Why common fever thermometers are not enough

A systematic perspective in the crossing between medicine and engineering

Rodrigues Santos, Ana; Diehl, Jan-Carel; Reis, R.

Publication date
2016

Citation (APA)
Rodrigues Santos, A., Diehl, J.-C., & Reis, R. (2016). *Why common fever thermometers are not enough: A systematic perspective in the crossing between medicine and engineering*. 1-2. Poster session presented at CUGH 2016 The 7th Annual Global Health Conference, San Francisco, United States.

WHY COMMON FEVER THERMOMETERS ARE NOT ENOUGH

A SYSTEMIC PERSPECTIVE IN THE CROSSING BETWEEN MEDICINE AND ENGINEERING

Project purpose This abstract describes a cross disciplinary design project aiming at developing a fever thermometer for East Africa, with clear cut-off points for community health workers and caregivers, based on medical evidence, and adapted to local realities and cultural notions. The Frugal Thermometer project is an initiative supported by the Centre for Frugal Innovation in Africa and it is carried out by the Leiden University Medical Centre and the Faculty of Industrial Design Engineering at Delft University of Technology since 2012.

The fever thermometer is an essential health technology and the entry point to a diversity of diagnostics in most healthcare systems. Nonetheless, the prevailing subjective nature of fever, makes it still today, a widely discussed topic amongst the medical community. The lack of accessibility to an accurate and reliable diagnostic of fever (i.e. the technology to measure body temperature variations and respective explanatory models), the misinterpretation of fever symptoms and its association with diseases such as Malaria, have direct implications on the costs of healthcare and on the health of patients seeking care. These are either misdiagnosed, over prescribed with medication, or lost from the health system because of a mismatch with expectations.

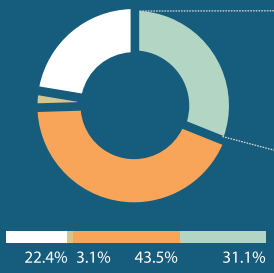
Health technologies, like the fever thermometer are an essential part of the delivery of primary healthcare services for global health. Despite the increasing engagement of the private sector and academia, there is a poor understanding of the barriers to their implementation across the different healthcare systems and their structures.

Design In this abstract, the authors suggest that the crossing of medicine and design engineering has the potential to offer new perspectives to health technologies, by focusing on developing value-sensitive innovations that include consideration for human factors involved in the development, procurement, use and disposal of technologies (e.g. individual, relational and organizational aspects), to the technical eco-system and underlying financing model needed to sustain such technologies.

Outcome and evaluation This abstract exposes a systemic perspective on the assessment of fever in rural Africa by describing how the engagement of these two disciplines in a series of design projects lead to relevant insights about the current barriers to access and proper use of existing fever thermometers and provides scenarios and concepts towards new solution directions.

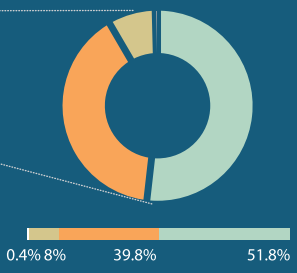
DISTRIBUTION OF HEALTHCARE RECEIVED BY PEOPLE WITH FEBRILE SYMPTOMS

- Visited a healthcare provider (except a traditional healer)
- Self treated
- Visited a traditional healer
- No action



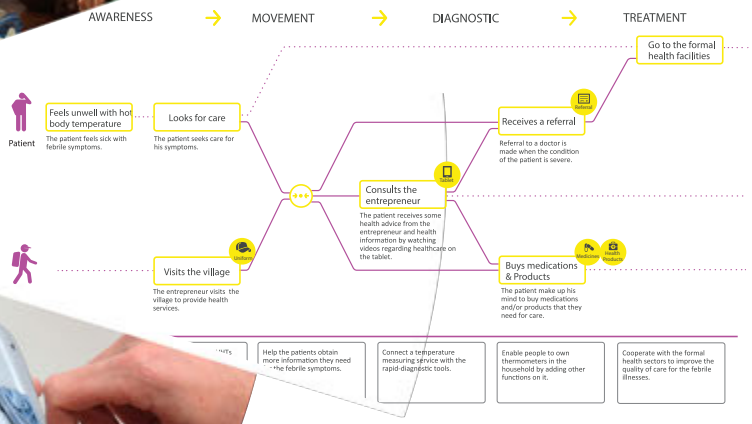
DISTRIBUTION OF HEALTHCARE PROVIDERS VISITED BY PEOPLE WITH FEBRILE SYMPTOMS

- Private for profit
- Public
- Private non-profit
- Informal



thefrugalthermometer

WWW.THEFRUGALTHERMOMETER.ORG



Going forward The Centre for Frugal Innovation in Africa and the partnering universities actively pursuit this applied research aiming at generating and disseminating knowledge about the contribution of frugal innovation to global health.

