Adult and Health Services and

Children and Young People's Services

Step 5 - A simple guide to developing surveys and questionnaires

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Introduction

The key to obtaining good data through a survey is to develop a good survey questionnaire. Whether you are conducting interviews or mailing out surveys, you will need to know how to design a good survey questionnaire.

1. What is a survey questionnaire?

Survey questionnaires present a set of questions to a subject who with his/her responses will provide data to a researcher. On the surface, it seems a fairly simple task to write up a set of questions to collect information, but there are many pitfalls that should be avoided to develop a good survey questionnaire. We will focus here on describing some of the key elements in designing a survey questionnaire, and then highlighting some tips and tricks to for creating a good survey questionnaire.

2. Objectives

The key to developing a good survey questionnaire is to keep it short while ensuring that you capture all of the information that you need. This is not an easy task. Before you even begin to design your survey questionnaire, you should develop a set of objectives for your research and list out the information that you are trying to capture. This list of objectives and research goals will serve as your plan for the survey questionnaire.

Now that you know what you are looking for, you can begin to structure the questions that will help you capture the information. Once you have developed your survey questionnaire, you can use your objectives to go back through the questions and determine if each of the questions is providing you with information that you need. Any question that is not providing necessary information should be removed.

3. Types of questions

There are two different types of questions that can be used to collect information. The first is called a structured or fixed response question and the second is called non-structured or open question. It is important to understand when and how to use these questions when designing your survey.

3.1 Structured (fixed response)

Structured questions are questions that offer the respondent a closed set of responses from which to choose. Structured questions make data collection and analysis much simpler and they take less time to answer. Structured questions are

best suited in the following situations: (1) when you have a thorough understanding of the responses so that you can appropriately develop the answer choices (2) when you are *not* trying to capture new ideas or thoughts from the respondent.

Examples of structured questions		
Do you have a driver's license? ( ) Yes ( ) No	Which subject do you enjoy the most at school? ( ) Math ( ) Science ( ) English ( ) Foreign Language ( ) History ( ) Government ( ) Art / Music ( ) Other	How many hours a day do you spend doing homework? ( ) 0 to 1 hour ( ) 2 to 3 hours ( ) 4 to 5 hours ( ) more than 5 hours

When writing the selection of responses for a structured question, you should make certain that the list covers **all possible alternatives** that the respondent might select AND that *each of the answers is unique* (i.e. they do not overlap). So for example, in the homework question above, we have included every option on the number of hours (from 0 to infinity). Also, you will notice that we were careful not to overlap the hours when defining the ranges by stating them as "0 to 1 hour" and "2 to 3 hours" rather than saying "0 to 1 hour" and "1 to 2 hours".

Sometimes, including general catch all responses (such as "Other", "Don't know", "None of the above", etc...) at the end of a list of answer choices will help to ensure that the data you are collecting will be accurate. In the school subject example above, you will notice that the last answer choice is "Other". Since the selection of non-required courses varies dramatically from school to school the option of "Other" helps to ensure that you are capturing the responses that do not fit into the broader subject areas already listed, rather than forcing respondents to select one of the other subject areas. Similarly, adding "Don't know" to a response list for a question that some of the respondents may not be capable of answering will help ensure you are collecting valid data. In general however, you want to use the "Don't know" option sparingly. You should try to ensure that your respondents are capable of answering the majority of the questions on your survey questionnaire.

You should also make sure that all of the answers are *relevant* to the question. Irrelevant responses may distract the respondent in addition to adding unnecessary length to your survey questionnaire. Consider the following change to the favorite school subject question.

Example of a bad question with an irrelevant answer choice

Which subject do you enjoy the most at school?
( ) Math
( ) Science
( ) English
( ) Foreign Language
( ) History
( ) Government
( ) Art / Music
( ) Football Practice
( ) Other

If we added a choice of "Football practice", we may find that football practice is someone's favorite "activity" at school, but it is not relevant to this particular question which asks "Which *subject* do you enjoy the most at school?"

