EngineeringUK

Using surveys to evaluate your STEM outreach programme

Evaluation shared practice guide

This guide

This guide provides an overview of how to design effective evaluation surveys for your STEM outreach activity. It will cover:

- Why use surveys as an evaluation tool?
- What to consider when planning your survey
- How to write effective survey questions
- Different types of survey questions
- Example survey questions
- What to include in your survey information page

Why use surveys as an evaluation tool?

There are a number of benefits of using surveys to evaluate your STEM outreach programme over, or alongside, other evaluation methods. For example, surveys can:

- Be used to evaluate both digital and face-to-face STEM activities
- Be developed and administered in a relatively short time
- Collect a lot of data in a cost effective and efficient way
- Be administered on mobile devices, tablets, laptops or via an online survey link (avoiding inefficiencies with paper-based data collection)
- Be designed to collect participant responses anonymously
- Collect a broad range of data (e.g. respondents' attitudes, opinions, behaviours, demographic characteristics)
- Be standardised to compare data over time, between programmes, or between groups of individuals
- Be analysed using statistical techniques to determine validity, reliability, and statistical significance, including the ability to analyse multiple variables at once.

Further reading:

Snap Surveys. 'Advantages and Disadvantages of Surveys'.

What to consider when planning your survey

There are a number of things you should consider when planning your survey and deciding how to use it most effectively. Before you start designing your survey, ask yourself:

- **What am I trying to find out?** – Deciding the primary objectives of your evaluation will help you to identify which questions to include and which to leave out.
- **Who will be answering the questions?** – If your target group is young people who have participated in your STEM outreach programme, try to capture survey responses from a wide range of respondents within that group. You should tailor the questions and format of the survey to be appropriate for that age group. You may also want to test respondents' familiarity with the topic before you ask about their experience or view of it.
- **Is the survey standalone or part of a series?** – If the survey is to be replicated (e.g. as part of a pre/post evaluation design) you will want to ensure that the questions are sufficiently comparable.
- **What order should the questions be in?** – Questions should follow a logical order rather than jumping about from one topic to another. You can make your survey

easier to follow by breaking it up into key sections or themes. Sometimes it's helpful to put harder or more sensitive questions towards the end of the survey.

- **Will the questions provide useful information?** - A question mapping exercise where you link each question onto the objectives for the survey can often be helpful to ensure that all questions are relevant and will contribute to collecting useful information.
- **How long does the questionnaire need to be?** – Only ask the questions you need to fulfil your primary evaluation objectives as overly long questionnaires can be off-putting to respondents.
- **What will I need to report?** – Consider how the resulting data will be analysed and what you would like to share with your team. For example, the response categories you offer will have implications for the analysis that can be done afterwards.
- **Is my survey GDPR compliant?** – Consider the type of data you're collecting (whether it is personal or sensitive, how it will be stored, etc.) and speak to your data compliance officer before administering the survey to ensure you are following GDPR rules.

Further reading:

National Foundation for Educational Research. 'How to… develop a questionnaire survey: Ask the right questions'.

Snap Surveys. '6 areas to consider when developing a survey project plan'.

How to write effective questions

To elicit responses that will provide you with helpful information, it is important to ask your questions in an effective way.

- **Keep questions short** and use age-appropriate language.
- **Avoid using technical language**, acronyms, abbreviations or jargon (e.g. don't assume that all young people will know what STEM means).
- **Avoid phrasing questions negatively** as this can be confusing (e.g. to what extent to you agree or disagree that the activity was not too long?)
- **Avoid double barrelled questions** that ask respondents about more than one thing. If a single question has two subjects, it's impossible to tell how the respondent is weighing the different elements involved (e.g. 'Did you like the activity and feel you learned a lot from it?')
- **Avoid loaded questions** that presume something about the respondent that may not be the case (e.g. 'Where do you typically look for careers information about engineering?' assumes that respondents do in fact search for this information).
- **Avoid leading questions** that may draw respondents to what looks like the 'correct' answer (e.g. 'Did you enjoy our excellent activity?')
- **Be aware of biases** as young people can be particularly susceptible to some biases; for example, 'social desirability bias', which is the tendency to answer questions in a way they think will be viewed favourably by others.
- **Read the questions out loud** to test if the order and wording of the questions seems natural or should be amended.
- **Test understanding and clarity** with a small group of the target audience (if possible) to ensure questions are understood as intended, and response options are appropriate.

Further reading:

UKDS. 'Evaluating Survey Questions'.

CEBM. 'Catalogue of bias'.

Scottish Government Social Research Group. 'Cognitive Testing in Survey Questionnaire Design'.

Types of questions

It is important to consider the types of questions you will be asking and the kinds of data that will be generated from these questions. Some questions can elicit wordy text responses, while others generate data which can be translated into numerical values. Both require different methods of analysis and presentation.

Multiple choice questions

Multiple choice questions provide respondents with a list of answers to select from. The data resulting from these questions is relatively easy to analyse because all respondents choose from the same possible answers.

It is important to make sure the response options:

- Are comprehensive, reflecting the full range of possible answers to the question
- Are ordered in a logical way
- Are mutually exclusive; i.e. that it is impossible for more than one response to be true at the same time
- Include a 'don't know' or neutral option so that respondents don't feel they have to select an option if they don't know the answer or have a neutral opinion on the subject.