A.L.R. Santos[1,3], J.C. Diehl[1], R. Reis[2]
[1] Delft University of Technology, Faculty of Industrial Design Engineering, The Netherlands
[2] Leiden University Medical Centre, The Netherlands
[3] Médecins Sans Frontières Sweden Innovation Unit, Sweden

Rikako Iwamoto[1]
Graphic support

Leiden • Delft • Erasmus

Centre for Frugal Innovation in Africa

Universiteit Leiden The Netherlands

Erasmus Universiteit Rotterdam

TU Delft Delft University of Technology

WHY COMMON FEVER THERMOMETERS ARE NOT ENOUGH

A SYSTEMIC PERSPECTIVE IN THE CROSSING BETWEEN MEDICINE AND ENGINEERING

Project purpose This abstract describes a cross disciplinary design project aiming at developing a fever thermometer for East Africa, with clear cut-off points for community health workers and caregivers, based on medical evidence, and adapted to local realities and cultural notions. The Frugal Thermometer project is an initiative supported by the Centre for Frugal Innovation in Africa and it is carried out by the Leiden University Medical Centre and the Faculty of Industrial Design Engineering at Delft University of Technology since 2012.

The fever thermometer is an essential health technology and the entry point to a diversity of diagnostics in most healthcare systems. Nonetheless, the prevailing subjective nature of fever, makes it still today, a widely discussed topic amongst the medical community. The lack of accessibility to an accurate and reliable diagnostic of fever (i.e. the technology to measure body temperature variations and respective explanatory models), the misinterpretation of fever symptoms and its association with diseases such as Malaria, have direct implications on the costs of healthcare and on the health of patients seeking care. These are either misdiagnosed, over prescribed with medication, or lost from the health system because of a mismatch with expectations.

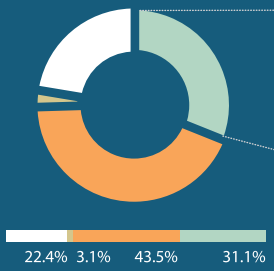
Health technologies, like the fever thermometer are an essential part of the delivery of primary healthcare services for global health. Despite the increasing engagement of the private sector and academia, there is a poor understanding of the barriers to their implementation across the different healthcare systems and their structures.

Design In this abstract, the authors suggest that the crossing of medicine and design engineering has the potential to offer new perspectives to health technologies, by focusing on developing value-sensitive innovations that include consideration for human factors involved in the development, procurement, use and disposal of technologies (e.g. individual, relational and organizational aspects), to the technical eco-system and underlying financing model needed to sustain such technologies.

Outcome and evaluation This abstract exposes a systemic perspective on the assessment of fever in rural Africa by describing how the engagement of these two disciplines in a series of design projects lead to relevant insights about the current barriers to access and proper use of existing fever thermometers and provides scenarios and concepts towards new solution directions.

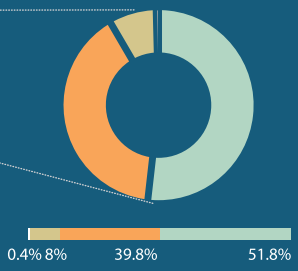
DISTRIBUTION OF HEALTHCARE RECEIVED BY PEOPLE WITH FEBRILE SYMPTOMS

- Visited a healthcare provider (except a traditional healer)
- Self treated
- Visited a traditional healer
- No action



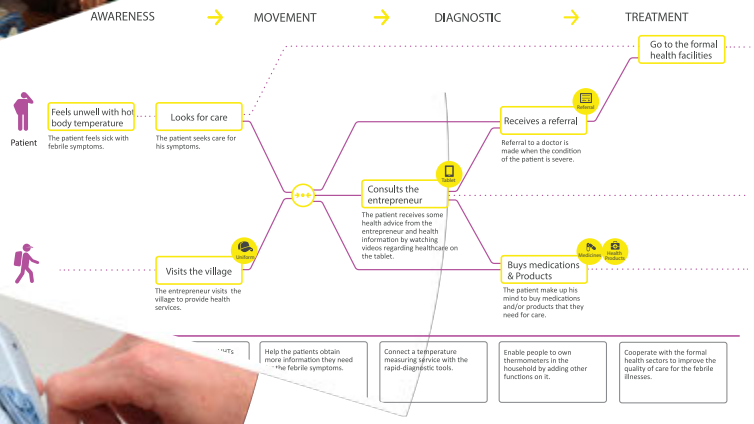
DISTRIBUTION OF HEALTHCARE PROVIDERS VISITED BY PEOPLE WITH FEBRILE SYMPTOMS

- Private for profit
- Public
- Private non-profit
- Informal



thefrugal thermometer

WWW.THEFRUGALTHERMOMETER.ORG



Going forward The Centre for Frugal Innovation in Africa and the partnering universities actively pursuit this applied research aiming at generating and disseminating knowledge about the contribution of frugal innovation to global health.

A.L.R. Santos[1,3], J.C. Diehl[1], R. Reis[2]
[1] Delft University of Technology, Faculty of Industrial Design Engineering, The Netherlands
[2] Leiden University Medical Centre, The Netherlands
[3] Médecins Sans Frontières Sweden Innovation Unit, Sweden

Rikako Iwamoto[1]
Graphic support

Leiden • Delft • Erasmus

Centre for Frugal Innovation in Africa

Universiteit Leiden The Netherlands

Erasmus Universiteit Rotterdam

TU Delft Delft University of Technology