Consistency is very important in writing the list of responses. All of the responses should be similar so that no single response stands out to the individual except the answer that is true for them. Consistency simply helps to ensure that you are not leading respondents to a particular answer by making that answer different from the others. It also makes it much easier for respondents to find the answer that is relevant to them. Here's an example using the homework question you have already seen above:

Example of a bad question with inconsistent answer choices

How many hours a day do you spend doing homework?
( ) 0 to 1 hour
( ) 120 to 180 minutes
( ) 4 to 5 hours
( ) more than 5 hours

In this example, the second choice is exactly the same as what we had before, but it is listed in minutes rather than hours making it inconsistent with the other answer choices. Listing answer choices in this way is very confusing for the respondent and makes it more likely that they will provide you with incorrect information.

Sometimes you will be interested in obtaining a person's opinion on a topic, subject, product, event, etc. To capture varying degrees of emotion about a subject, it is best to use either a rating or a ranking question. A rating question asks respondents to explain the degree with which they feel about a certain topic, subject, event, etc. For example:

Example of a rating question
Please describe how you felt about the Homecoming Pep Rally. Unsatisfied (1) Somewhat Satisfied (2) Satisfied (3) Very Satisfied (4) Extremely Satisfied (5)

A ranking question asks respondents to explain how they feel about something by comparing it to other items in a list. For example:

Example of a ranking question
Please rank the following Homecoming activities in order of preference (starting with 1 for your favourite activity). ___Homecoming Pep Rally ___Homecoming Parade ___Homecoming Football Game ___Homecoming Dance

In general, if you are trying to get a respondent's opinion about something, it is best to have them do a rating rather than a ranking. A ranking asks respondents to list their responses in order of preference. This type of question leads you to an answer where the respondent is comparing one thing to another rather than giving you their feeling about each individual item. The disadvantage to a ranking is that if the respondent feels the same about two or more items, they are still forced to sort them into a ranking. The results of a ranking basically tell you which is the most preferred and which is the least preferred item on the list, but you do not know from a ranking if the respondent likes or dislikes any or all of the items on the list.

3.2 Non-structured (open-ended)

Non-structured questions, or open-ended questions, are questions where there is no list of answer choices from which to choose. Respondents are simply asked to write their response to a question. Here is an example:

Example of a non-structured question
What do you like best about the Science Buddies Classroom Scientists Program? _____ _ _____ _

It is best to use non-structured questions when you are exploring new ideas and you don't really know what to expect from the respondents. In some situations, you may have a partial list of answer choices, but you may still have some doubt or uncertainty about other possible responses. You can create a partially structured question such as the following:

Example of a partially structured question
Why did you sign up for the Science Buddies Classroom Scientists Program (please select all that apply)? ( ) I really enjoy science ( ) My teacher asked me to sign up ( ) My teacher made me sign up ( ) My parents asked me to sign up ( ) I'm bored in science class & thought this would be fun ( ) I thought it would help me do a better project ( ) I thought it would help me win the Science Fair ( ) I thought having a Mentor to talk to would be fun ( ) I knew other students who were doing it ( ) Other _____

Open-ended questions let you get more insight into the respondents' thoughts and ideas about a subject. As we have already mentioned, open-ended questions are useful when you are trying to capture new ideas or information for which you have no basis to develop an all-inclusive set of structured responses. The disadvantages to using open-ended questions is that it can be much more time consuming and difficult to analyze the data. In general you should try to minimize the number of open-ended questions in your survey questionnaire. If you find yourself designing a survey questionnaire where the majority of the questions are open-ended, then you may need to do more exploratory research to get a better foundation of knowledge for the subject you are researching.

4. Tips to creating a good survey questionnaire

Here are some tips and tricks to help you ensure you are developing a good survey questionnaire:

- Clearly state your intentions with the research.

  Many people are hesitant to answer questions about themselves and their opinions. If you are developing your survey for a science fair project, people will probably be more willing to help if you clearly state your intentions. At the top of your survey, write a brief statement explaining why you are collecting the information and reassure each respondent that the information is entirely anonymous. If you need to know specifics about a person, respect their privacy by identifying them as subject1, subject2, etc.

