The Benefits of (Automated) Dialogue

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ABSTRACT

The authors compared user evaluation of a text-based dialogue system with a simple pick list for the same task. The authors matched the systems in terms of key factors, such as design for Usability, and took into account individual differences between participants that might have influenced their perception, such as Locus of Control, Experience and Personality. They found participants rated the text-based dialogue system as being more informative, more credible, less frustrating and more persuasive than the simple pick list system. Participants' ratings were dependent on their Personality, Locus of Control and reported level of physical activity. Participants did not differentiate between the systems in terms of their ease of use, indicating the other observed differences were not due to a simple difference in Usability. This study demonstrated the benefits of including automated dialogue in a system designed to help people find solutions for their exercise barriers. Further work is required to establish in what other situations dialogue provides a benefit.

Keywords: Dialogue, Evaluation, Exercise, Locus Of Control, Personality, Physical Activity,

INTRODUCTION

The potential for commercial application of automated interfaces that use text or speech-based dialogue to exchange information and guide users is increasing as people become more familiar with computers and the internet (McTear, 2004; Bickmore and Giorgino, 2006). From a technical perspective the field is fairly mature, with a body of research on the implementation of automated dialogue (Androutsopoulos and Aretoulaki, 2003), and recent advances on the underlying dimensions influencing its efficacy (e.g. De Boni, Richardson and Hurling, 2007). Research on dialogue content has explored the role of empathy (Liu and Picard, 2005), the use of ‘small talk’ (Bickmore and Picard 2004), trust (Bickmore and Cassell 2001), emotions, personalisation and narration (Stock, 1996), information exchange and ‘like-mindedness’ (Svennevig, 1999). Turunen et al. (2004) examined the role of user experience, tailoring system output to differentiate between novices and experts, whilst Bernsen and Dybkjær (1996) compared co-operation between humans with that between humans and computers, highlighting that, in the latter, a clear communication
of what the system can do should enhance the interaction.

De Boni et al. (2007) have shown that dialogue systems using relationship maintenance (e.g. elements of continuity between sessions) and appropriately positioned humour have a more positive impact on users’ perception of the dialogue. There has however been much less (if any) evaluation of the benefits of dialogue versus simpler forms of information exchange, such as a pick list of alternatives. Here we report a study directly comparing user perception of two systems, both designed to help identify solutions to overcome exercise barriers, but one guiding the user via an automated text based dialogue whilst the other employed a simple list of alternatives. We expected that user perception of dialogue versus simple pick-list systems might be dependent on the domain (e.g. railway times versus beliefs about exercising), the context (e.g. relaxed private versus rushed public situations) and the individual (e.g. degree of perceived control over own behaviour). In this study we constrained the domain (to finding solutions for exercise barriers) and the context (both were internet based systems used in the privacy of the user’s own home) and searched the literature for evidence on key factors that might influence user perception. First, we briefly reviewed the efficacy of Automated Behaviour Change Programs to determine the likely benefit of including dialogue-like elements, before considering the role of Individual Differences (such as Locus of Control, Self Efficacy and Personality). Finally we reviewed Usability Guidelines for computer based programs so that we could develop systems that were easy to use, and to minimise the influence of this factor when comparing the two types of system. We briefly summarise the literature in each of these areas and its bearing on our experiment design.

**Automated Behaviour Change Programs**

There is growing evidence for the potential of automated behaviour change programs. For example Tate, Jackvony and Wing (2006) conducted a randomized trial comparing e-mail counselling, computer-automated tailored counselling and no counselling in an internet weight loss program. At three month follow up they found the computer-automated feedback group had achieved a similar weight loss to the group receiving e-mail from a ‘real’ counsellor, and was much better than the group who received no counselling. However, at six month follow up the group who had contact with a real counsellor via e-mail had lost significantly more weight than the other two groups. This study indicated that automated feedback can improve the efficacy of internet based services that cannot offer contact with a real therapist, but that more research is required to prolong its impact after 3 months.

Marcus et al. (2007) compared tailored internet and tailored print based physical activity interventions. At six months that the group using the tailored website reported higher levels of physical activity than the group receiving tailored printed material or those viewing the standard site. However, at twelve month follow up there was no significance between the three groups.

Personalisation of computer based systems has been the object of research for a number of years, with some arguing that they would be more effective if they were able to recognise and respond to a user’s emotional state. Nass and Lee (2001) found that when a computer’s personality matched that of the user, the computer ‘voice’ was regarded as more attractive, credible, and informative. De Boni et al (2007) found that a system with relationship maintenance elements (e.g. continuity of information between sessions) was perceived to be more polite, professional, considerate, and more socially engaging. When humorous elements were present participants rated the system as more enjoyable to use, less impersonal and less abrupt.

In summary, research into automated behaviour change systems has demonstrated that they can have an impact on health behaviours. However, further work is required for automated behaviour change systems to match
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