Guidelines for the Design of Online-Questionnaires

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1. INTRODUCTION

As a new medium for questionnaire delivery, the internet has the potential to revolutionise the survey process. Online (web-based) questionnaires provide several advantages over traditional survey methods in terms of cost, speed, appearance, flexibility, functionality, and usability (Bandilla *et al.*, 2003; Dillman, 2000; Kwak and Radler, 2002). Online-questionnaires can also provide many capabilities not found in traditional paper-based questionnaires: they can include pop-up instructions and error messages; they can incorporate links; and it is possible to encode difficult skip patterns making such patterns virtually invisible to respondents. Despite this, and the introduction of numerous tools to support online-questionnaire creation, current electronic survey design typically replicates that of paper-based questionnaires, failing to harness the full power of the electronic delivery medium. Worse, a recent environmental scan of online-questionnaire design tools found that little, if any, support is incorporated within these tools to guide questionnaire designers according to best-practice (Lumsden and Morgan, 2005). This article introduces a comprehensive set of guidelines – a practical reference guide – for the design of online-questionnaires.

2. BACKGROUND

Online-questionnaires are often criticised in terms of their vulnerability to the four standard survey error types: namely, coverage, non-response, sampling, and measurement errors. Although, like all survey errors, coverage error ("the result of not allowing all members of the survey population to have an equal or nonzero chance of being sampled for participation in a survey" (Dillman, 2000, p. 9)) also affects traditional survey methods, it is currently exacerbated in online-questionnaires as a result of the digital divide. That said, many developed countries have reported substantial increases in computer and internet access and/or are targeting this as part of their immediate infrastructure development (OECD, 2001; OECD, 2002). Indicating that familiarity with information technologies is increasing, these trends suggest that coverage error will rapidly diminish to an acceptable level (for the developed world at least) in the near future, and positively reinforce the advantages of online-questionnaires.

Non-response errors occur when individuals fail to respond to the invitation to participate in a survey or abandon a questionnaire before completing it. Given today's societal trend towards self-administration (Dillman, 2000) the former is inevitable, irrespective of delivery mechanism. Conversely, non-response as a consequence of questionnaire abandonment *can* be relatively easily addressed. Unlike traditional questionnaires, the delivery mechanism for online-questionnaires makes it difficult for respondents to estimate the length of a questionnaire and the time required for completion[1], thus increasing the likelihood of abandonment. By incorporating a range of features into the design of an online-questionnaire, it is possible to facilitate such estimation – and indeed, to provide respondents with context sensitive assistance during the response process – and thereby reduce abandonment while eliciting feelings of accomplishment (Crawford *et al.*, 2001).

For online-questionnaires, sampling error ("the result of attempting to survey only some, and not all, of the units in the survey population" (Dillman, 2000, p. 9)) can arise when all but a small

[1] In the absence of appropriate measures to address this.

portion of the anticipated respondent set is alienated (and so fails to respond) as a result of, for example, disregard for varying connection speeds, bandwidth limitations, browser configurations, monitors, hardware, and user requirements during the questionnaire design process. Similarly, measurement errors ("the result of poor question wording or questions being presented in such a way that inaccurate or uninterpretable answers are obtained" (Dillman, 2000, p. 11)) will lead to respondents becoming confused and frustrated.

Sampling, measurement, and non-response errors are likely to occur when an online-questionnaire is poorly designed. Individuals will answer questions incorrectly, abandon questionnaires, and may ultimately refuse to participate in future surveys; thus, the benefit of online-questionnaire delivery will not be fully realised. To prevent errors of this kind[2], and their consequences, it is extremely important that practical, comprehensive guidelines exist for the design of online-questionnaires. Many design guidelines exist for paper-based questionnaire design (e.g., American Statistical Association, 1999; Belson, 1981; CASRO, 1998; Fink, 1995; Jackson, 1988; Lindgaard, 1994; Oppenheim, 1992; Taylor-Powell, 1998); the same is not true for the design of online-questionnaires (Dillman, 2000; Norman *et al.*, 2003; Schonlau *et al.*, 2001). The guidelines presented in this report address this discrepancy.

3. COMPREHENSIVE DESIGN GUIDELINES FOR ONLINE-QUESTIONNAIRES

In essence, an online-questionnaire combines questionnaire-based survey functionality with that of a webpage/site. As such, the design on an online-questionnaire should incorporate principles from both contributing fields. Hence, in order to derive a comprehensive set of guidelines for the design of online-questionnaires, we performed an environmental scan of existing guidelines for paper-based questionnaire design (e.g., American Statistical Association, 1999; Belson, 1981; CASRO, 1998; Fink, 1995; Jackson, 1988; Lindgaard, 1994; Oppenheim, 1992; Taylor-Powell, 1998) and website design, paying particular attention to issues of accessibility and usability (e.g., Badre, 2002; Brewer, 2001; Coyne and Nielsen, 2001; Coyne and Nielsen, 2002; Dillman, 1978; Hinton, 1998; Kothari and Basak, 2002; Lynch and Horton, 1997; National Cancer Institute, 2002; National Institute on Aging and the National Library of Medicine, 2001; Stover *et al.*, 2002; Stover and Nielsen, 2002; W3C, 1999). Additionally, we reviewed the scare existing provision of online-questionnaire design guidelines (Dillman, 2000; Norman *et al.*, 2003; Schonlau *et al.*, 2001). Principal amongst the latter is the work of Dillman (2000). Expanding on his successful *Total Design Method* for mail and telephone surveys (Dillman, 1978), Dillman introduced, as part of his *Tailored Design Method* (Dillman, 2000), fourteen additional guidelines specifically aimed at directing the design of online-questionnaires. Albeit seminal, Dillman's guidelines do not incorporate much of the relevant guidance uncovered as part of our environmental scan. We therefore propose – after collating, filtering, and integrating the disparate guidelines – a comprehensive set of guidelines for online-questionnaire design that, although stemming from Dillman's guidelines, are more encompassing. These guidelines are concerned with the interface to a questionnaire as it appears to respondents; they do not provide support for the back-end architecture of the questionnaire in terms of database structures, connectivity, security, communication protocols etc. It should be stressed that the following are *guidelines*; by following them one is more likely to develop a questionnaire that adheres to principles of best practice and is therefore more usable by the target respondent group – one is not, however, *guaranteed* a good questionnaire since that depends on the individual developer. It is also important to note that none of the guidelines are particularly innovative in their own right; each has been drawn from the aforementioned sources covered by the environmental scan. What is novel, however, is the fact that applicable guidelines from these disparate sources have been collated into a unified set which is presented methodically in order to comprehensively support online-questionnaire design.

[2] The research presented here is not concerned with coverage errors which are orthogonal to good questionnaire design; mixed-mode delivery is suggested as a means to combat such errors.

3.1 DESIGN PROCESS

To systematically design and implement an online-questionnaire, a sequence of logical steps needs to be completed. Drawing on, and combining, accepted processes for paper-based questionnaire and website design, Figure 1 highlights the breakdown of activities that contribute to the generation of an online-questionnaire.

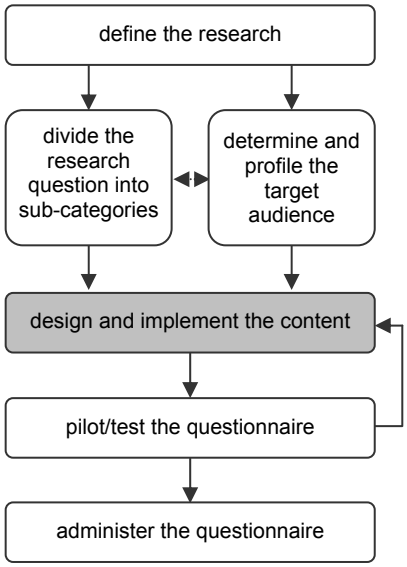

Figure 1: *A Design Process for Online-Questionnaires.*

The process assumes pre-determination that an online mechanism is appropriate for survey delivery. The guidelines primarily focus on support for the design and implementation of online-questionnaire content; minimal support is given for the preliminary steps and no support is given for the piloting and administration phases. Similarly, this process is only concerned with the design and delivery of the questionnaire as opposed to the analysis of the results upon termination of the survey. With the exception of the *Design and Implement the Content* step – which is discussed in detail in a later, dedicated section – each of the steps is outlined *briefly* as follows.