- Include instructions with your survey questionnaire

  What may seem obvious to you probably is not very obvious to someone else. To ensure that you collect valid survey results, make sure you include instructions on how to answer the survey questionnaire. There should probably be a short introductory set of instructions at the top of the survey questionnaire, and additional instructions for specific questions as needed.

  Your overall instructions may be something like:

  Please mark the appropriate box next to your answer choice with an "x" (X). Please answer all of the questions to the best of your ability.

- Don't ask for personal information unless you need it.

  Asking individuals to provide you with personal or demographic information (age, race, income level, etc.) may irritate some respondents and prevent them from completing your survey questionnaire. However, in many instances, this information is necessary for the research. If you need to ask for this type of information it is best to place the questions at the END of your survey questionnaire.

- Keep the questions short and concise

  The wording for survey questions should be short and concise. Each question should be clearly stated so that there is no misunderstanding about what is being asked. The best way to ensure your questions are well worded is to test them by having other people review and test your survey before you distribute it to the full sample.

- Ask only one question at a time (the double barreled question)

  This is a very common mistake in survey questionnaires and one that will severely impact the results of your data. When you are writing a question, you must make sure that you are only asking one question at a time. Here is an example of a double-barreled question:

Bad Question: Double-barrelled Question	**Good Question**
How have teachers and students at your school responded to the new 45-minute lunch period? ( ) Satisfied ( ) Unsatisfied	How have <u>teachers</u> at your school reacted to the new 45-minute lunch period? ( ) Satisfied ( ) Unsatisfied How have <u>students</u> at your school

	reacted to the new 45-minute lunch period? ( ) Satisfied ( ) Unsatisfied

You notice that the double-barreled question is asking about teachers AND students. This means that a "satisfied" response could mean any of the following:

- Teachers are satisfied
- Students are satisfied
- Teachers and students are satisfied
-

An "unsatisfied" response could mean any of the following:

- Teachers are unsatisfied
- Students are unsatisfied
- Teachers and students are unsatisfied

Since the question was phrased in such an ambiguous way, you will not know what the respondent intended with their response unless you ask them, invalidating your data.

To solve this problem, you simply need to break this question into two separate questions, as shown in the example above.

You will also notice that the two rephrased questions above are very similar and that the key word (which differentiates the two questions) has been underlined. This is a good technique to ensure that the respondents are reading the questions correctly when the structures are so similar.

- Make sure the questions are unbiased

When developing your survey questionnaire, you want to make certain that you are asking the questions in a neutral way, i.e. that you are not leading them toward a particular answer. This may seem simple, but when you are writing questions you will often find that the way you phrase the question may reflect your underlying opinion. Here is an example of a leading question:

Example of a leading question and how to correct it	
Bad question: Leading	**Good question: Neutral**
Do you think that the new cafeteria lunch menu offers a better variety of healthy foods than the old one?	How do you feel about the new cafeteria lunch menu compared to the old one? ( ) The new menu offers a better variety of

( ) Yes ( ) No ( ) No Opinion	healthy foods ( ) The old menu offers a better variety of healthy foods ( ) The selections are similar ( ) No opinion

The leading question drives the respondent to the conclusion that the new menu is healthier than the old. A yes response to this question is the easiest, and many respondents may simply take the path that requires the least amount of thinking. The neutral question presents a better way to phrase this question by removing the bias.

- Ask questions that can be answered by your subjects

Make sure that the questions you are asking are questions that people will be able to answer. The most common mistake is to ask questions that most people simply cannot remember. Here is an example:

How much did you spend on school supplies last year?
( ) £0 - £10
( ) £11 - £20
( ) £21 - £30
( ) over £30

While this question appears to be perfectly acceptable, it is unlikely that many students will really remember how much they spent on school supplies. Most responses will probably be guesses rather than actual numbers, and many respondents may become frustrated trying to calculate in their heads how much they spent. If a guess is all that you are looking for, then simply rephrasing the question to the following will make it much easier for the respondent.

