Positive partnerships web space usability: What does the think aloud protocol tell us?

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"Positive Partnerships" is a flexibly delivered, government supported training initiative, which incorporates an interactive learning platform customized for Australian teachers, parents, and carers of school aged students with autism. This cohort forms a diverse working group, possibly requiring more accommodations than the norm, so it is essential to determine whether the site meets their varying needs. In the current study a "Think aloud" protocol was used to determine the usability of the site for participants with varying computer access and competence. It was found that most of these users quickly accomplished a range of online activities and enjoyed the site's interactive nature and its time-saving features. It was concluded that the site should be promoted, and its potential would be maximized with deeper menus, an internal search capability, and explicit information about generic computer functions.

Keywords: Think-aloud protocol; usability; autism, Positive Partnerships

Introduction

Keeping abreast with the exponential increase in knowledge, skills and expertise is one of the key challenges facing the majority of professions, industries, trades, businesses and occupations today (Malhotra, 2000). Frequently the pursuit of excellence requires that interdisciplinary collaboration occurs across the workforce. In some instances, such as the helping professions, the collaboration may take the form of a partnership between professionals and other community members and this partnership may encompass persons with a range of computer literacies and available technologies. Moreover, if interaction with a national website forms a key strategy for these differently-skilled partners to achieve their aims, then the issues of computer usability and accessibility, site usefulness, and technological availability assume critical importance.

These are precisely the challenges faced by the designers of the Positive Partnerships website. This is found at http://www.autismtraining.com.au and forms an important plank in the Australian government's national initiative to improve outcomes for school-aged students with autism. The site brings together two components of the *Helping Children with Autism* package that is being implemented by the Australian Autism Education and Training Consortium ("the Consortium") under the auspices of the Department of Education, Employment and Workplace Relations. The two components are delivered flexibly (face to face and online) and consist firstly of professional development for teachers and other school staff working with affected students; and secondly of workshops and information sessions for parents and carers of school aged children with autism. In this blended delivery format, the various participants attend face to face sessions in different locations at varying times, but they all use the same web site. In addition, the site is open to a secondary group - the general public. To cater for the three user groups (school, family and the public), the site includes a home page with general information, a site map and useful links; a registration facility; and a learning portal which incorporates learning resources (such as fact sheets), interactive learning modules, and a discussion board. The site aims to bring together useful content, to support communication between users, and to manage and track the learning process by using assessment tools such as quizzes, the results of which may contribute towards accreditation for school staff.

With its geographical spread, three major audiences, and diversity of computer skills and access, it is imperative to determine whether the Positive Partnerships web space is easy to use. Because the site is

multi purpose, an evaluation needs to incorporate a variety of measures to capture its different features. Since the inception of *Positive Partnerships* in 2008, the Consortium has employed several methods to generate a range of qualitative and quantitative data. These methods include: user statistics; learning module review questions, quiz; public online feedback; discussion board analysis; focus group teleconference; and Think-Aloud Protocol (TAP). The last of these can provide direct insights into the site's usability for people with varying technologies and computer expertise. For these reasons the TAP was chosen as the focus of the remainder of this paper, although it is recognized that a full evaluation would require triangulation with the other methods previously mentioned.

Think-Aloud Protocols align with the position that web design is a collaborative activity (Alby & Zucchermaglio, 2008). They require participants to verbalise what they are thinking and feeling as they work with the user interface. These protocols are particularly useful in detecting problems, and they avoid some of the shortcomings of surveys which might have errors in recall and evaluation by the subject (Hoppmann, 2009). All TAPs generate objective data through documenting observable behaviours and verbal responses, but they also allow a glimpse into people's emotions as they perform given tasks. Originating in cognitive psychology, TAPs enjoy wide popularity for investigating tasks ranging from children's reading comprehension through to actor preparation and computer interaction, as in the current study (Berne, 2004).

