

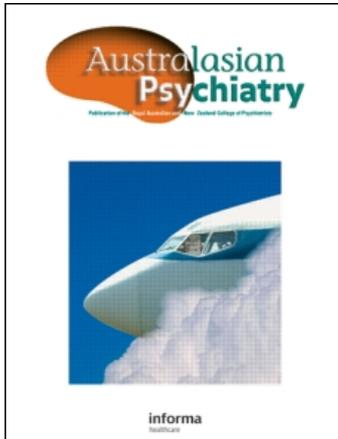
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### Bridging the information gap: IT and health in Indigenous populations

Ernest Hunter <sup>a</sup>; Helen Travers <sup>a</sup>; Brad McCulloch <sup>b</sup>

<sup>a</sup> North Queensland Health Equalities Promotion Unit, School of Population Health, University of Queensland, Brisbane, QLD, Australia <sup>b</sup> Tropical public Health Unit, Queensland Health, Cairns, QLD, Australia

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# Bridging the information gap: IT and health in Indigenous populations

Ernest Hunter, Helen Travers and Brad McCulloch

**Objective:** *A proof of concept evaluation of the use of touch-screen technology to address specific health issues in Indigenous settings and exploration of potential relevance to Indigenous mental health.*

**Methods:** *Quantitative and qualitative approaches were utilised to evaluate two touchscreen units with sound located in Indigenous settings (one clinical and the other a Centrelink office) with content on two topics – diabetes and musculoskeletal problems. Quantitative information included trace analysis and on-screen questionnaires. Qualitative information included individual and group interviews, and observation over a period of 10 months.*

**Results:** *Use was consistent over time. Subject areas were equally accessed with most users entering only one area per session. Mean session time was five minutes and clinical setting users were more likely to answer on-screen questions. The majority considered use 'easy' with the proportion indicating use 'very hard' increasing with age. Across both sites, women's health, children and drugs and alcohol were identified as issues for which more information was needed. Interview data emphasised the importance of Indigenous and recognisable voices with non-text based content relevant to the local context.*

**Conclusion:** *Touch-screen technology offers a means to provide relevant and accessible health information in Indigenous settings and may contribute to overcoming the 'information gap'. There are obvious implications in relation to Indigenous mental health.*

**Key words:** *Aboriginal, diabetes, health promotion, information technology, touch-screen.*

Aboriginal and Torres Strait Islander Australians do not enjoy the same levels of good health enjoyed by other Australians. Indigenous life expectancy at birth is about 15–18 years less than non-Indigenous Australians with only one in four males and one in three females dying over 65 years of age – this compares to three out of four non-Indigenous males and five out of six non-Indigenous females. The major causes of premature mortality are cardiovascular disease, respiratory disease, endocrine disorders (particularly diabetes) and accidents and injuries. The common denominator is lifestyle.

In terms of mental health, lifestyle influences translate into a higher burden of mental disorder across the lifespan. Poor nutrition and higher toxic load (particularly alcohol and tobacco) through pregnancy, instability in the early developmental environment (including abuse and neglect), high rates of substance abuse and its consequences, and low levels of health promoting activities (exercise, diet and positive recreational pursuits) are all compounded by problems of functional access to appropriate and effective services. Not only do these factors influence the incidence of mental disorders and mental health problems, they have obvious implications for the clinical course and general wellbeing of those already afflicted.

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**Ernest Hunter**

Professor, North Queensland Health Equalities Promotion Unit,  
School of Population Health, University of Queensland,  
Brisbane, QLD, Australia

**Helen Travers**

Professor, North Queensland Health Equalities Promotion Unit,  
School of Population Health, University of Queensland,  
Brisbane, QLD, Australia

**Brad McCulloch**

Tropical Public Health Unit, Queensland Health, Cairns, QLD,  
Australia

**Correspondence:** Professor Ernest Hunter, University of  
Queensland, PO Box 1103, Cairns, QLD 4870, Australia.  
Email: ernest\_hunter@health.qld.gov.au

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Lifestyle thus looms large in any consideration of the mental health needs of Indigenous populations. However, even within the wider population, mental health promotion has only recently received sustained attention and support. In relation to Indigenous health, addressing lifestyle issues has largely been the domain of health promotion practitioners who, while clearly giving attention to issues of relevance to mental health (such as substance use, exercise and nutrition) have not, until relatively recently, had mental health – or emotional and social well-being – as a primary objective.