Define the Research Question: Identify the purpose of the questionnaire and write it out clearly. In so doing, this sets out the mission and objectives of the survey.

Divide the Research Question into Sub-Categories: List, and arrange in a logical order, the categories and sub-categories of issues that are to be addressed by the online-questionnaire. Place appropriate questions within each category and order them logically.

Determine and Profile the Target Audience: Questionnaires are generally designed with a given audience or response group in mind. In order that the content of a questionnaire can be appropriately designed and delivered, it is essential that the target audience be profiled and their specific requirements identified[3]. This is especially true when an online-questionnaire is intended

[3] Only when the characteristics of the survey's targeted respondents have been ascertained is it possible to decide on the level of specificity of questions and to ensure that the questions are structured in a manner most appropriate for all of the target audience. As a general rule, unless the survey is being targeted at a specialized, homogeneous group, questions should be phrased to accommodate a reading age of approximately 10 to 11 years. As for newsprint journalism, this goes some way to ensuring the maximum degree of audience comprehension. When questionnaires are required to be multi-

to reach, and elicit response from, persons with disabilities or the elderly, given the level of technology that is involved. Within the following guidelines, special consideration for respondents with physical disabilities (principally visual) and elderly respondents have been included and is indicated with 👁.

Pilot/Test the Questionnaire: Traditional questionnaires should be piloted/tested prior to general release or administration to identify potential for misunderstanding of questions or instructions and thereby afford the researcher a greater degree of confidence in the responses obtained. The same is true for online-questionnaires. Furthermore, rigorous testing can help eliminate the presence of 'bugs' within the source code of online-questionnaires which, if gone unnoticed, can impact on online-questionnaire use to the extent of abandonment and/or corruption of results. After piloting/testing, an online-questionnaire should be amended to incorporate necessary changes, additions, or bug fixes. Thereafter, it should be re-piloted before being administered. This process of piloting and changing the online-questionnaire should be iterative until such time as the questionnaire is in the best possible position for administration; this process reflects good user interface design practice.

Administer the Questionnaire: Once the online-questionnaire has been designed and refined via iterative piloting/testing, it is ready to administer. Online-questionnaires can be administered in several ways depending on the target audience. Notification of the questionnaire and calls for response should be published in media most appropriate for the target audience. Such media include e-mail, newsprint, fliers, advertisements on radio and television, and person-specific correspondence. The process of profiling the target audience should serve to identify which media best suit the context and goals of the given questionnaire.

3.2 DESIGN AND IMPLEMENT THE CONTENT

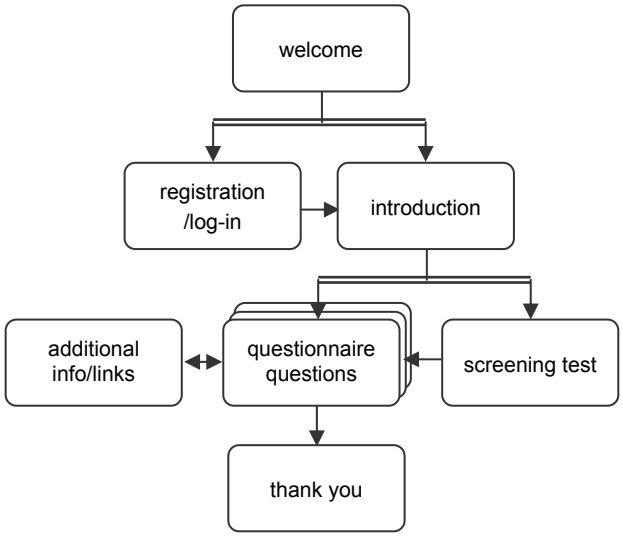

Figure 2: *Organizational Structure of Online-Questionnaires.*

When designing and implementing an online-questionnaire, there are many contributing factors to take into consideration, such as layout or organization, formatting, the structure of the questions themselves, and technical requirements. The following guidelines address each of these aspects

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lingual, it is important to ensure that all translations are meaningful. Note that, beyond this, the guidelines presented here are not intended to advise on the linguistic merits of survey questionnaires.

in turn. Regarding each of the following, decisions should be made in light of the target audience profile that has been identified for the survey[4].

3.2.1 General Organization

The following guidelines relate to the overall structure or organization of online-questionnaires. This is shown in Figure 2: a welcome page should be used to motivate respondents to participate in the survey; where authenticated participation is required, a login facility must be provided to allow respondents to enter pre-issued PIN numbers and passwords; a short introductory page should be used to present some general information about the survey, including any specific directions to be followed by the respondents; if a screening test is required for a survey, this would typically be delivered before proceeding to the main question-focused sections of the online-questionnaire; finally, it is important to remember to conclude every online-questionnaire with acknowledgement to the respondents for their time and effort in completing the survey.

Issues of navigation and layout must also be addressed when designing online-questionnaires. The following guidelines provide support for all organizational aspects of online-questionnaire design, partitioned according to element of organization (including all the sections outlined in Figure 2).

1. *Welcome:* The site or domain name that takes respondents to this page should be easy for the target audience to remember and should reflect the purpose of the questionnaire (it is advisable to register several domain names all of which will bring potential respondents to this page). The welcome page should be designed to load quickly and the organisation administering the questionnaire (or on whose behalf it is being administered) should be clearly evident. The welcome screen should be motivational and emphasise the ease of responding; it should also make it evident to the respondent how to proceed. For questionnaires with password restricted access, this should be made clear on the welcome screen to prevent wasting other users' time. 👁 Avoid the temptation to use animations and splash on the welcome page.
2. *Registration/Login:* A registration or login screen is necessary when access to a questionnaire is to be restricted to specific people and PIN numbers and passwords have been issued to the appropriate respondents. To prevent error messages, accept dashes and hyphens as part of a string of numbers (such as a telephone number). Furthermore, accept all correct data and show respondents only the fields that have been erroneously omitted or completed incorrectly, explaining to them what they are required to do to resolve the situation. Both of these approaches alleviate user frustration and so will increase the likelihood of continued respondent participation. 👁 Do not rely on the use of the '*' (as is typical in web-based forms) to indicate required fields since this is read as "star" by assistive technology, thus confusing the respondent and diluting the meaning that it was included to convey. 👁 Sufficient time should be provided to enable disabled users to read and complete the registration forms before automatic timeout. 👁 If error messages are unavoidable, present them in a clear, non-threatening manner so as to prevent alarming elderly users.
3. *Introduction:* This should comprise a brief, but strong, explanation of what the survey is about. It should also outline all security and privacy practices associated with the survey being conducted in order to reassure respondents. Where appropriate, this information might also or alternatively be included within the Registration/Login page.
4. *Screening Test:* The location of the screening test is open to debate, depending on the nature and extent of the test. If screening is very simple, it should be located within the Introduction Page; if more extensive, it should be assigned a page of its own but be clearly linked into the

[4] It is important to note that some of the guidelines are contradictory; applicability of any one guideline is dependent on the context for which the questionnaire is being developed and as such, developer discretion should be exercised to select the most appropriate guideline in there circumstances.

preceding and succeeding pages. Screening tests are advisable to prevent offence or insult and to maintain public relations; if a respondent fails a screening test do not deny him/her the chance to complete the questionnaire as this can be detrimental to his/her sense of worth and willingness to participate in the future – instead, simply discard or set aside his/her contribution.