Most usability studies of learning platforms recruit tertiary education students whereas the contribution of the current paper is its focuses on a more diverse group of adult learners less well represented in the literature. In particular, these learners may experience time stresses and exhibit a wide range of computer skills, and those in remote locations may have less-than-ideal network capabilities. Accessibility may also be an issue: the "Broader Autism Phenotype" (Arin et al., 2007) testifies to the statistically higher prevalence in relatives of people with autism of mild autistic traits such as minor communication impairment, hence Web Content Accessibility Guidelines are especially germane. Accordingly, the focus of the current paper is: *For this disparate workforce, what features of the Positive Partnerships site are more or less successful, and why is this so?*

Method

A minimum of four participants were individually tested in each of six locations where face to face autism workshops and information sessions were held, making a total of 25 participants. The six sites (Sydney, Ballarat, Canberra, Albany, Mount Isa, and Burnie) were chosen to represent a range of urban, rural and remote locations across Australia and the different Broadband capabilities associated with each. Participants (all volunteers) were recruited with a view to sampling four different combinations of high and low computer expertise and network capability. The final group of volunteers comprised eight teachers and other school staff, and sixteen parents and carers. Each participant took about 30 minutes to complete the TAP.

The TAP was part of the following larger suite of cyclical strategies designed to test the site's usability:

- a trial of a low fidelity release of the materials and functions on a test platform;
- a pre-test questionnaire for volunteers;
- the Think-Aloud Protocol, followed by a short interview; and
- further assessment (using large scale quantitative and qualitative technical and user testing), following development of the website.

Results

Demographics. As revealed in Table 1, just over half of the participants (56%) were confident about their computer skills, and the vast majority (84%) considered they had good computer access.

During the TAP, the participants' responses to a predetermined set of tasks and their free exploration of the site were noted. This was followed by a short interview. Responses were first collated and colour coded according to four categories obtained by separating out high and low expertise and access. In a second sweep, comments were organized into seven themes. Two themes were derived from the literature (navigation and terminology) and five themes were considered to be particularly relevant to this cohort – findability, time, accessibility, enjoyability and technological challenges. Residual comments were categorized as "other" but not interrogated in this paper due to space considerations.

Table 1: Distribution of expertise and access

	High Expertise	Low Expertise	Total
Good Access	13	8	21 (84%)
Poor Access	1	3	4 (16%)
Total	14 (56%)	11 (44%)	25 (100%)

The themes were defined and exemplars of the seven themes were provided. Coding was completed by two coders, with successive definition refinements until satisfactory reliability of 91% was reached, determined by the following method: [Total agreements divided by (Total agreements plus disagreements)] x 100%. The themes are organized as a series of seven questions, as discussed below.

Is the site locatable? Most participants (17/25 = 68%) used search words (*Positive Partnerships; AAETC, Autism training Australia)* that were sufficiently precise to find the site reasonably quickly. Three either memorized the site or inserted it into their Favourites menu. Twenty four percent used generic words such as *autism* or *online learning* that were far less efficient (*autism* at last count received 14,900,000 Google hits).

Is the site accessible? The site provides information in alternative formats, and 64% of participants commented on this aspect. One user remarked that the site would be attractive to her husband, who was deaf. Most participants liked the optional voice over that accompanied selected text. A small minority found the voice over distracting and were unaware that they could turn off the sound using the general mute button. Similarly, when seeking to enlarge small text, some participants were unfamiliar with text resizing options. In all, 24% either did not know or had forgotten about the mute and resize options.

Is the site compatible with "low tech"? For those with low resolution technology, various speeds were available for downloading video material. However no participant drew on this option. Four participants considered that downloading speed could be troublesome. One participant mentioned it took nearly three hours to complete a 90 minute module because her computer kept crashing. However she added that this was a regular occurrence outside the site, so this problem did not appear to be related to the Positive Partnerships software.

Is navigation clear? Users liked knowing where they were in the site, and appreciated features such as a site map, pagination to display their progress through learning modules, or arrows on the navigation bar to indicate their site location. Users also needed consistency in navigation features. Some became confused or accidentally exited the site when they encountered different ways to move through learning modules, only one of which would work on a given page – such as clicking "Next", an icon, an "x" or "Exit". Redundancy generally was considered a good thing, so users advocated the use of alternatives such as links and strategies to access information, and they also requested "deep" drop down menus, with many alternatives. Some participants wanted more links to external information. The most popular suggestion (80%) for improvement was the creation of a search button to find internal site content.

Is the site terminology understandable? Although participants commented on the terminology of both the autism subject content and the navigation labels, space constraints dictate that only the latter is considered here. Not surprisingly, computer terminology proved to be more difficult for those who were not confident in using the computer. Twenty percent commented that the words "Online Learning Portal" meant nothing to them. Others looked for a (non existent) round icon when asked to click on the (rectangular) computer button. Others clicked the word "help" in a vain attempt to find strategies to help their child with autism, and found computer help instead. One sixth of the participants were puzzled by the login terminology that mentioned "activating the account". This confused some participants who wondered whether they would have to pay to use the site.

