

How to Use Qualtrics and Measuring Margin of Error

Chelsea Green
October 14, 2021

Agenda

- Time to build your survey: a brief how-to on Qualtrics
- What is margin of error?
- In-class activity

Time to build your survey: a brief tutorial on Qualtrics

Qualtrics is a platform well-designed for fielding academic surveys.

Features include: extensive flexibility for question logic and exporting collected data.

Harvard students have **free** access to this [platform](#).

Time to build your survey: a brief tutorial on Qualtrics

The screenshot displays the Qualtrics user interface. At the top left, the 'XM' logo is followed by a hamburger menu icon and the text 'Home'. On the top right, there are icons for help, notifications, and a user profile. A notification banner at the top center reads: 'You're currently previewing the new Home and Projects page experience. [Switch back](#) or [Leave Feedback](#)'. Below this, a blue banner promotes a 'Use the survey flow to customize participant experiences' course with a 'Watch Video' button. The left sidebar contains a 'Welcome to XM' message, a settings gear, and a 'Recently visited' section with a 'See all projects' link. Under 'Survey', there is an entry for 'Climate Pipeline Fall 2021 ...' with '103 Responses' and an 'Active' status. At the bottom of the sidebar, a blue button labeled 'Create a new project' is highlighted with a red border. The main content area shows 'My active surveys' with a card for 'Climate Pipeline Fall 2021 Registration' featuring '103 responses' and '-56% WoW'.

Time to build your survey: a brief tutorial on Qualtrics

The screenshot shows the Qualtrics 'Create a project' interface. At the top, there is a search bar labeled 'Search the catalog'. Below it are five filter buttons: 'All' (highlighted in blue), 'CoreXM & DesignXM', 'CustomerXM', 'ProductXM', and 'BrandXM'. The 'From scratch' section contains a 'Survey' option with a clipboard icon, which is highlighted with a red rectangular border. The 'Guided projects' section is titled 'Start building using a pre-built solution with step-by-step guidance' and contains four project cards: 'Product Concept Testing' (evaluate potential ideas), 'Pricing Study (Van Westendorp)' (identify optimal pricing), 'Product Naming' (find the best name), and 'Brand Awareness & Performance' (assess current state).

Time to build your survey: a brief tutorial on Qualtrics

Create a new project

Survey

Name

Test Project

How do you want to start your survey?

Create a blank survey project



Create project

Cancel

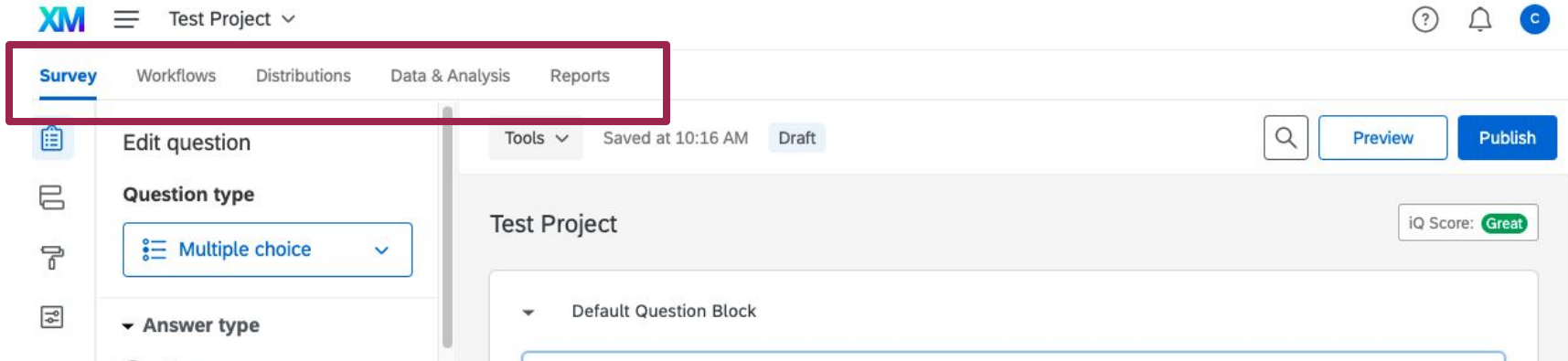
Time to build your survey: a brief tutorial on Qualtrics