5. *Questionnaire Questions:* In general, questions should be presented in a conventional format, similar to accepted paper-based standards. Later sections provide guidelines as to the specific types of questions. However, there are a number of important issues concerned with the number and order of appearance of questions, namely:
    a. The total number of questions included in a questionnaire should not exceed 60. More than 60 questions will increase the likelihood of abandonment of an online-questionnaire.
    b. Initial questions should be routine, easy-to-answer questions designed to ease a respondent into a questionnaire. In particular, the first question should be engaging and easily answered to hook the respondent. If a screening test is being incorporated into the questionnaire, this type of question *may* constitute all or part of the test.
    c. Delicate, tricky or the most important questions should appear approximately $^1/_3$ of the way through a questionnaire at a point at which a respondent has settled into the questionnaire but is not yet bored.
    d. Sometimes it is of value to repeat – slightly reworded – questions within a questionnaire; in particular, this technique is used to assess consistency of response and to determine whether a respondent is answering in a manner that he/she thinks is desired rather than answering with honesty. Such questions should appear far enough apart that respondents are likely to have forgotten exactly how they answered the first time.
    e. Open-ended questions should appear before closed-ended questions on the same topic to prevent influencing respondents with the fixed option choices of the closed-ended questions.
    f. If appropriate, open-ended questions should be reserved for placement at the $^2/_3$ point of the questionnaire to provide variation that will maintain the respondents' interest for the remainder of the questionnaire.
6. *Additional Information/Links:* To ensure that the main content of the questionnaire remains as simple and uncluttered as possible, links to additional information relating to the subject of the questionnaire should be included on a separate page from which it should be easy to return to the main questionnaire, at the point at which the respondent left it.
7. *Thank You:* Every questionnaire should conclude by thanking the respondents for their time and effort. This gratitude should be expressed in a gentle, friendly tone. Additionally, this page should include the facility for respondents to e-mail feedback or comments to the questionnaire administrators.

3.2.1.1 Layout

As a reflection of the organisation conducting the survey, online-questionnaires should create a distinctive, positive visual impression that will: (a) evoke, in respondents, feelings of trust about the organisation conducting the survey; and (b) assist the respondents in the process of completing the questionnaire. The following guidelines support the general layout and structure of online-questionnaires.

1. The question and answering process should be attractive – that is, uncluttered and easy to complete. The content of a questionnaire should be well presented and organised. Do not squeeze too much information onto each page and align elements horizontally or vertically to make them easier to read.

2. A question should never be divorced from its response set – that is, a question and all elements of its response should appear on the same page/screen.
3. Within a questionnaire, questions relating to a given topic should be presented together and clearly sectioned from questions related to other topics. Section headings and sub-headings which are meaningful and well designed should be used to clearly differentiate sections. Avoid using too many sections in any one questionnaire since this is likely to become confusing to the respondents and reflects poor questionnaire design and lack of focus.
4. Do not require that a respondent provide an answer to one question before moving on to the next question (the exception to this being screening questions); unless for very specific reasons, respondents should be able to interrupt and re-enter responses and move backwards and forwards throughout the entire questionnaire.
5. Some controversy exists regarding whether all questions in an online-questionnaire should be co-located within a single scrolling page or dispersed across several, linked, non-scrolling pages. In its favour, a single page strategy negates the need for navigational links and buttons; it can, however, be frustrating for respondents to have to scroll excessively through long screens just to access different questions or answer choices, and it gives the impression that a questionnaire is too long to complete. To avoid excessive scrolling, list only a few questions per page and provide clear and easy links to the preceding and succeeding pages of a questionnaire; be careful here, however, to avoid excessive numbers of pages with complex navigational aids. As a general rule, the decision to scroll or to segment a questionnaire into a series of pages should be determined on the basis of the content and size of a questionnaire: a very short questionnaire covering a limited number of topics may be best presented as a whole using scrolling; a long questionnaire is likely to benefit from page-based segmentation. In either case, refer to section 3.2.1.2 for more specific advice on the associated navigational mechanism.
6. ***Frames:*** 👁 Frames can make pages difficult to read, print, increase load time, and cause problems for disabled users who rely on assistive technology; they should therefore not be used for online-questionnaires. For more guidance about the use of frames see section 3.2.2.
7. ***Forms and Fields:*** By their very nature, questionnaires include elements common to forms – that is, layout and the use of fields for data entry. 👁 Users with disabilities can find forms and fields problematic, and so it is important that the following guidelines – which are relevant across all respondent groups – be taken into consideration when laying out these elements of a questionnaire:
    a. Locate field labels close to their associated fields so that respondents can easily make the association; 👁 this also prevents labels becoming lost when a screen is magnified by users with visual impairment.
    b. A 'submit' (or similar) button should always be located adjacent to the last field on any given page so that it is easily identified by respondents at the point at which they have completed the question responses; 👁 this is again especially important for users of assistive technology since it goes some way to ensuring that such a button will not be overlooked when the screen is magnified.
    c. The tab order for key based navigation around the fields in a questionnaire should be logical and reflect the visual appearance as far as is possible.
    d. Fields are most easily read if stacked in a vertical column and 👁 any instructions pertaining to a given field should appear *before* and not *after* the field if it is to be understood by users of assistive technology.

3.2.1.2 Navigation

Online-questionnaires can incorporate several facilities to assist navigation around the website presenting the questionnaire. These include buttons, links, site maps, and scrolling, each of which will be discussed in detail below. As a general rule, all mechanisms for navigation should be clearly identified and easy for respondents to find when interacting with a questionnaire.

Although navigational aids are typically located at the top right hand corner of web pages and as such this is likely to be the first place respondents would look, what is important is that the aids appear consistently in the same place on each page of a questionnaire's website. Navigational elements associated with Flash content are dealt with in section 3.2.2.

1. ***Buttons:*** Buttons allowing a respondent to exit a questionnaire or to return to the previous section of a questionnaire should be consistently available on each page of the website; the exception to this would be where it is necessary to restrict respondents from back tracking and altering responses (although this in itself is not an advisable practice in online-questionnaire design). 👁 Buttons should be used sparingly – only where absolutely necessary – since they can be hard for respondents with disabilities to use; when they are used, sufficient space should be inserted between them to increase their usability by such users. Furthermore, buttons should be large enough that users with visual impairment can see them and users with impaired motor function (including the elderly) can click on them; this often means including the area immediately surrounding the button as part of the button so as to avoid frustrating users with impaired vision or motor skills. 👁 Two buttons that are advisable to assist elderly users, are obvious buttons to help them navigate to the previous and next pages from their current position.
2. ***Links:*** Links are commonplace in websites, and as such, respondents with web experience are likely to anticipate their inclusion within the website for a questionnaire. That said, with a focus on simplicity of design, avoid excessive use of links in online-questionnaires (👁 as a general rule, do not exceed 20 links per web page). The following guidelines provide some support for the use of links when such facilities are necessary within online-questionnaires:
    a. When using links in questionnaires, make sure that the place-holder text for the links is clearly identifiable. Label them descriptively so that respondents can discriminate between similar links. Use blue, bold, underlined text for unvisited links since this is likely to meet the expectation of respondents with web experience. Indicate that a link has been visited by changing its colour.
    b. Use text-based links rather than image links for ease of navigation; if images or icons must be used for links, provide a redundant text link next to the image.
    c. Clearly distinguish between links to locations within the same page, links to other pages within the same website, and links to external sources outside the website. This will help avoid orientation confusion amongst the respondents and ensure that they are able to make an informed decision as to whether or not to follow any given link. Ensure that all links are accurate and work properly.
    d. Links to important information or those concerned with fundamental navigation around a website should be placed at the top of a page; it is often advisable to repeat the same links at the bottom of pages that require scrolling.
    e. 👁 Like buttons, the use of links should be restrained to accommodate users with disabilities who can find them hard to use. When they are included, sufficient space should be left between them to increase their usability by special needs groups and the areas immediately surrounding the links should be treated as part of the link because it is difficult for the likes of elderly users to hit small targets accurately.
    f. 👁 When blocks of links or navigational aids are included in a page, 'skip links' should be used; these are links that allow a user with visual impairment who relies on assistive technology to skip over the navigational aids rather than listen to a description of them on every page. This reinforces the importance of implementing links and navigational aids in a consistent fashion on each page.
3. ***Site Maps:*** Site maps provide an overview of the entire website at a single glance. They help users navigate through a website, saving them time and frustration. Although the path through *most* questionnaires is likely to be ostensibly linear and therefore orientation should not be overly complex, the provision of a site map (typically for websites containing 20 or more

pages) has the potential to contribute to positive reinforcement of a respondent's progression through a questionnaire. The following guidelines relate to the design and use of site maps:

a. Create a clear link to the site map on every page and label it "site map". Keep the site map short, simple, clear, and condensed into one page wherever possible. Minimise the site map's download time, ensuring that the most important information appears first.

b. Design the site map to complement, and be consistent with, the rest of the site and to include all areas of the site. Only use graphics if they are essential to the respondents' understanding of the site map.

c. Design site maps, like all web pages, to be scaleable.

