Application of the LifeGuide: The development and quantitative analysis of the 'Internet Doctor'

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Abstract. LifeGuide is a software package that allows health professionals and researchers with no programming skills to easily and flexibly create, evaluate and modify behavioural interventions. An intervention called the 'Internet Doctor' was developed as a way of identifying many of the tools that were required in LifeGuide. The 'Internet Doctor' provides people suffering from cold and flu symptoms with tailored advice for the self-care of cold and flu symptoms. Participants were automatically randomised to one of two versions of the website: (i) the full, 'more interactive' version, or, (ii) a 'less interactive' version which omitted references to the Internet Doctor and links to obtain further information. Participants who viewed the less interactive version were more likely to complete the full consultation cycle for their selected symptom and were also more likely to consult for more symptoms than those in the less interactive version. Few participants clicked on the optional links in the more interactive version. It is concluded that although the more interactive version of the website provided more information, participants did not make full use of the interactive features which displayed this information, and did not consult for as many symptoms, so may not have benefited from the website as much as those viewing the less interactive version.

Introduction

Behavioural interventions have traditionally been delivered face-to-face, but this is resource intensive, and the quality and timing of the information and advice is restricted. The internet is becoming increasing popular as a mode of delivery for interventions to promote behavioural change (Portnoy, Scott-Sheldon, Johnson & Carey, 2008; Webb, Joseph, Yardley & Michie, 2009) as it can provide a cost-effective means of delivering information and advice to individuals (Griffiths, Lindenmeyer, Powell, Lowe & Thorogood, 2006). LifeGuide is an open source software package that allows health professionals and researchers with no programming skills or access to programming input to easily and flexibly create, evaluate and modify their own interventions. A behavioural intervention called the 'Internet Doctor' was developed as a way of identifying many of the tools that were required in LifeGuide. The Internet Doctor provides tailored information and advice to promote the self-care of cold and

flu related symptoms. The aim of this pilot study was to examine the utility of LifeGuide for the development, delivery and evaluation of an intervention that provides tailored information and advice. A second aim was to examine quantitative indices of the usability of two different formats for presenting the intervention. Our hypothesis was that although users would prefer the choice offered by a more interactive version of the Internet Doctor (preference data are not presented here), completion of the entire consultation cycle (from completing questions about symptoms to receiving "Printable Advice") would be lower, because participants could be distracted by the additional information (Severson, Gordon, Danaher & Akers, 2008). The analysis below investigates this hypothesis by comparing patterns of usage of the two versions of the website.

Methods

Participants

100 participants were recruited through posters and flyers distributed throughout the University of Southampton, advertisements on websites and by email to other universities. The posters, flyers and emails gave the URL to access the Internet Doctor website. Participants were asked to access the website in their own time when they had cold or flu related symptoms. Those that wanted to take part in the study but did not have cold or flu symptoms were asked to complete the questionnaire and use the website thinking about a time when they had a bad cold or flu and were not sure whether they needed to see a doctor.

Procedure

Participants visited the Internet Doctor website at their own convenience (the site can be found at http://live.lifeguideonline.org/player/play/coldandflu), where they were first presented with a page which explained what the study was about and were asked to give informed consent to take part in the study and for their data to be collected. Participants were asked whether they had cold or flu symptoms and then had to fill in a short questionnaire about their views of their symptoms. The questionnaire was taken from 2 scales from the Revised Illness Perception Questionnaire (IPQ-R) (Moss-Morris, Weinman, Petrie, Horne, Cameron, Buick, 2002), plus measures of self-efficacy and outcome expectancies. The website then automatically randomised participants to: (i) the full 'more interactive' version of the website, or, (ii) a 'less interactive' version of the website. Both groups were asked their age, how old they were when they left school, if they had any education since leaving school and whether they were completing or had completed a university degree.

Website Design

More interactive version

The more interactive version (i.e. the full version of the website) includes all the interactive functions and references to the 'Internet Doctor'. The Internet Doctor provides information and advice for four common cold and flu symptoms: cough, sore throat, runny/stuffy nose and fever. The full version of the Internet Doctor has seven sections: (i) 'Welcome Pages' which introduces the aims of the website and presents the credentials and a video of Professor Paul Little (the GP and expert on management of colds and flu who led the team that prepared the advice) (Figure 1), (ii) "Doctor's Questions" which asks user's about their symptoms and general health, (iii) "Symptom Advice" which provides tailored information and advice on the user's symptoms, information on whether the user needs to see their doctor and includes links to "Ask the Internet Doctor" questions, (iv) "Other Conditions" which gives information about other more serious conditions which may be causing their symptoms (v) "Treatment Options" which gives information on how the user can ease their symptoms
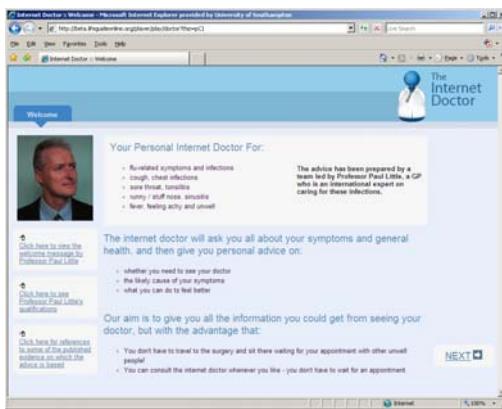
Figure 1. The Internet Doctor welcome page.