How much do you estimate you spent on school supplies in the last year?
( ) £0 - £10
( ) £11 - £20
( ) £21 - £30
( ) over £30

- Order/group questions according to subject

If you have more than six questions in your questionnaire, then you should make an effort to organize your questions so the respondents can answer them as quickly as possible. A good way to organize the questions is to group them together by subject. This way your respondents can focus their thoughts and answer a series of questions around these thoughts.

- Test the survey questionnaire

  Once you have developed your survey questionnaire, you should conduct a small test (5 -10 people) to make sure that respondents clearly understand the questions you are asking and that you are capturing the information that you need for your study.

- Present the questions in a clean and organized layout

  A clean layout will make it much simpler for people to respond to the questions and for you to collect the data. Make sure that your method for marking answers is well explained and that your answer boxes are consistent throughout the questionnaire. See the following sample survey questionnaires from Science Buddies.

Sample Survey 1 - Advisor Survey

Please answer the questions to the best of your ability, then click on the "Submit Survey" button at the bottom of the form. Please complete the survey one time only. If you have additional thoughts at another time, please email them to us separately. If a field is too small to hold your comments for a question, there is a "General Comments" question that has plenty of room.

We'll share with you the key results from this survey in our newsletter.

1. How would you characterize your overall experience in the Science Buddies program taking into account everything including the application process, training, communication with staff, the Command Center, and, of course, the actual work with your team?

   - ○ Excellent
   - ○ Very Good
   - ○ Good
   - ○ Fair
   - ○ Poor

2. Why did you sign up for Science Buddies? (check all that apply)

   - ☐ I really enjoy science
   - ☐ I considered it a way to "give something back" to the community
   - ☐ I thought it would be fun
   - ☐ I enjoy working with and helping young people
   - ☐ I knew other people who were doing it
   - ☐ I wanted the opportunity to interact with professionals that had backgrounds in a field of interest to me

   Other ____

3. Would you participate in Science Buddies again?

   - ○ Yes
   - ○ No

4. Would you recommend Science Buddies to a friend?

- ○ Yes
- ○ No

5. Did you feel adequately prepared (trained) to help the students with their projects?

- ○ Yes
- ○ No, I needed more training on how to mentor someone
- ○ No, I needed more training on doing a science fair project
- ○ No, I needed more training on _____

6. Compared to your expectations before you began to work with your Investigator, how would you characterize the skill level of your Investigator (i.e., his or her ability to successfully complete the Science Buddies program)?

- ○ Above my expectations
- ○ About what I expected
- ○ Below what I expected
- ○ I didn't know what to expect

7. My Investigator (check all that apply):

- ☐ Was an active participant
- ☐ Was not an active participant
- ☐ Was easy to communicate with
- ☐ Was difficult to communicate with
- ☐ Followed my suggestions
- ☐ Did not follow my suggestions

Other _____

8. In what part of the project do you feel you were able to offer the most help?

- ○ Choosing a question
- ○ Helping with research of the topic
- ○ Designing the experiment
- ○ Performing the experiment
- ○ Analyzing the experimental results

9. How did you decide when to offer guidance to your Investigator about how to find an answer versus when to simply give the answer?

10. Do you feel that you were able to offer your Investigator all the help he or she needed?

- ○ Yes
- ○ No, because I didn't have enough knowledge of his subject area
- ○ No, because I didn't have enough time
- ○ No, because I couldn't actually see what he or she was doing
- ○ Other

11. What parts of the Science Buddies Web Site did you use? (check all that apply)

- ☐ "Discussion Board" (the page where you talk to your teammates)
- ☐ "Assignment Folder" (the page with the timeline and the place to upload assignments)
- ☐ "Mentor/Advisor Forum" (the page where the staff posts daily answers to common Mentor and Advisor question as well as various program information)
- ☐ "Add/Edit Profile" (to post your picture and brief personal introduction)
- ☐ "Who's Online" (tells you whether any of your teammates are online right now)
- ☐ "How to Do a Science Fair Project" (which included separate pages for choosing a topic, researching a topic, variables, sample project, etc.)
- ☐ "Links" to science fair project ideas