4. ***Scrolling:*** Try to avoid the need for scrolling on web-pages comprising an online-questionnaire – some people find scrolling hard to use and when scrolling is required, information can be hidden from, and therefore overlooked by, respondents. It is particularly important that the welcome page to the questionnaire fit into a single screen and not require scrolling. If the use of scrolling cannot be avoided, inform respondents of the need to scroll – do not assume that it will be obvious to them – which will help prevent respondent frustration and ensure that questions are completely answered. Scrolling can be avoided via the use of jump buttons which take the respondent to the next "screen full" of information or questions.

3.2.2 Formatting

There are several aspects of general formatting that are of concern to designers of online-questionnaires, including: text; colour; graphics; feedback; and other miscellaneous factors. Guidelines pertaining to each of these are discussed in the following sections.

1. ***Text:*** There are a number of issues of importance when designing the textual content of an online-questionnaire:

a. Fonts used should be readable and familiar and text should be presented in mixed case or standard sentence formatting; upper case (or all capitals) should only be used for emphasis – for example to highlight certain words such as titles, captions etc.

b. Sentences should not exceed 20 words, and should be presented with no more than 75 characters per line. 👁 If elderly respondents are anticipated, then this limit should be reduced to between 50 and 65 characters per line. Paragraphs should not exceed 5 sentences in length.

c. Technical instructions (those being instructions related to the basic technical operation of the web-site delivering the questionnaire) should be written in such a way that non-technical people can understand them.

d. Ensure that questions are easily distinguishable, in terms of formatting, from instructions and answers.

e. For each question type, be consistent in terms of the visual appearance of all instances of that type and the associated instructions concerning how they are to be answered; in particular, keep the relative position of the question and answer consistent throughout the questionnaire. Where different types of questions are to be included in the same questionnaire, each question type should have a unique visual appearance.

f. 👁 When designing for access by users with disabilities and the elderly, employ a minimum of size 12pt font and ensure that the font colour contrasts significantly with the background colouring; text should be discernable even without the use of colour. It is advisable to test font colours and size with a screen magnifier to ensure usability prior to release.

g. 👁 If targeting an elderly audience, provide a text sizing option on each page, use bold face but avoid italics and left-justify the text. It is also advisable to increase the spacing between the lines of text for ease of reading by this respondent group.

h. 👁 Make sure that text is read (by screen readers) in a logical order; specifically, set the tab order on the pages. This is especially true for the actual questions in the questionnaire; think carefully about the order in which a visually impaired user will hear the elements of a question, including the instructions and response options.

2. ***Colour:*** Colour has more of an impact than most people might imagine (a considerable part of its influence being sub-conscious) and so it is important to use colour wisely:

   a. Use consistent colour coding throughout the questionnaire to reinforce meaning or information in an unambiguous fashion.

   b. Use a neutral background colour that excludes patterns which can make text very hard to read.

   c. When pairing colours or using two colours in close proximity, endeavour to use colours of high contrast to ensure maximum discernability across the target audience. This is particularly important for questionnaires targeted at audiences over 35 years of age; 👁 when catering to an elderly audience, this is imperative (easily distinguishable colours are to be recommended like black and white). Specifically, do not use the following colours together since visual vibrations and after-images can occur and these are the most common colour combinations to affect people who are colour-blind: red and green; yellow and blue; blue and red; and blue and green. 👁 For elderly respondents, the triple combination of blue, yellow and green should be avoided since it can be hard for some senior respondents to discriminate between these colours if used together.

   d. When using colour, keep in mind standard cultural colour associations.

3. ***Graphics:*** In essence, graphics should be kept to a minimum wherever possible to enhance download time and increase the accessibility of online-questionnaires across target audiences (especially users with disabilities). The following are some basic guidelines that should be considered if graphics must be included in an online-questionnaire:

   a. Avoid cluttering the questionnaire with graphics. 👁 This is especially true for users with visual disabilities.

   b. When using graphics, try to use small graphics that will download quickly. Individual images should not exceed 5KB in size and no single web-page should exceed 20KB of graphics in total.

   c. Wherever a graphic is used, it is essential to provide a text only version of the web-page. Use progressive rendering to allow the text to download before the graphics and thereby help alleviate access time issues that might repel a potential respondent from taking part in the survey. 👁 Graphics should be assigned descriptive names; furthermore, an ALT-tag should be used for images where the text can provide a comprehensive and effective description in no more than 5 words; if more than 5 words would be required to describe an image, place the description directly within the body of the questionnaire adjacent to the graphic to which it relates.

   d. Minimise the number of colours that are used in any single graphic and do not use graphics that mimic (or resemble) other items on a typical website. 👁 Ensure that graphics can be understood without colour.

   e. Do not blur pictures, grey out information or overlap menus; use crisp, clear images to maximise accessibility for users with visual disabilities.

   f. Do not associate multimedia and audio clips with graphics if plug-ins would typically have to be downloaded by the respondents in order to access the associated media. 👁 Make it easy for users to skip, without penalty, multimedia content.

4. ***Flash:*** In general is it advisable to avoid Flash (including blinking text) within websites for online-questionnaires since, to operate, it requires certain browser versions and/or plug-ins. 👁 As one of the most recent additions to the repertoire of websites, Flash can be problematic for users of assistive technology; it is difficult for users with low vision to focus on images that are moving and it is difficult for screen readers to interpret Flash. A site that uses flash or animation is basically just a difficult site that is slow to load for users suffering visual impairment. The following are a collection of guidelines to consider, in respect of users with disabilities, if Flash is considered essential within an online-questionnaire:
    a. Always give users an option of using a Flash or non-Flash format.
    b. Provide static navigation – that is, do not make the navigational facilities moving parts of the Flash where they disappear and reappear – and always include a way to navigate back to the location from which a user encountered the Flash.
    c. Let users determine the amount of time text appears on screen – do not make text automatically change or disappear.
    d. Include a "close window" option in all additional windows that open. 👁 Use such windows sparingly since it is hard for a user with vision impairment to know when and what additional windows have been opened.
5. ***Tables and Frames:*** Tables and frames are commonly used in website design for alignment and other aesthetic purposes. Whilst this is fine for 'standard' users, tables and frames cause confusion for people with visual impairment using screen readers and Braille displays. 👁 As such, tables and frames should be avoided when it is necessary to accommodate such respondents. Where tables are used to convey structured information (rather than for aesthetic purposes), they should be kept short and simple; cells should read serially when in cell-by-cell mode. All information included within tables should be provided in straight text as well, and tables should also be summarised using standard text. 👁 Frames should also be thoroughly described and a no frame version should be an option for users in the affected groups.
6. ***Feedback:*** An online-questionnaire is, in essence, the user interface to a software application. It is therefore important to consider the provision of feedback to respondents using a questionnaire. Well designed feedback can determine whether a respondent will abandon completion of a questionnaire or will persevere with it.
    a. With each new section (page) of a questionnaire, respondents should be given real time feedback as to their degree of process through the questionnaire; this might take the form of a statement to the effect "Question *x* of *y* completed" or it may be more visual such as a progress bar. It is important that such progress indicators are accurate in their reflection of respondents' relative completion status otherwise the respondents will cease to trust the feedback and may be more likely to abandon a questionnaire.
    b. At all times when accessing a website containing a questionnaire, respondents should be provided with clear indication of where they are relative to the website as a whole and should be informed, using non-technical language, whenever a processing delay has been encountered.
    c. Respondents' answers to questions should be immediately visible to them in a clear and concise manner to reinforce the effect of their actions. 👁 Feedback relating to a user's action should appear in close proximity to where their action took place to cater to the restrictions of assistive technology.
7. ***Miscellaneous:*** The following guidelines relate to formatting that does not naturally fall within any of the previous categories:
    a. Total web-site content should remain below 60KB of text and graphics.

b. A version of the questionnaire (as a whole) as well as all referenced articles or documentation (where possible) should be provided in an alternative format that would allow them to be printed in their entirety.

c. All introductory pages in the survey website should include a date-last-modified notification as well as a copyright notice if applicable.