Although this is now changing, progress is hampered by the persisting paucity and poor quality of clinical services (particularly for children), the need for which will increase as with awareness and mental health literacy. Mental health promotion is also compromised by the locational disadvantage of many Indigenous communities where, in addition, education and literacy levels are low, and where there are often competing priorities. Furthermore, the benefits that technological innovation has brought to the effectiveness of health promotion (and clinical care) for the mainstream have not, as yet, flowed to Indigenous Australians among whom far fewer are familiar or at ease with computer-based media. This paper presents findings from the evaluation of one approach to utilising information technology approaches to influence lifestyle and health in Aboriginal communities which, the authors contend, presents opportunities in relation to Indigenous mental health.

## BACKGROUND

The health sector in Australia has embraced Information Technology (IT), which offers means to address a range of problems and the needs of particular disadvantaged groups – for instance residents of rural and remote settings. These new technologies have been rapidly taken up by organisations involved in Indigenous health with obvious benefits. However, as Swanson<sup>1</sup> notes:

IT and telecommunications technologies are proceeding at an extremely rapid pace. The likely social effects are 'location independence' of a range of activities and widening gaps between the 'information rich' and 'information poor'. Most of the currently underserved groups will fit into the latter category. (p. S209)

These caveats are particularly salient in relation to IT innovations in health promotion for Indigenous Australians generally and for those living in remote Australia in particular, most of whom are 'information poor' as a consequence of being broadly disadvantaged. These differentials, as with health differentials between Indigenous and other Australians, are informed by complex historical, social, economic and political factors. Redressing the latter is a whole-of-government challenge and will take time

to be consequential for health. However, as Leonard Syme<sup>2</sup> notes:

insisting only on fundamental and revolutionary social change is dooming us to programs that will take years and generations to take effect. Since it is difficult to implement such major social change, it is easy to ignore inequalities because, they say, nothing can realistically be done about them. Moral outrage about inequalities is appropriate but may be self-indulgent. If we really want to change the world we may have to begin in more modest but practical ways. (p. 9)

Such 'modest but practical ways' include addressing 'information disadvantage' by exploring the utility of innovative IT approaches to improve Indigenous health literacy and capacity. The project outlined here is one such example and grew out of a community development partnership between an Indigenous community (Yarrabah, near Cairns), the University of Queensland and a corporate donor (Glaxo Smith-Kline). An IT component of this project was expanded into a pilot implementation of touch-screen technology developed by an English-based company (Julia Schofield Consulting) and funded by the Office of Aboriginal and Torres Strait Islander Health (OATSIH), the evaluation of which was undertaken by the University of Queensland.<sup>3</sup>

## THE INTERVENTION

The project involved siting touch-screen kiosks in two settings, the waiting room of an Indigenous health clinic in a large metropolitan community health centre in Inala (Brisbane), and in the Centrelink waiting room of a discrete Aboriginal community (Yarrabah). The kiosks are standard wall-mounted units similar to those used at checkout terminals and include both audio communication and printout capacity. The health-related software was developed for use in hospital settings in the UK using a standard production template, MediBooks.

For the purposes of this trial, one existing MediBooks module (musculoskeletal problems) was adapted by minor script alterations and overdubbing with recognisable Aboriginal (Murri) voices. A second module was produced through a consultation and workshop approach. Diabetes was selected as it is a common, chronic condition, which is seriously consequential when there is not consistent and careful attention to diet, behaviour and clinical care. Type 2 diabetes has become epidemic in a number of countries experiencing rapid social change, with Indigenous Australians having one of the highest prevalence rates (approximately 25% of adults) in the Asia-Pacific region.<sup>4</sup>

The structure and presentation of the modules was informed by previous experience in the UK in which it was found that: (1) the subject material needed to be relevant, non-patronising and easy to understand; (2) in spite of being a computer system, it should be

much more akin to TV, being easy to use and acceptable, and (3) the system must not be perceived as a 'self-diagnosis' tool.<sup>5</sup> In addition to the two health modules, the kiosks also run an 'attractor', that is, a series of screen savers that plays when the kiosks are not in use. These serve to encourage use and to allow for relevant local health and other information to be displayed. A key goal of the project was to increase local skills and capacity in relation to all aspects of the production and maintenance of software and hardware necessary for this to be an effective and sustainable resource. To this end, the evaluation gave particular attention to process issues and context. The kiosks themselves also ran a short on-screen questionnaire with condition-specific and kiosk-use questions, and provided 'trace' information that identified what users accessed, tracking and timing their trajectory through the system.