The screenshot displays the Qualtrics survey builder interface. At the top left, the XM logo is followed by a hamburger menu and the text "Test Project". On the top right, there are icons for help, notifications, and a user profile. Below the top bar, a navigation menu includes "Survey" (highlighted), "Workflows", "Distributions", "Data & Analysis", and "Reports".

The left sidebar contains a vertical list of icons for editing, a list of questions, a question type selector, and a question type dropdown menu currently set to "Multiple choice". Below this, the "Answer type" section has two radio buttons: "Allow one answer" (selected) and "Allow multiple answers". The "Choices" section shows a "Number of choices" dropdown set to "3", with minus and plus buttons. There is also an "Edit multiple" link and a "Use suggested choices" toggle switch.

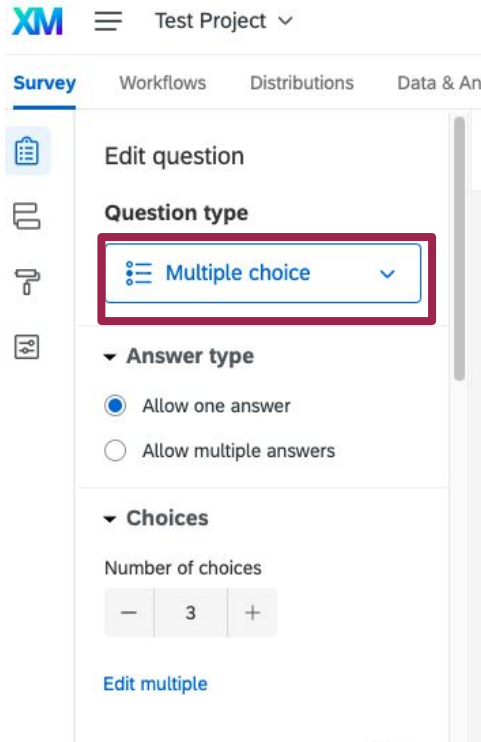
The main workspace is titled "Test Project" and shows a "Default Question Block" containing a question labeled "Q1". The question text area contains the placeholder "Click to write the question text". Below the text area are three choice options, each with a radio button and a placeholder "Click to write Choice 1", "Click to write Choice 2", and "Click to write Choice 3". At the top right of the workspace, there is a search icon, "Preview" and "Publish" buttons, and an "iQ Score: Great" indicator. At the bottom right of the workspace, there are "Import from library" and "+ Add new question" buttons. A blue "Add Block" button is visible at the bottom center of the workspace.

Time to build your survey: a brief tutorial on Qualtrics



- "Survey": edit your survey.
- "Workflows": manage various tasks associated with your project.
- "Distributions": distribute your survey.
- "Data & Analysis": view responses, conduct initial analyses, and download your collected responses for analysis with stronger tools outside of the platform.
- "Reports": View your survey results and create custom reports.

Time to build your survey: a brief tutorial on Qualtrics



Back to editing your survey!

- Qualtrics includes a variety of question types that you can include.
- Click the question type box to select your preferred question type and the options below to customize even further.

Some examples include:

Multiple choice

Survey Workflows Distributions Data & Analysis Reports

Tools Saved at 10:16 AM Draft Search Preview Publish

Edit question

Question type

Multiple choice

Answer type

Allow one answer

Allow multiple answers

Choices

Number of choices

- 3 +

[Edit multiple](#)

Test Project iQ Score: Great

Default Question Block

Q1 ...