3.2.2.1 Response Formats

Consideration must be given to the technical mechanisms used to facilitate responses to the various types of survey question; that is, electronic equivalents to the various paper-based response styles have to be selected to best meet the needs of the questionnaire and target audience. The following are guidelines in this respect:

1. ***Matrix Questions:*** Matrix formats can be used to condense and simplify a question if it involves many response options. They should, however, be used sparingly as they require a lot of work to be done within a single screen or locus of the questionnaire and, since they are typically constructed out of radio buttons, can encounter the interaction issues identified as hurdles to the use of radio buttons themselves (see below). Additionally, it is hard to predict how such questions will appear on respondents' web browsers and the size and format of such questions demands a significant amount of screen real estate which cannot be guaranteed on smaller-scale technology.

2. ***Drop-Down Boxes:*** A drop-down box measures the height of one line of text when collapsed; it contains a list of response options from which a respondent can select one or more by expanding the drop-down box. Drop-down boxes are fast to download but should be used sparingly – typically only when very long lists of response options are required. 👁 They can be difficult to use – not just by users with disabilities or the elderly – since they require two, very accurate mouse clicks; as such, they should only be used when the increased mouse action is cost-effective and should be avoided when it would be faster to simply type the response directly. Where drop-down boxes are used, their usability can be enhanced by incorporating type-ahead look up and avoiding requirement for, or possibility of, multiple selections. It is important that the first option in the drop-down box is not visible by default since this can lead respondents and that visual clues to indicate how the drop-box is used are clear and visible.

3. ***Radio Buttons:*** Radio buttons are essentially small circles that are placed next to the response options of a closed-ended question. Technologically, it is important to note that, by default, only one radio button within any given group of radio buttons can be selected at a time; that is, radio buttons are mutually exclusive within the set to which they belong. Check boxes (see below) allow many selections within a set and so should be used when multiple response options can be selected by respondents for any given question.

   Radio buttons are popular because they closely resemble paper-based questionnaire answer formats. 👁 They can, however, be frustrating because they demand a relatively high degree of mouse precision, and users with limited computer experience often do not know how to provide and/or change their responses (providing an answer involves clicking on the radio button; changing an answer involves clicking on another one in the set). Thorough, clear instructions should be provided when using radio buttons and no radio buttons should be filled in by default. 👁 Furthermore, like navigational buttons and links, radio buttons should be relatively widely spaced to allow the space surrounding each to be treated as part of the radio button and thereby assist users with any form of motor impairment.

4. ***Check Boxes:*** As mentioned above, check boxes (typically small squares that contain a tick mark when checked) allow for multiple rather than exclusive response selection. 👁 Like radio buttons (see above) they also demand a relatively high degree of mouse precision and it is important to be cognitive of the need to support interaction that is sympathetic to users with disabilities. Thorough, clear instructions should be provided when using check boxes, and

again, no check boxes should be filled in by default. The advantage to using check boxes and radio buttons within the same questionnaire is that their appearance is visibly different and so, provided with proper instruction, respondents are given visual cues as to how to answer any question using the either of the two response formats.

3.2.3 Question Type & Phrasing

The following guidelines relate, specifically, to the type and phrasing of the questions used within an online-questionnaire. These guidelines should be considered carefully when phrasing questions for inclusion in a questionnaire.

3.2.3.1 General Guidance

1. ***Sensitive Questions:*** If including sensitive questions – such as questions asking about confidential, disturbing, or threatening issues – word them politely, considerately, and in such a way that a low prestige answer is equally as acceptable as a high prestige answer.
2. ***Attitude Statements:*** If asking respondents to reflect their attitude regarding a statement about a particular topic, avoid statements that are too direct – instead, use more indirect or oblique statements. Ensure that each of the possible response options covers only one issue, is relevant to the topic being addressed, is clear, and represents a personalized expression of feeling. Make every effort to avoid descriptive observations in the response options since these will have a tendency to lead the respondents. It is advisable to use proven existing questions when measuring common concepts such as religiosity, politics, or user satisfaction.
3. ***Phraseology:*** It is best to phrase questions in the present tense using the active voice. Comprising familiar, simple words (unless addressing a specialist homogeneous audience), use precise, consistent, grammatically correct sentences to construct questions of not more than 20 words. Whenever a knowledge question is presented, the possible response options should include a “do not know” and a “no opinion” response choice. It is generally held to be the case that precise measurement options are preferable to general categories for accurate response elicitation: for example, precise occupation rather than general occupational categories should be used.

   The following should be avoided when composing questions (unless appropriate for a specialized, homogeneous target audience): acronyms; abbreviations; slang; jargon; proverbs; technical expressions; colloquial expressions; popular sayings; long alternatives as possible responses; different alternatives that could all be true; words which imply different meaning to different people; a lot of information carrying words; and loaded or provocative words such as black, democratic, free, healthy etc.

   Questions should be phrased so that they avoid being: double-barrelled; double-negative; hypothetical; negative; leading or biasing; two-edged (that is, containing two ideas); and demanding of major memory effort.

   ◉ When users must make a choice, warn them that the choice is coming, tell them how many options they will be presented with, and keep all possibilities in the same vicinity. ◉ If using age-related terms such as ‘senior’ or ‘elderly’ within an online-questionnaire, do not stereotype or be condescending when presenting information so as to avoid offending elderly respondents. When asking respondents about their occupation, be sure to include ‘retired’ as an option.

3.2.3.2 Types of Question

There are several different types of question that can be included in an online-questionnaire (see Figure 3); essentially, any question that is appropriate for traditional paper-based questionnaires can be incorporated in an online-questionnaire. These include: open- and closed-ended; ordinal;

magnitude estimate; Likert scale; categorical or nominal; rank-order; and skip questions. This section outlines some guidelines for each type of question in turn. It is important to note that for each question – irrespective of type – clear instructions should be provided to the respondents to inform them how and where to mark their answers; never assume a respondent will know how to respond to a question without instruction.

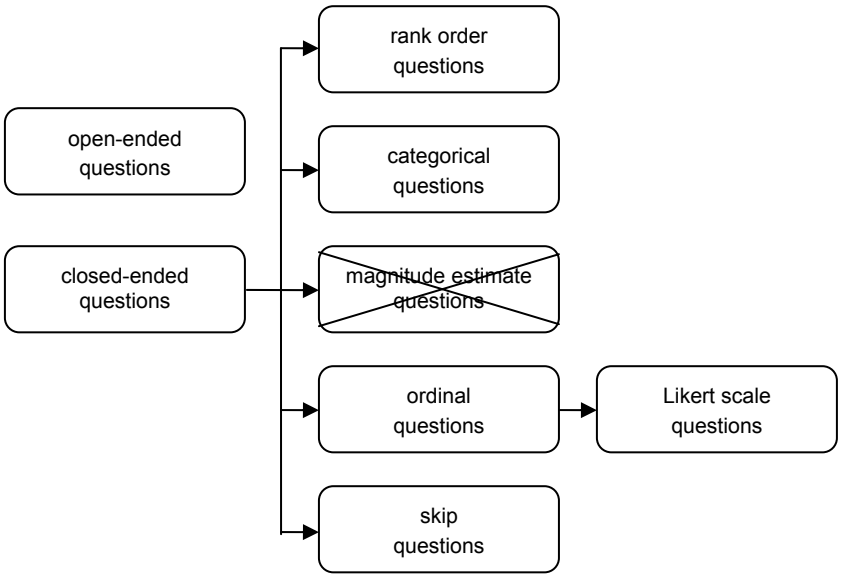

Figure 3: *Types of Question.*

Open- and Closed-Ended Questions: There are two main types of question that can be included in a questionnaire: open-ended and closed-ended. Open-ended questions should be used when there are too many possible response options to practically list or when the response possibilities are unknown at the time of administering the questionnaire. Alternatively, they should be used when it is important to capture the respondents' own words or where the researcher does not want to impose response categories onto the respondents. Such questions given the impression that the researcher is actively consulting each and every respondent but the responses elicited are hard to analyse and therefore require more experience and skill on the part of the researcher to use effectively. Hence, it is advisable to use such questions sparingly; keep these questions to a minimum.