## EVALUATION METHODOLOGY

The evaluation was ongoing through all phases of production, installation and implementation and was purposefully descriptive. Qualitative evaluation included participant observation and both individual and group semistructured interviews (key informants, users, diabetic patients, clinicians). A total of 55 formal interviews were completed. The results of these interviews were subjected to content analysis to identify key issues and common themes.

Quantitative information was gathered through program use (traces and the on-screen questionnaire). The data files from the kiosk were imported into Microsoft Access and, after cleaning, exported to SPSS where descriptive and analytic statistics were produced. Analysis of associations between items within kiosk sessions allowed for testing such questions as: Do sessions where the user chose to view information on diabetes receive feedback that is different to the feedback received from sessions where this information was not requested? As an index of 'site/system penetration', those uses in which a content rich sequence (a sequence that exposes the user to specific health information) was accessed during one session were selected to indicate purposive use. Where possible, triangulation of data was undertaken across different modes of investigation.

## FINDINGS

Between mid-October 2001 and the end of June 2002, there were 3280 kiosk activations (42% at Inala), of which there were 1987 sessions where at least one (purposive) selection was made (this may have been simply to activate a menu page). Excluding extreme duration activations (> 21 min or 98th centile in duration), 50% of sessions lasted between three and seven minutes with a mean of 5.25 min. In terms of the relationship between session length and content, the number of content-rich sequences accessed was a

significant (but poor) predictor of the temporal length of a session ( $p < 0.001$ ).

A similar proportion of activations were spurious (no further buttons pressed after the kiosk activation) in both sites (41% and 37% in Yarrabah and Inala, respectively). Of the 1987 sessions in which at least one selection was made, a content-rich sequence was accessed more commonly at Inala (58%) than at Yarrabah (48%). Not only were sessions at the kiosk at the clinical setting (Inala) significantly more likely to access at least one content-rich sequence than in the Centrelink (Yarrabah) office ( $p < 0.001$ ), the number of content-rich sequences accessed per session was also significantly higher (Kruskal-Wallis  $p < 0.001$ ). These findings suggest the importance of site/setting in relation to the likelihood of health-purposive use.

Of the 1987 sessions in which at least one selection was made, a further 941 where no health specific content was accessed were excluded from the subsequent analyses. Of the remaining 1046, sessions where content was accessed in Yarrabah were significantly less likely to have a survey question answered than those in Inala (RR = 0.70 (0.56–0.87),  $p = 0.002$ ). In addition, sessions where content was accessed were no more likely to have questions answered than sessions where no content was accessed, indicating the importance of site/location rather than content in relation to the likelihood of users answering questions. The on-screen questionnaire contained five questions (ease of use, prior use, age, gender and ethnicity). By correlating the question rank with the response rate, we find that almost 62% of participants did not answer any questions, with a consistent drop-off rate of 1.3% for each additional question that is asked. There were no significant differences between the responses given in Inala and Yarrabah. In terms of ease of use, a significant increasing trend was evident in the proportion of respondents who answered 'Very Hard' and increasing age ( $p$  trend = 0.038). However, it is possible that this association is stronger than is shown by the session traces, as traces are only available for clients who completed their sessions and successfully answered the questions. This suggests a bias with people who had the most difficulty with the kiosk less likely to have answered questions.

There were no significant associations between the access to pain and diabetes topics and age, gender, ethnicity, reported ease of use and prior use. In addition to questions regarding use, there were a small number of questions relating to the two subject areas. In approximately 4% of sessions the survey questions relating to pain were answered. For the diabetes-specific questions, approximately one half of one per cent of session provided answers. By contrast to these small proportions, approximately one-third (32%) of users who accessed the kiosk answered the

question: 'Would you use this kiosk to access more information (regarding other specified conditions)?' Of these people, more than three-quarters (77%) answered affirmatively with women's health, kids, drugs and alcohol being most commonly affirmed.

