

# ECHONET: Designing for Flexible Use

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**Abstract.** We describe the designing of ECHONET, a high-bandwidth, purpose built telemedicine system for sharing echocardiographic<sup>1</sup> expertise among hospitals in Hobart and the remote North-West of Tasmania, Australia. Extensive involvement of the technology's stakeholders in its design showed that the success or failure of ECHONET depended not just on its ability to support its original purpose but on its flexibility for appropriation for a range of other uses.

## Introduction

ECHONET (Echo Cardiographic Healthcare Online Networking Expertise in Tasmania) is the second major high-bandwidth, purpose built telemedicine system developed by CSIRO (Commonwealth Scientific & Industrial Research Organisation). It develops expertise gained in the design of ViCCU<sup>®</sup> (Virtual Critical Care Unit) (e.g. Li et al., 2006) - a telemedicine system developed for Emergency Departments that is currently being used to connect a regional and a metropolitan hospital in NSW, Australia. In turn, the design and development process of ViCCU<sup>®</sup> was informed by work done by Fitzpatrick for the TARDIS project, a telemedicine system designed to connect the Intensive Care Units (ICU's) of regional and metropolitan hospitals in QLD, Australia (Fitzpatrick, 1998). The thread that connects these three projects was a fundamental acknowledgement by the development team of the professional skills and commitment to patient care of clinicians. This resulted in the advocacy for, and use of, design processes shaped by a deep understanding of work practices in the situation of use.

## ECHONET Research

To date, the project has included:

- Interviews with 26 stakeholders representing different organizations – to capture individual perspectives and agendas, develop robust communication and elicit preliminary design suggestions and constraints.

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<sup>1</sup> Echocardiography is a diagnostic procedure that uses ultrasound waves to produce detailed moving images of the heart.

- Three participatory design workshops – to seek clinicians’ feedback on various prototypes of the developing system.
- A baseline study – to understand the working environments of the participating hospitals, to provide a means of assessing the social and organizational impact of ECHONET and to provide opportunities for further user participation. The baseline study included work place observations and questionnaires and/or interviews with 17 clinicians.
- An (enormous) number of 'non-design' meetings – to co-ordinate the project, maintain communications and mediate stakeholder expectations.

## Discussion

While echocardiography was the initial and defining domain of ECHONET, the project’s existence and strong stakeholder support to date has depended on how ECHONET could be used to further the agendas of stakeholders that did not necessarily, or exclusively, involve echocardiography. These agendas include: training and mentoring staff without extensive traveling, acknowledging, distributing and utilizing expertise more widely, justifying the cost of expensive medical technology by expanding its potential user base and reducing unnecessary patient transfers.

ECHONET’s success or failure therefore (and unsurprisingly) depends not just on its ability to support remote echocardiography, but on its ability to be appropriated for purposes outside its design brief. The major design implication from our study was that ECHONET needed to be sufficiently flexible to be used enough to justify the economic, organizational and social costs of fully embedding it in the everyday practices of the ICU. An important result of this approach was that ECHONET would be a communication tool only and not store any information itself. Our experiences designing ECHONET reaffirm several insights into the design of effective information communication systems from the literature. For example, while deep understandings of specific situations of use are now regarded as essential for the design of any novel technology, fitting the design to just one of these situations can impose constraints in other situations

## References

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