Closed-ended questions should be used when the goal is to obtain data that is ranked or rated and when the researcher knows in advance how to order the ratings. These questions should be used when statistical data is required and where the researcher would prefer to count the number of choices rather than analyse free text. Closed-ended questions incorporate a pre-specified set of response choices and are generally used more frequently than open-ended questions in a survey. The response options listed for a closed-ended question should exhaust the possible answers to that question or alternatively include an "other – please specify" option. There are many different types of closed-ended question, guidance for the design and use of each of which is given in the following sections.

1. ***Rank-Order Questions:*** This type of question requires the respondent to rank items in a list according to some criteria such as importance, for example. Given that people have a tendency to find ranking difficult, it is imperative that clear instructions are provided for these questions and that such questions are kept to a minimum in any one questionnaire. Respondents should not be asked to rank more than three items in a list. Rank-order questions should be given a sufficiently distinct visual appearance that they can be differentiated from ordinal questions.

2. ***Categorical or Nominal Questions:*** These questions require that a user chose one or more from a selection of categories listed as the response options. Categories listed should be all inclusive and exhaustive. They should also be meaningful within the context of the survey and useful categories for analysis. This question type is particularly useful for obtaining sensitive information like income.

3. ***Magnitude Estimate Questions:*** Magnitude estimate questions are typically used in a survey when comparative judgements are required. However, it is unadvisable to use them within online-questionnaires because, as a question type, they are generally only effective when the researcher is physically present to explain to respondents how to use such questions.

4. ***Ordinal Questions:*** Only use ordinal questions when the topic is well-defined and the response options represent a gradation along a single dimension. Use a meaningful, balanced scale to list the response options – the endpoints should be polar opposites of each other and the intervals between all points on the scale should be even. When listing options that could be open to interpretation, prevent confusion by specifying exactly what is meant by each (for example, if listing "Often" as an option indicate that this means "2 – 3 times a week" to avoid subjective interpretation of "often"). Although a neutral response category need only be included if it is meaningful or valid to do so, it is unadvisable to include only 2 options (the polar opposites of each other) because this effectively forces a respondent into indicating an extreme opinion which may inaccurately reflect less extreme opinions or ambivalence. It is generally accepted that ordinal questions work best when an odd number of response options are presented; 5 or 7 options have proven to be particularly effective although it is possible to include more or less. When the negative response option to a question reflects potentially embarrassing or socially undesirable behaviour, it should be placed at the left hand (or first) end of the list of options.

5. ***Likert Scale Questions:*** These questions are really a specialized type of ordinal question, requiring respondents to indicate their level of agreement with a particular statement. When using this question type, a brief explanation of how respondents are to indicate their answers should be provided – it is best to provide this instruction per question since backward referencing in online-questionnaires incurs greater cognitive load than for paper-based equivalents. Vary the wording of the response options to prevent encouraging a response-set (that is, where respondents answer questions in an automated fashion as a result of anticipated response options). Place the response option for the strongest level of agreement at the right-hand end of the option list which is best laid out horizontally. As with ordinal questions, it is generally accepted that Likert scale questions work best when an odd number of response options are presented; 5 or 7 options have proven to be particularly effective although it is possible to include more or less.

6. ***Skip Questions:*** This type of question is primarily used to determine, on the basis of an individual respondent's answer, which of the following questions a respondent should jump (or 'skip') to when question path is response directed. Although it is advised that these questions should not be used in self-administered paper-based questionnaires, technology permits them to be included in online-questionnaires in such a manner that respondents are not burdened with determining where to skip to; skip questions can, and should, all be automated to the extent that a respondent need not even be aware that they are answering skip questions – complex skip patterns should appear invisible to them. When using skip questions, provide thorough directions that encourage marking of answers and being able to click to the next applicable question.

   If it is deemed necessary to make skip questions explicit within online-questionnaires, they should be distinct from all other question types, should include a training instruction, and reminder instructions should be used within the remainder of the questionnaire where appropriate to ensure correct question paths are maintained.

3.2.4 General Technical Guidelines

Although all of the above relate to the technicalities of online-questionnaire design, there are some additional aspects that should be taken into consideration when developing online-questionnaires:

1. ***Privacy & Protection:*** Ethically, it is important to ensure that respondents' privacy and perception of privacy are protected; it is especially important to encrypt the survey data and, in most cases, anonymize the data received.
2. ***Computer Literacy:*** In general, design with the less knowledgeable, low-end computer user in mind; provide specific instructions to show users how to take each necessary step to respond to the survey without being condescending to this category of user and insulting to more experienced users. Do not assume prior knowledge or preconceptions in terms of technological know-how or expectations. 👁 Try to eliminate the need for double-clicks since these can be very difficult for users with motor impairment, including the elderly; instead, use single click activation.
3. ***Automation:*** Unlike paper-based questionnaires, many aspects of online-questionnaires can be automated – most noticeably skip questions. It is important to weigh up the costs of automating elements of a questionnaire before including them in the design; when automation *is* included, it is vital that it be designed carefully so as to avoid disorientating or confusing respondents and it is imperative that the automation is correct (it will frustrate respondents if automatically completed responses are filled in incorrectly).
4. ***Platforms & Browsers:*** Always ensure – via rigorous testing – that the questionnaire operates effectively across all platforms and within all browsers. As a general rule, use only a portion of the capacity of the most advanced browsers in order to maximise the chance that all recipients of the questionnaire are likely to respond.
5. ***Devices:*** Given increasing portability of technology and mobility of information access it is important to design all elements of the online-questionnaire to be scaleable – and to test the effect of viewing them on different scales of device. It is unlikely that many respondents would choose to complete a lengthy questionnaire on a handheld device, but equally this cannot be discounted nor can the range of sizes to which a respondent might resize their desktop browser be anticipated so a well designed and tested online-questionnaire needs to take this into consideration.
6. ***Assistive Technology:*** 👁 If users with visual impairment are to be included in a target audience, it is imperative that the design of the questionnaire be tested with assistive technology – in particular screen magnifiers and readers – to ensure that it is accessible to such an audience. The following guidelines provide some support to help achieve this requirement:
    a. 👁 Pages should not be overcrowded and screen readers should be told how to read initials or acronyms.
    b. 👁 Activity should be isolated to one area of the screen and the need for scrolling should be minimised.
    c. 👁 Wherever possible, avoid using pop-up windows, rollover text, cascading menus, and new browser windows; if pop-up windows are used, make sure that the default option is the most forgiving and if new browser windows are opened, make sure that a simple means to get back to the original is provided.

4. CONCLUSIONS

The previous sections have outline a series of *guidelines* for the design of online-questionnaires. Following these guidelines should help avoid some of the hurdles or pitfalls currently found in

many online-questionnaires and potentially increase response rates and quality of responses; it does not, however, guarantee an effective questionnaire that will elicit a higher than average response rate. Such a guarantee is infeasible and unrealistic since the quality of a questionnaire is ultimately the responsibility of the person(s) designing the questions within the questionnaire, for which limited guidance can, at this point, be offered.

Included to this report, as Appendix A, is an evaluation framework based on the guidelines. This framework enables the comprehensive evaluation of an online-questionnaire design tool according to the functional provision of the tool and the degree to which, and mechanisms by which, the above guidelines are supported within the tool. By using this framework, one can assess candidate online-questionnaire development tools and thereby make an informed choice relative to any given project. This framework is included here as an additional support mechanism; further advice on its use can be obtained by contacting the report author.

