular blog posts also published at the HIF site. We transformed the results of the literature survey into a survey paper that we have published at ResearchGate[1], an open access professional network portal. We had presentations of results at UNESCAP and ADPC (both in Thailand). For further dissemination, we are invited to present at the CAP Implementation Workshop in Rome, Italy, and the INTERACT EU project in London, UK.

[1] ResearchGate Pictographs project and literature review paper: https://www.researchgate.net/project/Pictographs-for-Disaster-Communication

2. If you have made changes or amendments to the planned activities and objectives that have not been detailed in an *Agreement Amendment Form*, please list them here.

Initially, we planned to evaluate our findings through an online/tool-based survey. However, we had the opportunity to do user-centered field studies that did not need (and would be negatively affected) by using an online tool. As a consequence, tool use has been delayed to subsequent project phases.

ACHIEVEMENTS

3. Has the project demonstrated the success of the innovation or idea?

By 'success' we mean that the innovation has achieved the planned positive impact/outcome, or that the idea has proven effective.

☒ Completely successful
☐ Significantly successful
☐ Partially successful
☐ Completely unsuccessful

Please explain further:

Our goal was to understand the challenge and validate the concept of pictographic disaster communication.

1. We achieved a great deal of understanding the problem, through literature review, consultation of researchers and practitioners and interaction with low-literate communities and disaster communication experts
2. International Emergency Data Exchange Language standards: EDXL-CAP and EDXL-SITREP, were examined against the pictographs communication approach to understand the information elements and transform them to a generalized pictographs mobile phone screen layout
3. We collected requirements and needs of target audiences through field studies in Sri Lanka and the Philippines. We also discussed the needs of disaster agencies through a workshop with experts.
4. Based on a user-centered design study, we developed a prototypical pictograph dictionary along with an underlying design grammar and tested its effectiveness in field studies.
5. From our studies, we could find a set of important research questions for further development of our idea.

4. Please describe how the project achieved the planned objectives, and describe all of the results achieved through the activities indicated in Question 1.

Results:

1. With pictograph alerts, the disaster event is understood if the target audiences can relate to the problem depicted.
2. Low-literate communities are to a large extent excluded from disaster communication. In disaster situations, they often don't know what to do, and they do not know how to communicate their needs and situation to authorities.

3. Understanding of pictographs relies on given context, such as depicted reference objects. In particular, these reference objects contribute to the notion of “severity” of an event. Understanding of severity can be increased through context, detail and response actions.
4. Communicating a “response action” in alerts is crucially important. Indications of response actions within the pictograph raises the understanding of severity of the event and increases the chance of the right action being taken.
5. Communication about time to (or interval to) respond is challenging, as illiterate people often lack the needed understanding of time concepts.
6. As we expected, cultural differences play a large role in understanding pictographs. They can be highly local and even appear within the same country. Verbose pictographs clearly showing the hazard impact can even raise bad feelings by people affected by previous events.

APPROACH

5. Describe how the approach, project design or methodology you used was OR was not appropriate to carry out the planned activities or to achieve the planned objectives.

The methodology we used as proven to be effective to achieve the results. Even if not initially planned, we had the chance to undermine our findings though field studies where we developed pictographs using a user-centered design approach. Although it was not possible to have a direct long-time interaction of the designer and the communities within our possibilities, the experience Muki Haklay and Indrani Medhi with this approach helped the project a lot.

As opposed to our proposal, we delayed involvement of technical tools to a later project phase. This would have added an additional layer of complexity and distracted communication with target users.

MAJOR OBSTACLES

6. Please list the three most significant obstacles faced during the project and describe how they affected the planned activities and results.

Obstacle	Impact of Obstacle
1. Inability to cooperate with IIT Bombay	After intense communication and planning, it turned out that the project could not realise the cooperation under the formal conditions of IITB due to financial reasons.
2. Heavy storms and floods in Sri Lanka in May	The conditions made it impossible to conduct the 2nd Sri Lankan study as planned. It is not possible to conduct studies while people are in calamity.
3. Communication with deaf participants, especially elderly, turned out to be even harder than expected	We underestimated the variety of sign languages and even lack of understanding sign in our user groups. Through that, we have seen some misunderstandings especially in our first field study, where a part of the survey could not be conducted to a full extent.

7. Please indicate what steps were taken to address these obstacles and whether the solutions were effective.

Solution	Effective?
1. We searched for different partners and worked with Sarvodaya and DDAT-DRR to realise the field studies.	Yes, but led to a significant delay
2. We extended the project by one month to give the local partners time to finish conducting the survey when the situation had calmed down.	Yes
3. For the second study, we especially took care of an easy-to-understand study workflow and assigned more time for the study. We also spent more time training the local facilitators.	Yes

OPTIONAL: PARTNERSHIPS AND COLLABORATION

***If** you received HIF funding with partners or collaborators, please answer questions 8 and 9.*

8. How and why did the partnership change during the course of the project?

To conduct our field studies, we added partners for ground work, see Section 1.

9. Are there plans to continue your partnership, either while continuing this innovation or on other projects?

☒ Yes, with this innovation
☐ Yes, with another project
☐ Maybe
☐ No

Please describe further:

We plan to continue, both with our research partners and our ground work partners for the invention phase. Additionally, we have shared our preliminary findings with the Sri Lanka Disaster Management Center and PAGASA who are interested in collaborating, in the future, to work with us. We intend to include additional communities, such as the Disabled and illiterate Womens in Cambodia, through SEI, and illiterate farmers in Vietnam, through ADPC, in the subsequent phase. All of them have expressed great interest in continuation.

DISSEMINATION

10. Please describe any steps taken to disseminate the outcomes of the project.

Please include all completed and forthcoming, as well as all planned and unplanned products (for example, research and policy reports, journal articles, video blogs, evaluations).

See section 1, “Communication and Dissemination”. Additionally, we are looking into ways to submit a research paper on the findings of the field studies.

NEXT STEPS

11. Will the project, idea or innovation be replicated, carried forward or scaled up?

- [x] Yes
- [ ] No
- [ ] Maybe

Please describe further:

We found enough evidence to work in a highly relevant field and to tackle a substantial problem with a big possible impact. Thus, we will carry on this idea to the invention phase for further scaling it up.

12. If the project or innovation could be carried forward, replicated or scaled up, please list the three most important issues or actions that will need to be considered *(where 1 = most important and 3 = least important)*

Suggestion/issue	***1***	***2***	***3***
1 identifying the other communities and right use cases; especially, the necessary and sufficient ones that can be developed for wider use.	☐	☐	**X**
2 Defining a process to enable pictograph based communication for local stakeholders. This includes design guidelines and technical realizability.	☐	**X**	☐
3 Deeper studies on the understanding of immediate needs, severity and response actions / an improved scaled replication / applying user centered design methods for in depth contextual pictograph dictionary	**X**	☐	☐