Design a better EMR:
Design and testing of a provotype GUM interface

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IN A WORLD where smartphone apps are designed for usability and user delight, and where health data stewardship is shifting towards the patient, how might we redesign the EMR interface to make consultations more efficient and even a little bit delightful?

BACKGROUND: GUM patient data come from many sources – the patient history, point-of-care tests, microscopy, laboratory results, online triage, partner notification and patient apps. Clinicians need this information, in cumulative historical form, at their fingertips. However, poor usability of most commercial Electronic Medical Record (EMR) interfaces is often cited as a leading cause of physician burnout[2] and patient harm[3]. Through participatory design with GUM clinicians, this research reimagines the EMR interface through a provotype - a **provo**cative proto**type**[4], introduced in the design process to provoke and engage users to imagine possible futures.

METHODS: Stage 1. A mixed methods paper survey of commercial EMR usability (see Pao[5] for full details) **>>**
Stage 2. Results of Stage 1 inform the design of a visually-biased provotype interface **>>**
Stage 3. 'Test-drive' exploring perceived usability and impact of the provotype on GUM consultations

RESULTS:

Stage 1: Forty-seven surveys were returned, by a mix of clinical staff from four GUM clinics, using 2 commercial EMR systems.

Distribution of the 7-point Likert-type responses around perceived usability and clinical performance of EMR1 and EMR2 are visualised in *Figure 1* (top 2 panels only).

Figure 1: Perceived usability, deviation from neutral
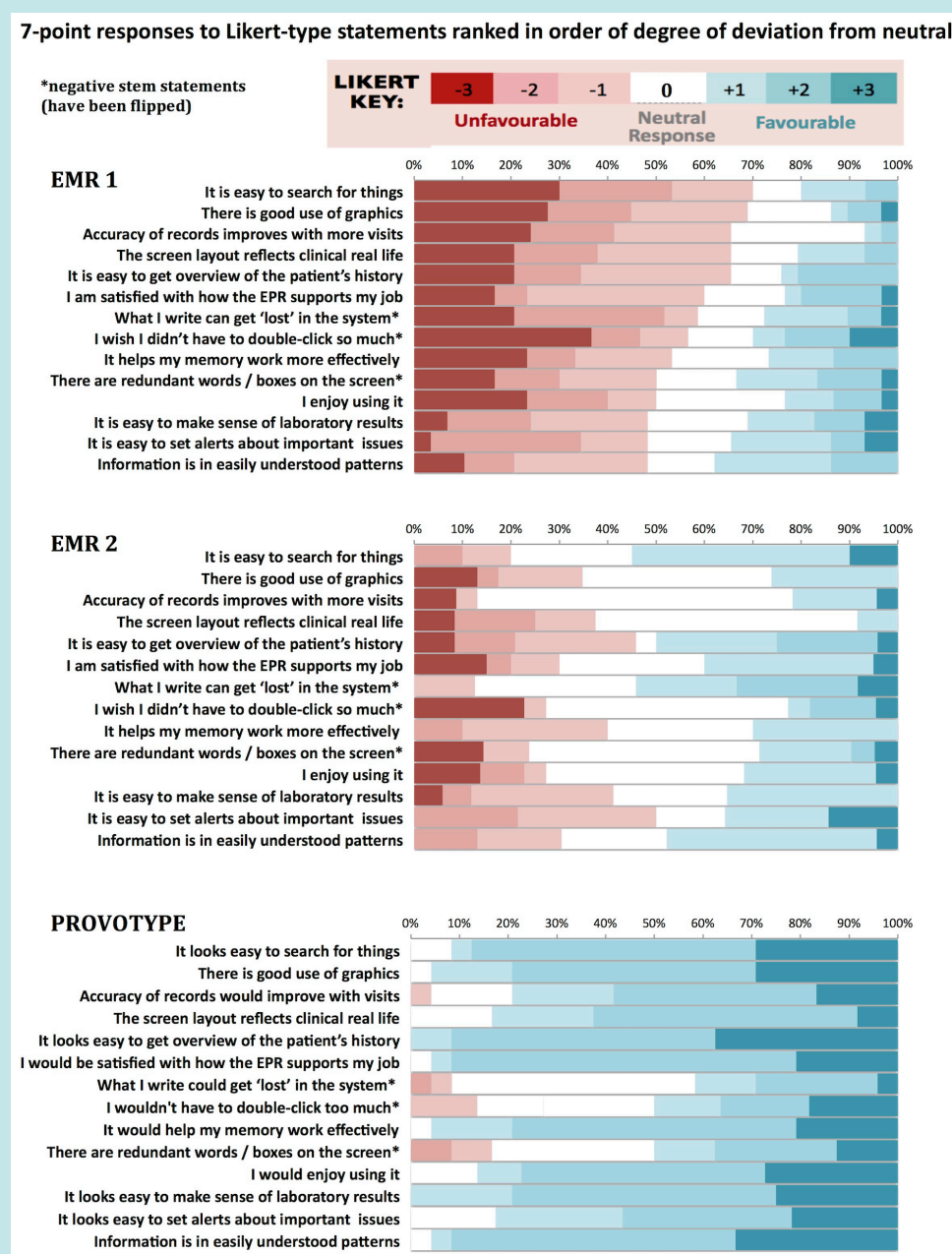
Stage 2: *Table 1* shows the major issues reported in the qualitative responses, and their provotype solutions:

1. **Low data density:** increased visuals, reduced text
2. **Getting lost:** single window, 2 linked 'anchor' screens
3. **Poor consultation flow:** mirroring clinical reality, intuitive screen layout, hover-over
4. **Poor history overview:** timeline overview and semantic zoom for time-dependent data
5. **Repeated questioning:** data salient data boxes for time-independent data
6. **Data density:** chunking, glyphs, drill-down for results, vaccinations, risk factors, alerts
7. **Results overview:** development of results matrix

Figure 2 shows these solutions embedded into the provotype history screen (episode page not shown):

Stage 3: Four workshop 'test drives' took place, during which the survey was repeated for the provotype (n=64) - see panel 3 of *Figure 1*. Qualitative feedback was predominantly positive, with further ideas suggested (not shown here).

LIMITATIONS: The survey was based on long term use of the commercial EMR systems but only a 90 minute test drive of the provotype. Although essential data fields were included, there is more complexity in the full datasets used in clinical reality.

Full statistical analysis of the survey data from commercial and provotype interfaces, showing association between usability and performance statements as well as categorisation and discussion of qualitative responses, will follow in a full paper.

CONCLUSIONS: The potential value of clinically-relevant visualisation in transforming EMR usability is shown to be realisable. Findings suggest visualisation holds the key to embedding clinical reasoning and practice into an interface – not only improving perceived performance but nurturing 'the art of the consultation'.

What is also clear from this research is the essential contribution clinicians bring to the very early stages of interface design, which can easily be overlaid above existing platform architecture.

REFERENCES:
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