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Appendix A

An Evaluation Framework for Online-Questionnaire Design Tools

GUIDELINES SECTION		FUNCTIONAL SUPPORT					GUIDELINES SUPPORT								COMMENTS
		No Support	Automatic Insertion	Manual Insertion	Automatic Control	Manual Control	Defaults	Imposed Restrictions	Use of Wizard	Context Sensitive Help	Non-Context Sensitive Help	On-Line Tutorials	Templates	Other	
1.2	**DESIGN PROCESS**														
1.2.1	**Define the research question**														
1.2.2	**Divide the research question into sub-categories**														
	Arrange the sub-categories in a logical order														
	Place appropriate 'pseudo' questions in each category														
1.2.3	**Profile the target audience**														
1.2.4	**Design & implement the content - see later**														See Below
1.2.5	**Pilot the questionnaire**														
1.2.6	**Administer the questionnaire**														
	Notify potential respondents via appropriate mechanism														

GUIDELINES SECTION		FUNCTIONAL SUPPORT					GUIDELINES SUPPORT									COMMENTS
		No Support	Automatic Insertion	Manual Insertion	Automatic Control	Manual Control	Defaults	Imposed Restrictions	Use of Wizard	Context Sensitive Help	Non-Context Sensitive Help	On-Line Tutorials	Templates	Other		
1.3	**DESIGN & IMPLEMENT THE CONTENT**															
1.3.1	*General Organisation*															
	Welcome Page															
	Register an appropriate domain name															
	Clearly identify the researcher/organisation performing the survey															
	Include motivational text															
	Include instructions on how to proceed with the questionnaire															
	Ensure page fits into single screen with no need for scrolling															
	👁 Avoid animation and splash															
	Registration/Login Page															
	Accept dashes & hyphens as part of string of numbers															
	Accept all correct data and highlight missing/incorrect data on submit															
	👁 Do not use '*' to indicate required field															
	👁 Set acceptable timeout periods															
	Word error messages in a clear, non-threatening manner															
	Introduction Page															
	Include a brief, strong explanation of what the site is about															
	Outline all security & privacy procedures															
	Screening Test Page															
	Include clear links to preceding and following pages															
	Allow repsondents who fail the test to complete the questionnaire															
	Questionnaire Questions															
	Include no more than 60 questions															
	Make all initial questions routine & easy-to-answer															
	Place delicate/tricky/most important questions 1/3 of the way through															
	Locate repeated questions an appropriate distance apart															
	Locate open-ended questions before closed-ended questions on the same topic															
	Place open-ended questions approx. 2/3 of the way through the questionnaire															
	Additional Information Links Page(s)															
	Include easy links back to the referring page															
	Thank You Page															
	Include an expression of gratitude using a friendly tone															
	Provide facility for respondents to comment or provide feedback on the questionnaire															

GUIDELINES SECTION		FUNCTIONAL SUPPORT					GUIDELINES SUPPORT									COMMENTS
		No Support	Automatic Insertion	Manual Insertion	Automatic Control	Manual Control	Defaults	Imposed Restrictions	Use of Wizard	Context Sensitive Help	Non-Context Sensitive Help	On-Line Tutorials	Templates	Other		
1.3.1.1	***Layout***															
	Ensure the question & answer process is attractive															
	Do not squeeze too much info onto each page															
	Align elements vertically or horizontally															
	Ensure questions are not divorced from their response set															
	Use sections to group related questions															
	Include section & sub-headings that are meaningful															
	Avoide too many sections															
	Do not require completion of one question before progress to another															
	Allow respondents to interrupt questions															
	Allow respondents to move backwards through a questionnaire															
	Allow respondents to move forwards through a questionnaire															
	Use a single scrolling page only when questionnaire is very short															
	Preferably, use multiple non-scrolling pages															
	Include clear & easy links to adjacent pages															
	Do not use frames															
	Forms & Fields:															
	Locate field labels close to their associated fields															
	Include a 'submit' or similar button next to the last field on every page															
	Implement a logical tab key order															
	Locate instructions before fields															
	Stack fields in vertical columns															

GUIDELINES SECTION		FUNCTIONAL SUPPORT					GUIDELINES SUPPORT								COMMENTS
		No Support	Automatic Insertion	Manual Insertion	Automatic Control	Manual Control	Defaults	Imposed Restrictions	Use of Wizard	Context Sensitive Help	Non-Context Sensitive Help	On-Line Tutorials	Templates	Other	
1.3.1.2	***Navigation***														
	Ensure all mechanisms can be clearly identified														
	Ensure all mechanisms are easy to find														
	Ensure all mechanisms are consistently located on each page														
	Buttons														
	Locate Exit and Back buttons consistently on each page														
	👁 Use Buttons sparingly														
	👁 Insert sufficient space between buttons to accommodate special needs users														
	👁 Ensure buttons are large enough														
	👁 Include area around button as active area for the button														
	👁 Include Back and Next buttons on each page for elderly users														
	Links														
	👁 Avoid excessive use of links - do not exceed 20 links per page														
	Make sure the text place-holding a link is clearly identifiable														
	Use descriptive labels														
	Use blue, bold, underlined text for unvisited links														
	Indicate a link has been followed by changing its colour														
	Use text-based links rather than image-based links														
	If image-based link is used, include adjacent text-based link also														
	Clearly distinguish between links to locations within the same page, links to other pages within the same site & links to other sites														
	Ensure all links are accurate and working properly														
	Locate Important links or ones concerned with navigation at the top of the page														
	Repeat important and navigational links at top and bottom of pages that require scrolling														
	👁 Leave sufficient space between links														
	👁 Make the area immediately surrounding links active also														
	👁 Use 'skip links' when blocks of navigational features are included in pages														
	Site Maps														
	Create a clear link called 'site map' on every page														
	Keep the site map short, simple, clear and condensed into one page														
	Minimise the site map's download time, ensuring the most important info loads first														
	Design the site map to complement and be consistent with the rest of the site														
	Only use graphics if they are essential to the respondents' understanding of the map														
	Design site maps to be scalable														
	Scrolling														
	Try to avoid the need for scrolling														
	Where scrolling cannot be avoided, inform users of need to scroll														
	Use jump buttons instead of scrolling when possible														

GUIDELINES SECTION		FUNCTIONAL SUPPORT					GUIDELINES SUPPORT									COMMENTS
		No Support	Automatic Insertion	Manual Insertion	Automatic Control	Manual Control	Defaults	Imposed Restrictions	Use of Wizard	Context Sensitive Help	Non-Context Sensitive Help	On-Line Tutorials	Templates	Other		
1.3.2	*Formatting*															
	Text															
	Use readable & familiar fonts															
	Use mixed case (standard sentence) formatting															
	Only use all upper-case for emphasis															
	Sentences should not exceed 20 words															
	Use no more than 75 characters per line															
	👁 For elderly respondents use 50 - 65 characters per line															
	Do not exceed 5 sentences in any one paragraph															
	Write technical instructions so that non-technical respondents can understand them															
	Ensure questions are easily distinguishable from answers and instructions															
	Use a consistent visual appearance for all instances of the same question type															
	Use a consistent visual appearance for all instructions for the same question type															
	Use a consistent relative positioning of question and answer for all instances of the same question type															
	Give each question type a unqiue, distinct visual appearance															
	Set the tab order on each page to reflect reading order															
	👁 Use minimum of 12pt font															
	👁 Ensure font colours contrast significantly with background colouring															
	👁 Test font colours with screen magnifier to ensure usability															
	👁 Provide text sizing option on each page if targetting elderly audience															
	👁 Use bold face with left-justification															
	👁 Do not use italics															
	👁 Increase spacing between lines of text															
	👁 Ensure text is read in logical order by screen reader															
	👁 Think carefully about the order a visually impaired user will hear the elements of a question, including instructions and responses															

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	Colour														
	Use consistent colour coding throughout														
	User neutral background colour														
	Do not use patterned backgrounds														
	Use colours of high contrast together when pairing colours														
	👁 Use strongly contrasting colours, black and white being the safest combination														
	Avoid the following colour combinations:														
	Red & green														
	Yellow & blue														
	Blue & red														
	Blue & green														
	👁 Avoid using blue, yellow & green together for elderly audiences														
	Cater to standard cultural colour associations														
	Graphics														
	Keep graphics to a minimum														
	👁 Avoid cluttering questionnaire with graphics														
	Use small graphics that download quickly														
	Do not exceed 5KB for any one graphic														
	Do not exceed 20KB of graphics for any one page														
	Provide a text-only version of any web page which includes graphics														
	User progressive rendering to allow text to download before graphics														
	👁 Assign descriptive names to all graphics														
	👁 Use ALT-tag for images where text can provide an effective description in no more than 5 words														
	👁 Place descriptive text next to graphic where more than 5 words is required for description														
	Minimise the number of colours in any one graphic														
	Do not use graphics that mimic other items on a typical website														
	👁 Ensure graphics can be understood without colour														
	👁 Do not blur pictures														
	👁 Do not grey out information														
	👁 Do not overlap menus														
	Do not associate multimedia & audio clips with graphics if plug-ins would typically be required to play them														
	👁 Allow users to skip, without penalty, multimedia content														