These and interview findings suggest that kiosk use is informed by content. However, significant siting issues are evident, indicating that decisions regarding location must balance competing priorities across the following issues: (1) volume/exposure of potential users passing the site; (2) receptivity of potential users, which relates to site-specific expectancies; individuals in a health context are more likely to be drawn to health-related material than individuals using a welfare service or in a public space, the health context thus cuing use; (3) intentionality of those who choose to use the kiosk, that is, the likelihood that use of the kiosk may cue subsequent action. For instance, siting a kiosk with nutrition-related material in a supermarket may influence purchasing behaviour. In addition, interview findings suggest that these decisions must also take into account; (4) support systems to maintain the hardware; (5) security of the same, and, (6) space considerations that influence privacy and the capacity for vicarious or proxy use.

Key informant and user interviews supported these findings and emphasised the importance of the context, the experience of first use, and the need for different strategies to facilitate use by age and with acute versus chronic conditions. The importance of proxy/vicarious use (having others use the kiosk or opportunistically 'eavesdropping') was emphasised, as was 'context cuing' (being more attuned to a health message in a health setting). Aspects of presentation that were consistently raised included: non-text-based information, recognisably Indigenous voices, culturally appropriate graphics, and the discouraging influence of institutional signifiers (departmental logos). Observation reinforced the importance of health service siting in terms of site-based worker engagement in encouraging use or providing kiosk support, and of contextual cuing in relation to motivating use and receptiveness to messages.

## DISCUSSION

This technology can be run and maintained in Indigenous settings. The process of adaptation of existing material was shown to be simple, as was the content generation process for new material, including for the attractor. The evaluation demonstrated that there are considerations in this regard that relate to the operational environment of Indigenous communities in which technical support is limited. Overall, the critical importance of process (rather than technology) was repeatedly reinforced, that is, of negotiating across all stakeholders, clarification of roles and responsibilities, and defining clear protocols, these

activities being undertaken within a capacity building framework.

It is also important to recognise that this is a rapidly changing field that has shifted in the last decade from computer-assisted instruction (information provision) to computerised health risk appraisals that are interactive and personalised. Given the rapidly expanding array of programs, Skinner *et al.*<sup>6</sup> suggest three basic criteria for program selection:<sup>1</sup> programs should be easy to use;<sup>2</sup> programs should provide printed feedback to the user, and;<sup>3</sup> programs should be developed not only by computer experts but also by reputable health professionals who are acquainted with health education and behaviour change principles. Furthermore, as Krishna *et al.*<sup>7</sup> emphasise in a review of 22 randomised-controlled trials of educational computer-patient interactions, these approaches may be the preferred education method for patients with certain chronic diseases, but should be integrated with existing clinical care. This resonates with findings from another review<sup>8</sup> that emphasised the capacity for these approaches to be individualised and made non-threatening, and thus effective for those with low literacy levels or impaired social skills.

Touch-screens have now been examined in many service contexts including with radiotherapy patients,<sup>9-12</sup> diabetes<sup>13,14</sup> and antenatal care, with Graham *et al.*<sup>15</sup> commenting that in provision of information, touch-screens may have selective benefit over leaflets as they 'seem to reduce levels of anxiety and may be most effective for providing information to selected women who have a relevant adverse history or abnormal results in their current pregnancy' (p.155). Kinzie *et al.*<sup>16</sup> examined touch-screen technology to address the risks of alcohol to pregnancy with low-income women and emphasised three concepts essential for the development of successful educational programs: personal control, self-efficacy and the stimulation of curiosity. Of most relevance to this project is a series of studies undertaken by the City University in London to evaluate a different national touch-screen health information initiative undertaken in collaboration between health services and a commercial health informatics provider, *Intouch with Health*. This work includes the development of appropriate trace metrics for evaluation<sup>17</sup> and the authors combined a range of evaluation tools including intensive observation of one kiosk in the waiting room of a walk-in centre in a general hospital and interviews with relevant staff.<sup>18</sup> From this approach, the authors conclude that the kiosk was seen as an information point, not simply as something to do while waiting, which in turn added to the use and relevance of the centre itself.