- [ ] "Science Fair Gallery" (pictures of fairs)
- [ ] "About Us", "History & Mission", or "Sponsors"

12. How did you find the information on the Science Buddies Web Site? (check all that apply)
    - [ ] Easy to understand
    - [ ] Hard to understand
    - [ ] It was easy to find what I wanted
    - [ ] It was difficult to find what I wanted
    - [ ] I didn't use it enough to say

    Other

13. Did you use the timeline in the Assignment Folder to help you plan your Investigator's project?
    - ( ) Yes
    - ( ) No, I never saw the timeline
    - ( ) Not exactly, but it was useful in helping me remind my Investigator that he or she had a lot of work to do
    - ( ) No, because it had the wrong dates from the very beginning (the team started work well after the timeline start date)
    - ( ) No, because

14. What improvements would you like to see made to the Science Buddies Command Center? (check all that apply)
    - [ ] Don't log me off if I'm in the Command Center, but inactive for an extended period of time
    - [ ] The ability to group the discussion board posts by subject line (also known as "threaded messaging"), rather than just by post date
    - [ ] The ability to have the feedback form open while having the Investigator's assignment open at the same time (e.g. have two windows open so I can see their work while I compose my feedback on it)
    - [ ] If my Investigator posts several messages or assignments within a short period of time, send me just one e-mail alert, instead of one for each action

- [ ] Add a "no response necessary" option to the Assignment Feedback form
- [ ] A way for the Mentor and Advisor to communicate privately on the Command Center without the Investigator seeing
- [ ] The ability to post questions and/or advice of my own to the Mentor/Advisor Forum (e.g. the Mentor/Advisor forum would become a place where Mentors and Advisors could talk to each other rather than only being a place where the staff can post messages)

Other

15. Where did you do most of your communications with your Team?
    - ○ Computer at school or work
    - ○ Computer at home

16. How often do you check to see whether you have e-mail?
    - ○ A couple times a week
    - ○ Once a day
    - ○ More than once a day
    - ○ Every hour
    - ○ Continuously

17. Did your Investigator's project come out better than it would have without your help?
    - ○ Yes
    - ○ No
    - ○ Maybe

18. What was the best thing about the Science Buddies program? What gave you the most satisfaction?

19. What was the worst thing about the Science Buddies program?

20. Would you be interested in receiving an e-mail newsletter throughout the year, similar to the one we have during science fair season, that contained information on (check all that apply):

- ☐ General news about the Science Buddies program
- ☐ Advice/tips on being a good Mentor or Advisor
- ☐ Science lectures or events in the Bay Area
- ☐ Tours of scientific facilities like biochemistry labs, astronomical observatories, & particle accelerators
- ☐ Science clubs in the Bay Area
- ☐ Summer programs in science for high school students
- ☐ Science competitions
- ☐ Exhibits at local museums

Other

- ☐ I wouldn't be interested in such an e-Newsletter

21. Would you be interested in having Science Buddies sponsor any of these events where you could meet other Mentors, Investigators, and Advisors (check all that apply):

- ☐ Talks by prominent scientists, engineers, or astronauts
- ☐ Tours of scientific facilities like biochemistry labs, astronomical observatories, & particle accelerators
- ☐ Tours of local museums
- ☐ A pizza party with a science program of some kind
- ☐ A pizza party with just pizza (and something to drink)

Other

- [ ] I wouldn't be interested in attending such an event

22. General comments:

23. There needs to be a balance between help originating with you, the Advisor, versus help originating with the Mentor. Our original intent was that the Advisor was a "back stop" to monitor the traffic between Investigator & Mentor, and help or correct only occasionally. Were you ever in doubt about when to "jump into" a conversation originated by the Mentor?

- ○ Yes
- ○ No

Some teams had more than one Mentor. For the next two questions, please answer according to your opinions about the *most active* Mentor on your team.

24. In comparison to the time and effort you contributed to mentoring your Investigator, how would you characterize the time and effort your Mentor spent?

