

LETTER

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Novel way of displaying Delphi responses when collecting through the REDCap data collection system

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Delphi surveys are regularly used in health care research to anonymously determine through controlled feedback an expert consensus on issues. Although it was originally developed by RAND researchers as a forecasting methodology in military research [1], the Delphi process has undergone many modifications and is now used in many different disciplines, most notably by medicine, as a gold-standard approach for expert elicitation and stakeholder engagement [2]. The method is often used where there is limited or conflicting evidence, where respondents may be geographically dispersed, and where anonymity is desired to control for dominant individuals. The Delphi method involves asking individuals to provide their opinions on a specific topic by completing a few rounds of questionnaires. In each round, the results of the previous round are presented, and respondents are asked to review the results and provide their further opinions—they can change their opinions based on feedback from the previous round, and this iterative process eventually leads to a consensus. The goal of multiple iterations in the Delphi method is to reduce the range of responses and gain expert consensus, which is often seen as more credible than conjecture or individual opinion.

The four key defining features of a Delphi are anonymity, iteration, controlled feedback and the statistical aggregation of the group response, where anonymity is taken in this context to refer to the fact that respondents should not know who else is involved in the study (i.e. names) besides the researchers rather than always completing a totally anonymous questionnaire [3].

There are a number of commercial software programmes available to conduct Delphi surveys which include but are not limited to eDelphi [4], the COMET project's DelphiManager [5] and also ExpertLens [6]; however, these come at a cost which many researchers cannot afford. Some researchers have instead utilised the REDCap system [7] for conducting Delphi surveys. REDCap is a data collection system which is available at no charge to non-profit organisations and is now used across the world for many clinical studies and trials. Its website currently lists its use in 163 countries and by 7950 institutions [7–9]. It is a secure web application for building and managing online surveys and data collection, designed to support data capture for research studies. It also includes an external module 'plug-in' development framework that allows users to add custom REDCap functionality for individual projects [8].

This is not the first letter to report on the use of REDCap for Delphi surveys; there are many published examples [10–13] however, this letter reports on a REDCap external module (also known as a plug-in) developed that brings new functionality for those using REDCap for Delphi surveys. The external module developed allows for the use of 'controlled feedback'—a regular tool used within a Delphi survey that was used on this occasion.

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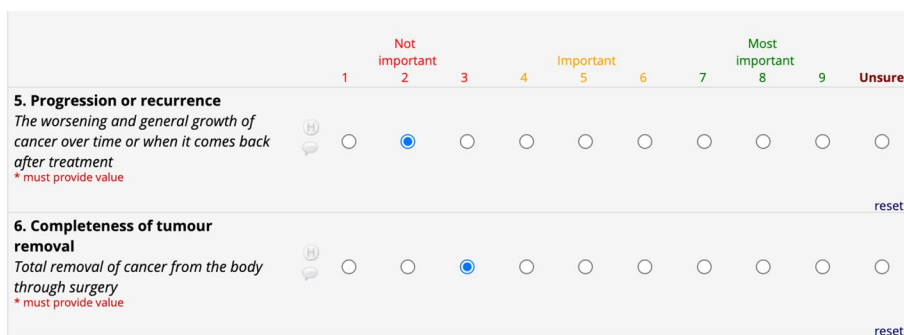


Fig. 1 Standard REDCap display routinely available to be used for preference (rating) responses

In a Delphi survey, sometimes the provision of feedback from the previous survey round involves presenting both individual feedback together with group responses. Controlled feedback gives insight to the individual participant about a response trend and allows them to change their response if needed [14]. Other groups have used REDCap alongside emails with reports of the first stage responses [15]; however, we report integration of rating displays, both for an individual of their previous responses and for the combined responses of other responders by groupings.

Our research team at the Oxford Clinical Trials Research Unit (OCTRU) conducted a two-round modified Delphi survey investigating which generic clinical trial concepts would be most useful to create into animated explainer videos—the EXPLAIN project [16]—as part of this survey our group created new functionality in the form of a REDCap Plug-in to enable the display of data collected in our Delphi survey. Round one data was collected using a standard REDCap form—where multiple topics were presented and respondents were asked to rate the importance of each topic on a scale of 0–10.