There are two main sub-types of multiple choice questions. Single-answer questions allow one and only one answer to be chosen by providing radio buttons next to the answers. For example:

> Did you talk to anyone during the activity about one day having a career in engineering?
>
> - Yes
> - No
> - Don't know

Multiple-answer questions allow one or more answers to be chosen by providing check boxes next to the response option.

For multiple-answer questions:

- Respondents should be given instructions on how many response options to select e.g. 'tick all that apply' or 'select a maximum of 3 answers'
- You should include what you think will be the most frequent responses and, if the list is becoming overly long, add a catch-all option such as 'other' and ask respondents to specify their response.

Can you tell us the reason(s) for taking part in this event? Please select all that apply.

- My school arranged for my entire class or year group to take part
- My after-school or out-of-school club (e.g. STEM club, Girl Guides, Scouts) arranged for me to take part
- My parent or guardian arranged for me to take part
- I asked to take part because I am interested in science, engineering, technology or maths
- I was selected to take part because I do very well in science or maths
- I was selected to take part because I don't do very well in science or maths
- My friend was taking part and I came with them
- Don't know
- Other (please specify) _____

Response scales

Multiple choice questions often provide a range of response options ordered in a scale and ask respondents to pick the one that most closely matches their position on an issue.

For example:

- Respondents' agreement or disagreement with a statement
- Their level of satisfaction with something
- How they would rate something
- How likely they are to do something in the future.

The most widely used scale is known as a Likert scale. These are typically 5- or 7-point scales that offer a range of answer options from one extreme attitude to another, like 'Extremely likely' to 'Not at all likely'.

Typically, response scales include a moderate or neutral midpoint which should be defined.

When designing questions on scales it is important to keep the direction of the scales the same across the survey. It is generally good practice to go ascending e.g. from 'Not at all likely' to 'Very likely' to follow left-to-right reading.

Example:

How interesting or uninteresting did you find the activity?

- Not at all interesting
- Not very interesting
- Neither interesting nor uninteresting
- Quite interesting
- Very interesting
- Don't know

Open text questions

Open text questions allow respondents to give any answer rather than pick from a list of options. They are helpful if you are aiming to collect rich and detailed feedback or if the evaluators do not know the full range of relevant response categories. The types of

analysis required for open text data will be different, since this type of question will generate text rather than numeric data.

The downsides of open text questions can be:

- They are more time consuming for the respondent to complete and the researcher to analyse.
- Responses may be irrelevant to the research objectives.
- It is harder to form generalised conclusions.
- It is harder to compare findings over time, between programmes, or between groups of respondents.

Example:

We're interested in hearing about what you think of the activity. Please use the space below to tell us what, if anything, you enjoyed when taking part:

_____

Further reading:

SurveyMonkey. 'Types of survey questions'.

UKDS. 'Likert items and scales'.

Evaluation question examples:

Listed below is a selection of example evaluation questions that you may wish to choose from and adapt to help you gather data about young people's experience of your programme or activity. You will need to think up response options that are relevant to your programme or activity.

- How enjoyable have you found the <programme/activity> overall?
- Did you meet any <engineers/scientists> at the <event/activity>?
- Did you talk to anyone at <programme/activity> about one day working in <sector/organisation>?
- How useful did you find talking to someone at the event about one day working in <sector/organisation>?
- To what extent do you agree or disagree with the following statement: I learnt a lot by taking part in<insert event/activity>?
- To what extent do you agree or disagree with the following statement: Taking part in <event/activity> has inspired me to work in <sector/organisation> in the future?
- To what extent do you agree or disagree with the following about<programme/activity>: It made me feel that a job in <sector/organisation> would be interesting?
- After taking part in <programme/activity>, how much would you say you know about what people working in <sector/organisation> do?

Methods of collecting data

Depending on the size of your team and the resources you have available, there are a number of ways of collecting evaluation data:

- **Online surveys** – Survey data can be collected by sending out links to online survey platforms (e.g. SurveyMonkey). You may want to consider how and when to administer the survey (e.g. during the event, sending a link out immediately afterwards in the or days/weeks following). It's helpful to think about timing as collecting retrospective data can result in recall bias if left too long.
- **Mobile devise or tablet** – These devices can either be fixed to a stand or 'roving', facilitated by a team member. There are many survey software options that will make designing, collecting and processing your data easier. Consider options where survey responses can be collected without connection to the internet.
- **Paper questionnaires** – These are a good option if you do not have tablet or mobile devices available; however, they often require more effort in terms of data input and processing.

Check with your data compliance officer to ensure that you store, process and destroy data correctly.

> Further reading:
>
> Research Connections. 'Data Collection'.

What to include in the survey information page

The first page of your survey should contain the following information:

- **What the survey is about** – Provide a statement of who you are, what the objectives of the survey are and what you will be asking respondents to do.
- **Who can participate** – Outline the criteria for eligibility (e.g. age range or year groups).
- **How long the survey will take** – Give an estimated time range (e.g. 3-5 minutes).
- **Survey closing date** – Let respondents know when data collection will close.
- **Do I have to take part in this survey?** – Make respondents aware that participation is optional, and they are free to change their mind during the survey.
- **What will you do with the information about me?** – Consult your Data Compliance Officer to make sure you include all necessary information, including letting participants know how you will be collecting, storing and processing their data, and ensuring this is compliant with data protection laws.
- **Further information** – Provide respondents with any other relevant information (e.g. details of a prize draw if applicable).
- **Contact details** – You should provide details of who to contact and how to get in touch if the respondent has any questions about the survey.