Meaningful Digital Health Interventions: bridging digital divides via tailored design

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Introduction: project

• Part of on-going UK ESRC funded research seeking to better understand information behaviours in disadvantaged (socio-economic) and high risk (health and wellbeing) circumstances; that is working with young (<21) mothers from areas of multiple deprivation.

• Addressing issues of low digital literacy, access and use, this paper reports on an exploratory sub-project that sought to develop a prototype tailored digital resource to facilitate meaningful digital interactions between young mothers and their support workers.

• Responds to calls for “person-based” and “persuasive” approaches to digital health interventions (e.g. Yardely et al, 2015) and recognition that “more work is needed to create successful [digital health] engagement strategies” (e.g. O’Conner et al, 2016, p1).
Introduction: some key concepts

Information seeking is a conscious effort to acquire information in response to a need or gap in your knowledge. Information behaviour encompasses information seeking as well as the totality of the other unintentional or passive behaviours (such as glimpsing or encouraging information), as well as purposive behaviours that do not involve seeking, such as actively avoiding information.

(Case, 2012)
Introduction: some key concepts cont.

• We are not motivated to search until we recognise a knowledge gap/sense uncertainty.
• Info. needs ‘evolve’: visceral; conscious; formalised; compromised (Taylor, 1968).
• Info. seeking is active and intentional but info also passively received.
• Strong preference for info that comes directly from other people.
• Info. seeking not always rationale, decision oriented, or valued.
• Info. can increase rather than decrease anxiety.
• Variable barriers to knowledge acquisition include: socio-economic circumstances, attitudes, beliefs, values, knowledge, family socialisation, community identity and socialisation, ethnic stratification, media use and exposure.
• Three components to effective info. literacy programs (Eisenberg, 2008): information process; technology in context; and tasks based on real needs.
Background

- The UK has one of the highest rates of teenage pregnancy in Western Europe, with conception rates correlated to multiple deprivation indexes.
- At risk groups are disadvantaged and disengaged, with significant health and wellbeing issues reported for both mother and child:
  - Young mothers more likely to be single parents, to have experienced family conflict/trauma, not to be in employment, education, or training, and to be at risk of short and long term mental health issues (Trivedi et al, 2007);
  - Infant mortality rates are higher than for older women (Torvie et al. 2015), and babies are at greater risk of poor nutrition and childcare (Harron et al, 2016).
  - Stress and anxiety are heightened, as are rates of depression (Raskin et al, 2016).
  - Low literacy levels reported (e.g. Bennett et al, 2013).
Methodology

Mixed method design incorporating semi-structured interviews, digital services analysis, evolutionary prototyping and focus groups to:

1. **Identify information needs**
   - A typology of information needs developed from initial work with 22 first-time mothers (Louden et al, 2016), refined via fieldwork with 49 support workers (Buchanan et al, 2017) and on-going work with a further 40+ young mothers.
   - Information needs identified via interviews and focus groups, and disaggregated into meaningful categories via identification of patterns and regularities through a cyclical process of iterative pattern coding.

2. **Identify appropriate online information sources.**
   - Identified via service directories and online searches (based on identified needs); approached in a systematic and structured manner via content analysis of identified candidate UK state and voluntary sector websites.

3. **Develop a tailored digital access resource**
   - Individual and group field trials and presentations held with 12 young mothers variously attending voluntary sector support groups or part of the state National Health Service (NHS) Family Nurse Partnership (FNP) programme.
Information needs

- Young first-time mothers have multiple, complex, interrelated, and at times competing information needs, categorised as follows:

  - pregnancy
  - labour and birth
  - child development
  - child health
  - parent health
  - playtime activities
  - childcare
  - family relationships
  - housing
  - money
  - legal advice
  - work
  - education and training
  - domestic abuse
  - helplines
  - stress

“social challenges require systematic solutions that are grounded in the clients or customer’s needs” (Brown and Wyatt, 2010, p32)
Key online information sources

• In identifying appropriate websites to meet identified information needs, an initial list of 98 candidates was reduced to 36 when redundant (mirrored content and/or link) sites were removed.

• Shortlisted 36 mapped via a matrix to identified information needs, and assigned one or more of the following codes as appropriate:
  – 2. Is a primary source of information.
  – 1. Is a secondary source of some information.

• During analysis child and parent health categories were noted to be logically grouped on existing websites separated by child age (i.e. baby or toddler), and this convention was adopted in our own model.