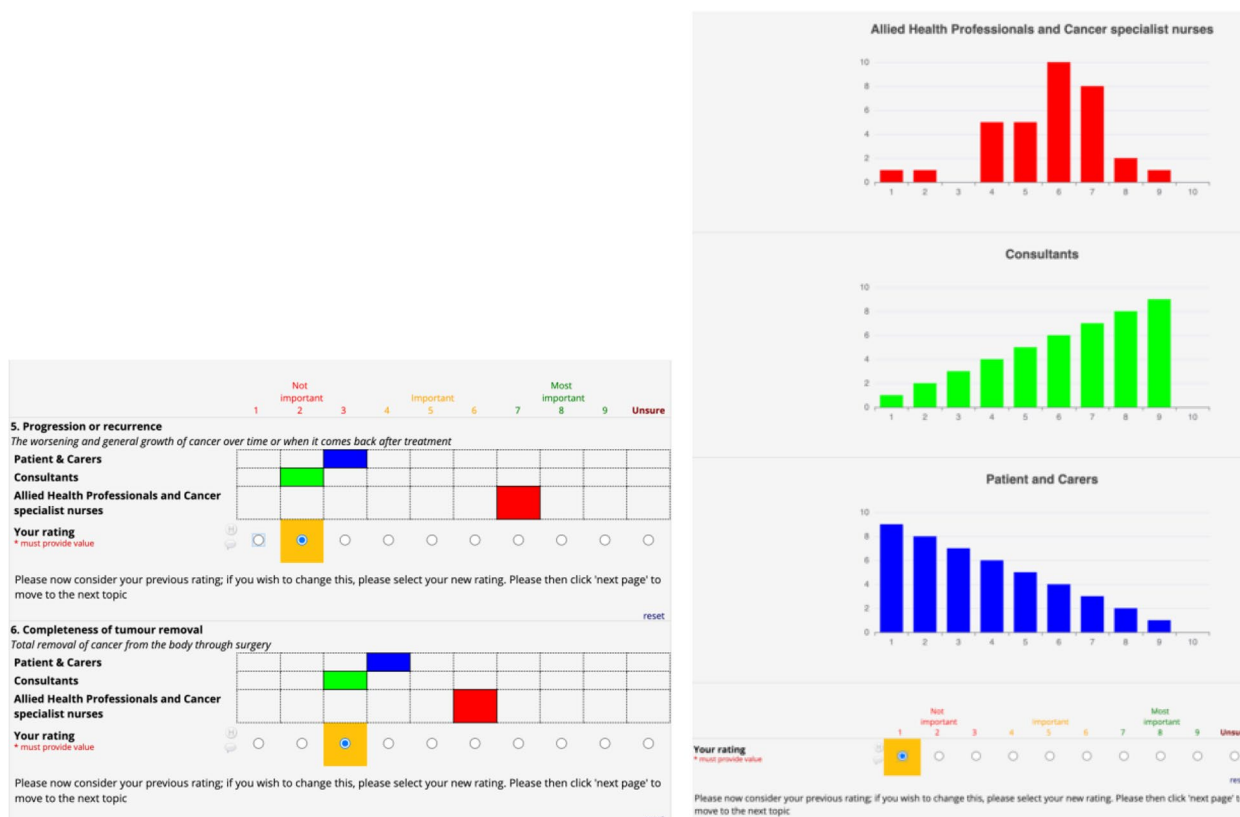


Fig. 2 Displays used in round two to be able to display clearly previous own rating and those from different groups. The figure to the left shows an example of only showing a single average response from each stakeholder group. The figure to the right shows an example of the distribution of responses

For round two, however, we wanted to show respondents their previous score for each topic as well as the mean score for each topic as rated by a) all respondents in each stakeholder group (respondents were asked in the survey to select a category that best described their clinical trial experience/role) and b) by all respondents. We note other groups have displayed data at the second stage—but we can only find in the published literature one mention of including a figure illustrating an aggregated response [17].

OCTRU Delphi REDCap Module (Plug-in)

Figure 1 shows a standard display from REDCap when a horizontal Likert scale is used to collect preference (rating) responses.

In the development of this OCTRU REDCap module, the above display functionality was incorporated into new functionality (mechanism) that allowed the display of both an individual participant's previous response for each topic as well as the mean score for the other stakeholder groups. Respondents were able to either retain their previous rating of each topic or revise this after reviewing the responses from the different stakeholder groups given in the previous round.

This module must be configured by hand (full details can be found at https://github.com/dappelbe/REDCap_DelphiModule/blob/main/README.md) with any required calculations for presenting scores performed in Microsoft Excel or similar software to determine the averages or distributions to be displayed to the end-user. In our survey, the topic scores and stakeholder groups were calculated using Excel. Once the display option had been decided by the research team, each question within the REDCap survey was configured individually using a REDCap action tag. This action tag was used to specify the display type, stakeholder group name, stakeholder group value(s), stakeholder group display colour and the field containing the user's previous answer.

Since the initial use of this module for the EXPLAIN Study [16] it has been further enhanced to facilitate the following display options: Only displaying the average value for each stakeholder group (as per Fig. 2 (left)) and a bar chart display of the distribution of results from the previous round (as per Fig. 2 (right)). Both options work with single radio button type questions (a configuration whereby one question has one set of inputs) and matrix type questions (a grid of questions that share the same response options) within REDCap.

The authors have uploaded this functionality to be available to all REDCap users via the REDCap External Module repository and is called within the Repository

'REDCapDelphi' or via GitHub—https://github.com/dappelbe/REDCap_DelphiModule.

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Authors' contributions

DA conceived the idea for the external module and wrote it. VB drafted the letter. CC led the user testing and implementation of the module on the EXPLAIN project, a real-world application. All authors read, commented and approved the final manuscript.

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Data availability

There is no data to be shared; the software created is freely available from the GitHub repository https://github.com/dappelbe/REDCap_DelphiModule or the REDCap External Module repository.

Declarations

Ethics approval and consent to participate

Not applicable.

Consent for publication

Not applicable.

Competing interests

The authors declare that they have no competing interests.

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