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	Flash															
	Avoid flash (including blicking text) wherever possible															
	👁 Give users option of using Flash or non-Flash format															
	👁 Provide static navigation															
	👁 Do not make text automatically change or disappear															
	Include a 'close window' option in all additional windows that open															
	👁 Use additional windows sparingly															
	Tables & Frames															
	👁 Avoid tables and frames															
	Keep tables short and simple															
	👁 Ensure cells read serially															
	👁 Provide all information as straight text also															
	👁 Provide summaries of all table contents															
	👁 Describe frames thoroughly															
	👁 Provide Frames & non-Frames options															
	Feedback															
	Provide real-time feedback about respondent's degree of progress through the questionnaire with each new page															
	Provide clear indication of respondent's relative position within the website															
	Use non-technical language to inform respondents of processing delays															
	Ensure respondents' answers are immediately visible to reinforce their actions															
	👁 Ensure feedback appears in close proximity to action															
	Miscellaneous															
	Ensure total web content remains below 60KB of text and graphics															
	Provide version of questionniare in alternative, printable format															
	Provide versions of all additional information in alternative, printable format															
	Include date-last-modified notification on all introductory pages															
	Include (where applicable) copyright notification on all pages															

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1.3.2.1	***Response Formats***															
	Matrix Questions															
	Use sparingly															
	Drop-Down Boxes															
	Use sparingly															
	Only use when long list of response options is required															
	Only use when increased mouse action is cost-effective															
	Avoid when it would be faster to type response															
	Include type-ahead look-up															
	Avoid multiple selections															
	Do not make the first option visible															
	Include clear visual clues on the operation of the box															
	Radio Buttons															
	Ensure consistency of exclusivity of radio buttons															
	Ensure consistency of appearance of radio buttons															
	Provide instruction on how to record an answer															
	Provide instruction on how to change an answer															
	Ensure it is possible to delete all responses from a set leaving the question unanswered															
	Do not fill in any of the radio buttons by default															
	👁 Locate radio buttons relatively widely apart															
	👁 Treat space around each radio button as active area for that button															
	Check Boxes															
	Ensure consistency of exclusivity of check boxes															
	Ensure consistency of appearance of check boxes															
	Provide instruction on how to record an answer															
	Provide instruction on how to change an answer															
	Do not fill in any of the check boxes by default															
	👁 Locate check boxes relatively widely apart															
	👁 Treat space around each check box as active area for that button															

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1.3.3	*Question Type & Phrasing*														
1.3.3.1	***General Guidance***														
	Sensitive Questions														
	Word politely & considerately														
	Word so that low prestige answer is as acceptable as high prestige answer														
	Attitude Statements														
	Use indirect or oblique statements when asking respondents to reflect their attitude														
	Ensure each response option covers only one issue														
	Ensure each response option is relevant to the topic being addressed														
	Ensure each response option is clear														
	Ensure each response option represents a personalised expression of feeling														
	Avoid descriptive observations in the response options														
	Use proven existing options when measuring common concepts such as religion etc.														
	Phraseology														
	Use present tense and active voice														
	Use familiar, simple words														
	Design for a reading age of 10 - 11 years unless for specialised group														
	User precise, consistent, grammatically correct sentences														
	Always include a 'do not know' or 'no opinion' option for knowledge questions														
	Use precise measurement options rather than general categories														
	Avoid: acroynms; abbreviations; slang; jargon; proverbs; technical expressions; colloquial expressions; popular sayings; words which imply different meaning to different people; a lot of information carrying words; and loaded or provocative words unless for specialised group														
	Avoid long alternatives as response options														
	Avoid different response alternatives which could all be true														
	Phrase questions to avoid being: double-barelled; double-negative; hypothetical; negative; leading or biasing; two-edged; and demanding of major memory effort														
	◉ Warn respondents that a choice is coming when they are required to make a choice														
	◉ Tell respondents how many options are available when they are required to make a choice														
	◉ Keep all options together when respondents are required to make a choice														
	◉ Include 'retired' as an occupational option when surveying the elderly														

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1.3.3.2	***Types of Question***														
	Provide clear response instructions														
	Do not assume respondents know how to answer a question														
	Open-Ended Questions														
	Use when there are too many response options to list														
	Use when the response options are not known in advance														
	Use when important to capture respondents' own words														
	Use to avoid imposing response categories on respondents														
	Use to create impression that respondents' opinion matters														
	Use sparingly														
	Closed-Ended Questions														
	Use when goal is to obtain ranked and rated responses														
	Use when known in advance how to order ratings														
	Use when statistical data is required														
	Use when researcher prefers to count responses rather than analyse free text														
	Response options should be exhaustive or include 'other - please specify' option														
	Rank-Order Questions														
	Keep to a minimum														
	Provide clear response instructions														
	Do not ask respondents to rank more than 3 items														
	Give distinct visual appearance														
	Categorical or Nominal Questions														
	Provide clear response instructions														
	Use inclusive and exhaustive categories														
	Use meaningful and useful categories for analysis														
	Magnitude Estimate Questions														
	Do not use														

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	Ordinal Questions														
	Provide clear response instructions														
	Only use when the topic is well defined														
	Only use when response options represent a gradation along a single dimension														
	Use a meaningful balanced scale														
	Ensure that the endpoints of the scale are polar opposites														
	Ensure all intervals between points on the scale are even														
	Use clear specification of the meaning of points on the scale														
	Include a neutral response option (recommended)														
	Avoid only 2 point scales														
	Use an odd number of response scale options														
	Use 5 or 7 point scales for best results														
	Place negative response at left hand side (or first) when it reflects potentially embarrassing or socially undesirable behaviour														
	Likert Scale Questions														
	Provide clear response instructions														
	Vary wording for response options on successive questions														
	Place response option for strongest level of agreement at right-hand side														
	Lay out horizontally														
	Use odd number of response scale options														
	Use 5 or 7 point scales for best results														
	Skip Questions														
	Do not use if questionnaire is not automated														
	Provide clear response instructions to encourage marking of responses														
	Automate to the extent that respondent is unaware of their existance														
	Make visually distinct from all other questions, if making them explicit														
	Include reminder instructions, if making them explicit														
	Include a training instruction, if making them explicit														

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1.3.4	*General Technical Issues*															
	Privacy & Protection															
	Ensure respondents' privacy															
	Ensure respondents' perception of privacy															
	Encrypt the data															
	Anonymise the data															
	Computer Literacy															
	Design for the less knowledgeable															
	Provide instructions for each step required to respond to the survey															
	Do not assume prior knowledge or preconceptions															
	👁 Try to eliminate the need for double clicks															
	👁 Use single click activation															
	Automation															
	Weigh up costs of automation before using it															
	Design to avoid disorienting or confusing respondents															
	Ensure all automation is correct															
	Platforms & Browsers															
	Rigorously test to ensure questionnaire operates effectively across all platforms															
	Rigorously test to ensure questionnaire operates effectively across all browsers															
	Use only a portion of the capacity of the most advanced browser															
	Devices															
	Design all elements to be scaleable															
	Test the effect of viewing the questionnaire on different scales of device															
	👁 **Assistive Technology**															
	👁 Test the design with assistive technology															
	👁 Do not overcrowd pages															
	👁 Tell screen readers how to pronounce acronymns or read initials															
	👁 Isolate activity to one area of the screen															
	👁 Minimise the need for scrolling															
	👁 Avoid using pop-up windows															
	👁 Avoid using roll-over text															
	👁 Avoid using cascading menus															
	👁 Avoid using new browser windows															
	👁 Make the default option the most forgiving if pop-up windows are used															
	👁 Provide simple means to get back to initial window if new browser windows are used															