Are time demands addressed? This category generated the greatest number of suggestions from the participants. Without exception, they liked the facility which allowed them to resume an activity where they had left off. They appreciated timesavers such as automatic email updates to alert them about new information and suggested a flashing light to show new information. Other time-saving suggestions included eliminating mouse clicks so the login and username were presented all in one, and typing in only the first letter at login to activate automatic text. Participants also suggested that there should be clarification that the 90 minute module was composed of 6 subsections. One participant commented "I have a 3 and 5 year old and 7year old twins so 15 minutes at a time is my max" and another said a fortnight passed before she could find a 90 minute window of available time.

Is the site enjoyable? Participants were positive about the site, largely because of its interactive nature and the option to progress at their own speed. Three remarked that it would appeal to relatives with autism. The only issue was that participants had to complete every interactive task to score 100%, and it was easy to miss a task which meant they had to go through the module again.

Discussion

Before discussing the results, it should be emphasised that the seven themes do not work in isolation. For example, *enjoyment* and memorability may be enhanced by animation (Lai, Kuan, Hui & Liu, 2009), which assist people with attention deficits, but in "*low-tech"* environments the information takes longer to load and the advantage is lost. An additional clarification is that although 25 might seem a small cohort, TAP research indicates that approximately 85% of the usability problems can be identified with as few as five respondents (Nielsen, 2006). Assuming then that the present data are representative, what lessons can be learned from this specialized yet diverse workforce, and when might these lessons apply to the workforce more generally?

Locating the site is fundamental, because no matter how good the site, it is wasted if people can't find it. High findability may be assumed when participants consist of enrolled students or workers within a single institution who have recourse to a familiar customized intranet to guide their search. In contrast in this study, with its cross discipline mix of paid workers and parents, nearly a quarter of participants used inefficient, generic search words such as "autism". This is a relatively high proportion of users, and so this has implications for site promotion. It is recommended that not just the URL but also the brand name (in this case "Positive Partnerships") be further publicized using electronic and hard copy formats, the media, and personal networks. The value of the latter should not be underestimated. When web-based searches failed to locate the site, participants turned to friends and colleagues. One participant with a low computer confidence rating stated he would ring the ultimate authority - his wife.

The text and sound options on the site accord with the first Principle - Perceivability - in the Recommended W3C Web Content Accessibility Guidelines (WCAG) 2.0 (2008) and should be retained. However some participants lacked awareness of generic computer functions such as text resizing and sound muting. This knowledge gap illustrates the need to plan this site in relation to *computer literacy*. Beyond formal adherence to WCAG, *explicit* information about viewing and listening options should be given to ensure participants are not hampered by their lack of knowledge about general computer functions.

The site appears viable for those without the latest computer technology. However *navigation* issues surfaced, in that several inconsistent responses were required to exit selected web pages. This so-called transitional volatility (Danielson 2003) impacts negatively on all users, not just the present cohort. Also consistent with mainstream research (see Nielson, 2009), participants suggested "deeper", more extensive menus. A search facility also deserves serious consideration for material internal to the site, perhaps with a list of searchable terms. Further external links would be overly ambitious, because the funding for the site is time limited. Unduly high expectations need to be managed, and existing alternatives utilized (such as the Google search function).

In some cases, the computer terminology acted as a deterrent for potential users: "Avoid the word 'account' or at least flash 'free' across the screen", advised one participant. Finally, efficient use of time is important for all users but time minimization was an especially high priority for this cohort. Users liked timesaving features and wanted to interact with the platform in small bites. Possible ways to do this (such as completing a 90 minute module in a series of 15 minute sessions) need to be made more explicit, otherwise users will not engage with the site in the first place.

Overall, the user-friendliness of the site appears high. Several factors, including transitional volatility and deep menus, could augment site usability not only for the workers in this study but also for the wider workforce. Other factors can be applied to the participants in the present study as well as other more heterogeneous cohorts. These considerations include directing efforts to promoting the site so it can be located more easily by its intended audience, and making explicit various features (muting, text resizing; specialized computer vocabulary, and time saving features). These strategies help to match the site to the needs and capabilities of its diverse workforce, and maximizes the value and enjoyment of the interactive content in this and other sites with heterogeneous user groups.

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