- ○ My Mentor spent more time and effort than I did
- ○ We spent about the same amount of time and effort
- ○ My Mentor spent less time and effort than I did

25. How would you characterize your team's Mentor? (check all that apply)

- [ ] Was slow to answer questions
- [ ] Was quick to answer questions
- [ ] Participated too little
- [ ] Participated too much
- [ ] Participated just the right amount
- [ ] Gave encouragement
- [ ] Did not give encouragement

- [ ] Gave us helpful & understandable advice
- [ ] Did not give us helpful & understandable advice
- [ ] Was easy to communicate with
- [ ] Was difficult to communicate with

Other

26. What is the most important improvement we could make to the Science Buddies program?

- ○ Better screening and application process to ensure motivated students
- ○ Better screening and application process to ensure students have necessary skill level
- ○ Additional features or changes to the functionality of the Command Center
- ○ Other

27. *Ask an Expert* is an online bulletin board staffed by volunteers who offer help to anyone and everyone's science fair project questions (from students not in our mentoring program). We established Ask an Expert as an experiment this year, and we were so pleased with the results that we plan to expand the program next year. Volunteers on Ask an Expert will work with a larger number of students, but generally in less depth than with our existing mentoring program. We also plan to organize Ask an Expert so that the time commitment is less than that required for mentoring. Would you be willing to serve as an expert?

- ○ Yes, I would be willing to serve as an Expert IN ADDITION to being an Advisor for my own team(s)
- ○ Yes, I would be willing to serve as an Expert INSTEAD of being an Advisor
- ○ No

28. With our program growing from 30 students to over 500 students in just two years, we discovered that it is difficult for our small staff to personally monitor so many teams. In order to handle as many students as possible, one idea we actually experimented with this year is to create a new volunteer role of Advisor "supervisor". An Advisor supervisor reviews somewhere between 5 & 10 teams on a regular basis, reporting any deficiencies to the Science Buddies staff for resolution. This entails logging into Command Centers, reading discussions, briefly looking at assignments, and monitoring the teams' progress and interaction (but not having to actually do any mentoring). We estimate this takes

about an hour a week. Would you be willing to participate as an Advisor "supervisor"?

- Yes, I would be willing to serve as an Advisor supervisor IN ADDITION to being an Advisor for my own team(s)
- Yes, I would be willing to serve as an Advisor supervisor INSTEAD of being an Advisor
- No

Sample Survey 2 - Teacher Resources Survey

Dear Teachers,

Thank you for visiting the Science Buddies website. We are continuously searching for ways to provide additional resources to science teachers. Please answer the following questions so we can continue to improve our online science resources.

1. What is your occupation?

   - ○ Student
   - ○ Teacher
   - ○ Parent

2. What were you looking for when you came to the Science Buddies website (check all that apply)?

   - ☐ Class handouts on how-to do a science fair project
   - ☐ Class handouts specific to one area of doing a science fair project
   - ☐ Information on how to set up and run a science fair at my school
   - ☐ Information on science fair judging
   - ☐ Ideas on how to challenge my best students
   - ☐ Science fair project ideas
   - ☐ Ideas for in class experiments
   - ☐ Materials for class experiments
   - ☐ Basic information on the scientific method
   - ☐ Mentors for my students
   - ☐ Lesson plans
   - ☐ Help with a science question

   Other (Please specify) _____

3. Do you have computers with internet access in your classroom?
   - ○ Yes, we have one computer, for my use, with internet access.
   - ○ Yes, we have computers with internet access for the students.
   - ○ No, we do not have internet access in the classroom.

4. Which grade level do you teach?
   - ○ K-5
   - ○ 6th
   - ○ 7th
   - ○ 8th
   - ○ 9th
   - ○ 10th
   - ○ 11th
   - ○ 12th

5. Which area of science do you teach (check all that apply)?
   - ○ Earth / Environmental Science
   - ○ Biology
   - ○ Physics
   - ○ Chemistry
   - ○ General Science

   Other (Please specify) _____

6. Please enter your post code:

Credits Source

Parasuraman, A. Marketing Research - 2nd Edition. Addison-Wesley Publishing Company, Inc., 1991.

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