In another article, these authors examined the impact of location.<sup>19</sup> This study involved 21 kiosks in four location groups (pharmacy, hospital, information

centre and doctors' surgery) as well as a case study of a kiosk in a supermarket. Details are reported from the transactional logs of 90 000 users and some 750 000 page views. The researchers found that kiosks in information centres were used most and hospitals also performed well. By contrast, surgeries performed less well and pharmacies poorly. The impact of site was also considered in an Oregon-based non-random pre/post study of interactive multimedia utilising touch-screen health risk appraisal in a clinic waiting room, a workplace and a senior citizens centre. Only in the clinic setting was the number of subjects significant; the authors reported significant changes in terms of stage of change, risk perception, behavioural intention and self-efficacy.<sup>20</sup>

The above-mentioned University of London group<sup>17</sup> also report on the views of health professionals in organisations where health information kiosks are operating, interviewing doctors, nurses and practice managers across 10 sites using postal surveys and semi-structured interviews as well as trace material. The researchers record:

'Nurses tended to be far more pro-active than doctors, and saw many health related benefits in referring patients to the kiosk. ... doctors saw the system in very practical ways – praising its space saving potential, for example, not enthusing about its possible value to patients in health terms. Practice managers and others with responsibility for the maintenance of the system were dissatisfied with the extra work they were required to undertake, and complained about children "playing" and about printer and other problems'. (p. 313)

Finally, acknowledging the potential of computers in patient education, and with a focus on medical practitioners, Gillispie and Ellis<sup>21</sup> identified six barriers to uptake: (1) lack of familiarity with the technology on the part of practitioners; (2) technical difficulties; (3) problems of integration into service routine; (4) spatial location; (5) lack of quality material, and; (6) concerns about effectiveness. From experience in a range of settings, these authors comment that: 'age is not necessarily a limiting factor in the use of computer-based instruction', a finding supported by Rippey *et al.*<sup>22</sup> in a late 1980s study of older patients with osteoarthritis utilising a keyboard-based instruction program that would be considered primitive by today's standards.

## OPPORTUNITIES

It is clear that the potential of touch-screen technology within health is expanding in the wake of the rapid uptake of IT generally. In relation to patient (and other health user) interactive systems, there has been a shift over the last two decades from instruction or information provision to systems that engage by personalising responses and providing feedback. Touch-screens have proven to be effective communi-

cations means in wider non-health applications and have particular benefits for users with limited literacy. While particularly attractive to youth, given appropriate content and design, older age is not necessarily a barrier.

However, in addition to technological sophistication, health application success also requires content, health promotion and social (cultural) expertise. It also demands consideration of location and institutional setting, both in terms of the acceptance and integration within a broader set of goals and activities, and in terms of system and content support, and making available appropriate interventions triggered by touch-screen use. Effective use of this technology provides for a number of collateral outcomes, including the feedback of information in a timely manner to the wider interested public, and the ability to gather data. In this respect, there is some evidence that particular types of information, for instance in relation to substance use, may be more accurately gathered through computer-based approaches than through conventional survey techniques.<sup>23</sup>

In terms of Indigenous health, this project has demonstrated the importance of local and process issues in relation to production, implementation and support. It has also shown that for health purposes this technology is best integrated into wider service structures and strategies. It provides for flexibility in terms of production, timely updating and adaptability (localising through voice-over) for a wide range of settings. It will also allow for information that is personalised (for instance by inclusion of an on-screen questionnaire such as the AUDIT) and reinforced (via printout and practitioner). As well as opportunistic use, it can be mediated by an Indigenous health worker using a laptop, thus providing a means of accessing particular hard-to-reach groups. Indeed, this medium attracts one such group – young males – who are difficult to access through conventional health promotion mechanisms. There are also a range of ancillary benefits that do not relate directly to health content including the development of local capacity and expertise, provision of a community local events noticeboard, a means for feedback of local health information and a mechanism for collection of locally relevant information.

This project reveals that there is keen interest in the appropriate provision of material relating to issues of immediate relevance to Indigenous mental health – children and substance use. This pilot implementation has allowed for a proof of concept evaluation that has demonstrated this technology, appropriately produced, presented and supported in collaboration with clinical service providers and Indigenous communities, will be used. A wider implementation to examine health outcomes and cost effectiveness is now in planning. While such 'modest and practical'

interventions will not have a significant impact on Indigenous health and mental health in the short term, helping to bridge the information gap and in so doing increasing health literacy and both health and technological capacity, helps, incrementally, to redress the imbalance of power experienced by most Indigenous people in their interactions with the health system.

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