MDI WRITTEN PROPOSAL

DRIL stream: Datamine
Stream Coordinator/s: Walter Langelaar
Proposed Supervisor: Walter Langelaar
Funding (if applicable):
External Partner/s (if applicable):
Working Research Project title: Healthcare in the Digital Age - the Future of Health Records.

Project Overview (approx. 100 words):

Briefly summarise the research area and particular focus of your study. Also, please indicate if your thesis contributes to a larger team research project.

Electronic Health Record (EHR) software is widely used within the New Zealand healthcare system. My research will focus on understanding how EHRs are used day to day by General Practitioners (GPs), and how this interaction can be improved through design. The project will focus on attempting to improve the user experience of EHR software, through changes in the functionality and user interface. The main output will be a proof of concept EHR system.

Research Project Description (approx. 250 words):

Briefly state your research question or hypothesis, and explain why the pursuit of this question is of value to your area of study (i.e. using published sources in support, explain how it contributes to academic and/or design knowledge and practice).

This project seeks to answer, "How might Human Centred Design improve Electronic Health Records for New Zealand's General Practitioner?". The project will focus on improving the user experience of EHR software through changes in both the functionality and user interface. I will focus on the perspective of GPs, as they are the most frequent users of EHR systems.

EHR systems are used in all of New Zealand's General Practises (Protti & Bowden, 2010), with GPs usually using the software in each patient appointment. The software is used so frequently, that even minor issues can have a large negative effect on GPs. Likewise, any advances have the potential to improve GP's efficiency, job satisfaction, and the quality of the New Zealand medical system as a whole. Due to the the frequency of EHR use, and the importance of health records, researching EHR software has value to the medical field.

This research is well timed - in October 2015, the NZ minister of Health Jonathan Coleman announced that a single national electronic health record system will be developed in New Zealand over the next three to five years ((www.bka.co.nz), 2015; "Independent review of New Zealand's Electronic Health Records Strategy," 2015). My research could provide a different perspective on this issue.

By developing user requirements for EHR systems, they could provide a starting point for any

designers in the future. This thesis could also provide a case study to see if the Human Centred Design (Cooley, 2000), process and methodologies used work within the context of medical software.

Aims and Objectives

1. Understand how EHR systems are used by GPs in their daily workflows
    a. Review and Analyse Existing EHR systems
    b. Ethnographically research NZ GP's to understand their workflow and develop user requirements
    c. Evaluate and discuss developed prototypes and solution with Doctors and against requirements
    d. Discuss proof of concept EHR system from 2b with doctors and collect final feedback

2. Design and Develop a proof of concept EHR system
    a. Design prototypes using parallel prototyping to address user requirements from 1b
    b. Combine prototypes to design a proof of concept EHR system

Research Methods (approx. 200 words):

Using published sources in support, please describe how you will develop your design investigation, and what your research aims and objectives are —this may follow a clearly defined design process, other research method and/or theoretical model. Please state why this method (or combination of methods) is most suitable for your investigation.

First, I will conduct a literature review of existing EHR software used in New Zealand, to complete 1a. To achieve objective 1b, I need to gather qualitative data from GPs. Medical professionals are very busy, so I have chosen methods which can get a lot of data in a short amount of time. I will depend on three ethnographic; semi-structured interviews, photographs, and cultural probes.

I will first interview GPs in a semi-structured manner (Crouch & Pearce, 2013), and take photographs of their workspace. After the interview I will leave a cultural probe (Hanington & Martin, 2012), most likely a small notebook to catch any afterthoughts they may have. I will then use thematic analysis (Vaismoradi, Turunen, & Bondas, 2013) to understand my qualitative data. I will then triangulate (Hanington & Martin, 2012) my analysis from 1a and 1b to produce the user requirements.

During the design stage I will use parallel prototyping (Hanington & Martin, 2012). Designing an EHR system as a whole initially would be too complex, so I will design multiple separate prototypes to address single user requirements. This will allow me to be more exploitive, parallel prototyping has been shown to create better, more divergent results at faster speeds, compared to a iterative design process (Dow et al., 2012). It will also save GP's time, as I can test multiple designs in a single feedback session. I will evaluate the prototypes against both the user requirements, and feedback from the GPs.