and help their body to recover, (vi) "Printable Advice" where user's can see and print all the advice they have been given for that symptom, and (vii) "Common Questions about colds and flu" which gives answers to questions relevant to colds and flu that people often ask. Complex logic provides the tailored information and advice, which is dependent on a number of factors including the user's age, general health, combination of symptoms reported and duration of symptoms. The advice given by the Internet Doctor is based on the NICE 'traffic light' system for identifying the risk that the user's symptoms could be a sign of a serious condition: Red - high risk of a serious condition – contact NHS Direct or your doctor immediately; Amber: intermediate risk of serious illness – contact your doctor; Green: low risk of serious illness – you do not need to contact your doctor at present.

Less interactive version

The less interactive version of the website gives information on the core aim of the website and how to use it, then requires users to complete questions about their symptoms, and finally provides tailored advice on whether users need to see a doctor for their symptoms (which could be printed). These sections are identical to the more interactive version. This version omits all the optional links on the website – "Ask the Internet Doctor", "Other Conditions", "Treatment Options", "Common questions about colds and flu", and all references and instructions for using these. It also avoids 'humanising' the website, as it omits all references to the 'Internet Doctor' including references to Professor Paul Little.

Results

Participant characteristics

Data from the first 50 people randomised to the more interactive version and the first 50 people randomised to the less interactive version were analysed. Table I shows the demographics of the participants in the two groups. The participants were aged between 18-

Table I. Participant demographics.

	Age (years)	School leaving age (years)	Education after school	Degree
More interactive	29.66 (±11.66)	16.64 (±3.59)	49 (98%)	43 (86%)
Less interactive	27.84 (±9.83)	17.4 (±1.05)	48 (96%)	44 (82%)

Table II. Number of symptoms viewed by participants in the more interactive and less interactive versions.

	0 symptoms	1 symptom	2 symptoms	3 symptoms	4 symptoms
More interactive	12	16	7	8	7
Less interactive	3	10	12	8	17

69 years (M = 28.75, SD = 10.77). Sixty-five participants reported having cold or flu symptoms when viewing the website. A similar number of participants reported having cold or flu symptoms in the more interactive version (n = 35, 70%) and less interactive version (n = 30, 60%).

Comparison of the more interactive and less interactive groups

The number of symptoms viewed by participants in each of the two versions of the website is shown in Table II. The number of symptoms selected by participants was significantly greater in the less interactive group than in the more interactive group (U = 801.5, p = 0.002). There were 12 participants (24%) in the more interactive version who did not select a symptom compared with only 3 participants (6%) in the less interactive version.

The data were not normally distributed, so non-parametric tests were carried out. Mann-Whitney U tests showed that there was no significant difference between the two versions in the time spent on the website (U = 1058.0, p = 0.186).

Table III shows the number of participants viewing each section of the consultation cycle in each of the two versions of the website. The percentage of participants completing the consultation cycle for each symptom in the more interactive version is shown in Figure 1.

Very few participants viewed the optional links in the more interactive version of the website: "Ask the Internet Doctor" = 7 (14%), "Other Conditions" = 1 (2%), "Treatment Options" = 7 (14%), "Common Questions about colds and flu" = 3 (6%).

Table III. Number of participants viewing each section of the consultancy cycle in the more interactive and less interactive versions.

|	"Doctor's Questions"	"Symptom Advice"	"Treatment Options"	"Printable Advice"
More interactive				
Cough	26	12	3	3
Sore throat	23	17	6	5
Runny/stuffy nose	21	14	12	10
Fever	12	5	1	1
Less interactive				
Cough	41	30	N/A	12
Sore throat	33	19	N/A	9
Runny/stuffy nose	30	20	N/A	13
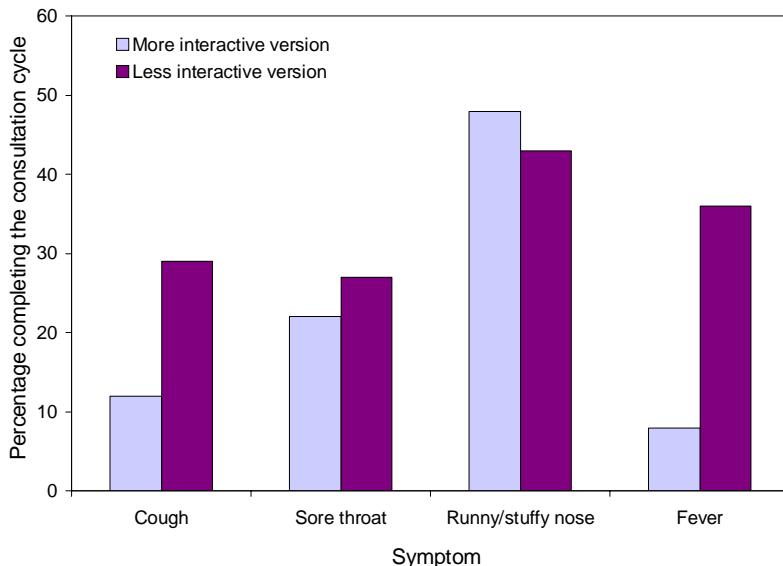
Figure 1. The percentage of participants completing the consultation cycle in the more interactive and less interactive versions.