• 15 sites identified.
Tailored GUI design

• Intentionally mirrors ubiquitous tablet and smartphone design.
• Each icon represents a category of identified information need.
• Cognisant to issues of digital literacy and cognitive load, we considered it beneficial to begin with a GUI design that mitigated for issues of information overload common in the initial stages of information seeking (e.g. Kulthau, 2004), via simplified meaningful (needs based) categories that provided direct access to single primary source of trusted information.

98 ➔ 36 ➔ 15

• In cognitive science our categories of information need can be considered as schemas which “can be treated as a single element in working memory and thus heavily decrease cognitive load associated with the performance of later tasks” (Van Merriënboer and Sweller, 2009, p87).
Prototype GUI

Mothers Digital Gateway

- My Baby and Me
- My Toddler and Me
- Playtime Tips & Ideas
- Early Learning & Childcare
- Stress
- Housing
- Money & Benefits
- Family Relationships
- Work, Education & Training
- Domestic Abuse
- Legal Advice
- General Health
- A-Z of common terms
- Helpline
- More Links
Pilot trials

• Mothers appeared to intuitively understand the resources purpose and provided positive feedback regarding information categories, with none questioned and three further suggestions made: *sexual health, local information* and *useful phone numbers*.

• Single direct links to trusted resources were positively noted, felt to avoid unnecessary and tedious navigation, and provide valued “guarantees the information is reliable”.

• Several mothers indicated that they might use this resource, with one commenting that it can “take forever” to find trusted sites, and another that it was “good to have all the trustworthy sites in one place”.

• Mothers also thought that there should be both a website and app to encourage widespread use and that it should have its own domain with visible links from NHS and public library sites (although notably there is limited evidence of library use amongst this group).
Pilot trials

- The resource could be seen to increase awareness of online information sources amongst participants. For example one mother while exploring the website link under family relationships commenting, “I quite like this one – family lives – I’ve never seen that one before.”
- However, the majority of participants as part of general discussions, also confirmed a low use of digital sources (favouring interpersonal sources such as family and health visitors instead). For example:
  - Many unaware of *ReadySteadyBaby* (NHS Scotland’s main online guide to pregnancy and the first 12 months);
  - Many knew of Young Scot (Scotland’s national information and citizenship resource for young people aged 11-25), but none used the website or knew of any peers who did.
Pilot trials

• Comments regarding design were mixed.
• Several mothers described the design as “plain” and “boring”, and suggested that it “could be a bit more colourful and not just white”.
• Positive pictures of parenthood were suggested.
• Some mothers suggested having a page beneath each icon providing more links for each topic and additional context and direction such as “general summaries” of the info available beneath.
• The name was disliked. It was suggested that mother needs to be replaced with a gender neutral term encompassing carers, and that gateway might be replaced with “help book” or “helpful info for parents”.
• Discussions encompassed a dislike of the term young parent as it “kind of makes you feel like your less… or making you seem less valuable as a parent than older mums”.
• Stigma an important consideration known to influence information behaviours (Lingel & Boyd, 2013, Louden et al, 2016).
Conclusion

• Our findings suggest that the tailored digital resource provides useful simplified access to trusted and meaningful online information for young mothers.

• However, findings also suggest that usage is likely to be extremely low without systematic intermediary intervention, which given limited existing digital interactions, would for many most likely need to begin in the physical space.

• Support workers ideally placed to utilise the resource in their interactions with young mothers, encouraging use of trusted sources of information; and providing opportunity to develop digital literacy skills in an interactive and meaningful manner.

• In combination (digital resource and human intermediary), a holistic systematic (and transitional) approach can then be applied to digital health interventions, and this is the next stage of this research.
References

Harden, A., Brunton, G., Fletcher, A., Oakley, A., Burchett, H., & Backhans, M. (2006). Young people, pregnancy and social exclusion: A systematic synthesis of research evidence to identify effective, appropriate and promising approaches for prevention and support. EPPI-Centre, Social Science Research Unit, Institute of Education, University of London.
References cont.


The prototype portal can be accessed at: ¹ http://yftm.cis.strath.ac.uk/mothers-digital-gateway/

For more information and/or to explore collaborative research and knowledge exchange opportunities, please contact Dr Steven Buchanan at: steven.buchanan@strath.ac.uk