Once I am satisfied with my prototypes I will then combine them into a single EHR system.

Research Outputs (approx. 100 words):

Please describe your expected research outputs (besides the thesis), which may include artefacts, digital works, installations, and data collection and analysis. Please include a brief description of the thesis format that you intend to apply in the presentation of your research (traditional design thesis or online portfolio) and how you foresee your outputs and thesis relating to and supporting one another.

The final output will be a proof of concept EHR system. It will either be a mockup of the UI or a functioning prototype, but it's not intended to be a production ready piece of software. It will be a well designed interface for an EHR system, with the potential to be developed further.

My other outputs will be written analysis of my qualitative data, and a defined list of user requirements for EHR systems. These however, will be part of the written thesis, and not presented separately. They will inform, and support my proof of concept EHR system.

I will present my thesis online, both as a presentation of the final EHR system, and as an overview of the design process.

Material, Equipment, and Workshop Requirements:

What are the material, equipment, and/or workshop requirements of your study? Please specifically detail all such requirements.

- Desktop computer and laptop
- UI prototyping software
- Voice recorder & digital camera for fieldwork documentation

I do not require anything which I don't already have access to.

Research Plan:

In close discussion with DRIL Stream coordinators / supervisors, please detail a research workplan with key milestones and deliverables. Please indicate if Ethics approval is necessary.

Completion Date	Outputs
Mid July - August 2016	1a - Written analysis of Existing EHR systems
Mid September - Mid October 2016	1b - Interviews and User Requirements
December - January 2017	2a - Designed prototypes & 1c - Evaluated prototypes with GPs
Mid February 2017	Objective 2b - Design a proof of concept EHR system & 1d - assess system with GPs
March 2017	Final Write Up

Ethics approval required for ethnographic design work.

Appendix:

This section should include a bibliography and may be used to include additional information of relevance to your application including, a portfolio of prior related work, research precedents, and other similar background or contextual materials.

Cooley, M. (2000). Human-centered design. Information Design, 59–81.

Crouch, C., & Pearce, J. (2013). Doing Research in Design.

Dow, S. P., Fortuna, J., Schwartz, D., Altringer, B., Schwartz, D. L., & Klemmer, S. R. (2012). Prototyping Dynamics: Sharing Multiple Designs Improves Exploration, Group Rapport, and Results. In H. Plattner, C. Meinel, & L. Leifer (Eds.), Design Thinking Research (pp. 47–70). Springer Berlin Heidelberg. Retrieved from http://link.springer.com/chapter/10.1007/978-3-642-31991-4_4

Hanington, B., & Martin, B. (2012). Universal methods of design: 100 ways to research complex problems, develop innovative ideas, and design effective solutions. Rockport Publishers.

independent-review-new-zealand-electronic-health-records-strategy-oct15.pdf. (n.d.). Retrieved from https://www.health.govt.nz/system/files/documents/publications/independent-review-new-zealand-electronic-health-records-strategy-oct15.pdf

Independent review of New Zealand's Electronic Health Records Strategy. (2015, July 16). Deloitte New Zealand.

PrototypingParallel-TOCHI10.pdf. (n.d.). Retrieved from http://spdow.ucsd.edu/files/PrototypingParallel-TOCHI10.pdf

Protti, D., & Bowden, T. (2010). Electronic medical record adoption in New Zealand primary care physician offices. Commonwealth Fund, 96, 1–13.

Snapshot. (n.d.). Retrieved from http://www.nzdoctor.co.nz/login.aspx?ReturnUrl=/news/2015/october-2015/20/grand-plan-to-develop-a-single-national-electronic-health-record-for-kiwis.aspx&returnid=70024

Vaismoradi, M., Turunen, H., & Bondas, T. (2013). Content analysis and thematic analysis: Implications for conducting a qualitative descriptive study. Nursing & Health Sciences, 15(3), 398–405.

(www.bka.co.nz), S. designed and developed by bka interactive ltd, Auckland, New Zealand. (2015, 10). Grand plan to develop a single national electronic health record for Kiwis. Retrieved June 9, 2016, from http://www.nzdoctor.co.nz/news/2015/october-2015/20/grand-plan-to-develop-a-single-national-electronic-health-record-for-kiwis.aspx