Discussion

The results suggest that participants randomised to the less interactive version of the website were more likely complete the consultation cycle than those in the more interactive version and were more likely to then consult for symptoms. The additional information and optional links in the more interactive version may have distracted participants from completing the full consultation cycle and selecting further symptoms.

The more interactive version of the website had optional links which gave participants the opportunity to view extra information and advice, but only 9 participants (18%) clicked on one or more of these links. This suggests that after viewing the core pages of the website, the majority of participants may not have been interested in viewing any additional information. Alternatively, the opening of new tabs and windows when the optional links were clicked and the range of navigational options in the more interactive version may have caused some users difficulties when using the website.

In the more interactive version, participants were required to view the two welcome pages and answer the "Doctor's Questions" for their selected symptom in order to view the "Symptom Advice", "Other Conditions", "Treatment Options" and "Printable Advice". The results of the qualitative study of the Internet Doctor (Morrison, Joseph, Andreou & Yardley, 2009) showed that many participants wanted to see the "Treatment Options" without having to view the information on the "Welcome Pages" and answer all the questions in the "Doctor's Questions". In the quantitative pilot study, people may have thought there was too much information in the earlier parts of the website and this may have deterred them from clicking on the optional links to view more information on "Other Conditions", "Treatment Options", etc. For the main Internet Doctor study, the website may be altered so that the "Doctor's Questions" are optional, giving participants the opportunity to view the optional links without having to answer the "Doctor's Questions".

The qualitative pilot study of the Internet Doctor (Morrison, Joseph, Andreou & Yardley, 2009) revealed that 25 of the 26 participants had major navigational difficulties, including the inability to close new tabs or windows and move forwards through the pages. Changes were made to the Internet Doctor before the start of the quantitative pilot study to try to resolve

these issues. In this study, 15 participants did not proceed past the "Welcome pages" by selecting one of the four symptom tabs at the top of the page. Additionally, some participants stopped viewing the website after clicking on a link which opened a new tab or window. This suggests that people may still have encountered navigational difficulties with the latest version and further changes need to be made to the Internet Doctor website to make it more user friendly.

Data collection for the main quantitative Internet Doctor study will start during the cold and flu season in Autumn 2009. Data from 2000 participants will be collected during this time when it is anticipated that people will be more interested and willing to take part in research concerning colds and flu when they are suffering from cold and flu related symptoms.

Acknowledgements

References

Griffiths, F. Lindenmeyer, A. Powell, J. Lowe, P. and Thorogood, M (2006): 'Why are health care interventions delivered over the internet? A systematic review of the published literature'. *Journal of Medical Internet Research*, vol. 8: e10.

Morrison, L. G. Joseph, J. A. Andreou, P. and Yardley, L (2009): 'Application of the LifeGuide: A think-aloud study of users' experiences of the 'Internet Doctor'. In: Proceedings 5th International Conference on e-Social Science, Cologne.

Moss-Morris, R. Weinman, J. Petrie, K. Horne, R. Cameron, L. and Buick, D. (2002): 'The revised illness perception questionnaire (IPQ-R)'. *Psychology & Health*, vol. 17, no. 1. pp. 1-16.

Portnoy, D. B. Scott-Sheldon, L. A. J. Johnson, B. T. and Carey, M. P. (2008): 'Computer-delivered interventions for health promotion and behavioral risk reduction: a meta-analysis of 75 randomized controlled trials, 1988-2007'. *Preventative Medicine*, vol. 47, pp 3-16.

Severson, H. H. Gordon, J. S. Danaher, B. G. and Akers, L. (2008): 'ChewFree.com: Evaluation of a Web-based cessation program for smokeless tobacco users'. *Nicotine and Tobacco Research.* vol. 10, pp. 381-391.

Webb, T. L. Joseph, J. A. Yardley, L. and Michie, S. (2009): 'Using the internet to promote behaviour change: A meta-analytic review'. Submitted.