Click to write the question text

Click to write Choice 1

Click to write Choice 2

Click to write Choice 3

[Import from library](#) [+ Add new question](#)

Text entry

Edit question

Question type

 Text entry

Text type

Single line

Autocomplete



Response requirements

Add requirements



Add validation



Tools

Saved at 10:56 AM

Draft



Preview

Publish



Click to write the question text



Import from library

+ Add new question

Add Block

End of Survey

We thank you for your time spent taking this survey.

Rank order

Edit question

Question type

Rank order

Choices

Number of choices

3

Edit multiple

Use suggested choices

Format

Drag and drop

Tools

Saved at 10:55 AM

Draft

Preview

Publish

Click to write the question text

Click to write Item 1

Click to write Item 2

Click to write Item 3

1

2

3

Import from library

+ Add new question

Add Block

Slider

Edit question

Question type

 Slider ▼

▼ Slider type

Sliders ▼

▼ Statements

Number of statements

- 3 +

[Edit multiple](#)

Use suggested statements

Tools ▼

Saved at 10:57 AM

Draft



[Preview](#)

[Publish](#)

iQ ⋮

Click to write the question text

	Like	Neither like nor dislike	Dislike
Click to write Choice 1	0	10 20 30 40 50 60 70 80 90 100	
Click to write Choice 2			
Click to write Choice 3			

Additional features: Block options

The screenshot displays the XM survey editor interface. At the top left, the XM logo is followed by a menu icon and 'Test Project'. On the top right, there are icons for help, notifications, and a user profile. Below the header, navigation tabs include 'Survey', 'Workflows', 'Distributions', 'Data & Analysis', and 'Reports'. The left sidebar contains icons for question management and editing. The main editing area is titled 'Test Project' and shows a 'Default Question Block' containing a question 'Q1' with a text input field and three choice options. A red box highlights the 'Add Block' button at the bottom of the question block. The top right of the editing area includes a search icon, 'Preview', and 'Publish' buttons. A 'Tools' dropdown, 'Saved at 10:16 AM', and 'Draft' status are also visible. The 'Question type' is set to 'Multiple choice'. Under 'Answer type', 'Allow one answer' is selected. The 'Choices' section shows 'Number of choices' set to 3. An 'iQ Score: Great' badge is present in the top right of the editing area.

XM Test Project

Survey Workflows Distributions Data & Analysis Reports

Tools Saved at 10:16 AM Draft

Search Preview Publish

Test Project

iQ Score: Great

Default Question Block

Q1

Click to write the question text

- Click to write Choice 1
- Click to write Choice 2
- Click to write Choice 3

Import from library + Add new question

Add Block

Question type: Multiple choice

Answer type: Allow one answer

Choices: Number of choices: 3

Edit multiple

Use suggested choices

What are block options?

- Blocks are sets of questions within your survey. Check out [this](#) page for more details.
- Blocks can also be useful for organizing your questions, particularly should you decide to field a longer survey.
- If you're concerned about question ordering effects, you may also choose to randomize questions *within* blocks.

What are block options?

- Depending on your audience, you may choose to present some respondents with certain blocks and not others.
- You also may choose to **randomly assign** respondents with certain blocks of questions. This can be particularly useful for running survey experiments to test hypotheses!

Eg. Do **social environmental norms** (A) or **financial motivations** (B) better incentivize people to drive less?

Example: using blocks for experiments

Block A contains a question about participants' driving intentions, worded like this:

Our data indicates that individuals from similar backgrounds to yours drive less because they are concerned about the environment. How many hours per week do you intend to spend driving this fall? (enter # of hours)

Block B contains a question about participants' driving intentions, worded slightly differently:

Studies show that driving less saves individuals between \$20 to \$100 per month. How many hours per week do you intend to spend driving this fall? (enter # of hours)

Time to build your survey: a brief tutorial on Qualtrics

Additional features include:

- Requiring responses to certain questions
- Implementing "validation checks" to make sure that individuals taking your survey actually qualify for participation or are paying attention.

Eg. Are you over the age of 18? If the answer is yes, the condition is met and the respondent will be able to proceed through the survey. If the answer is no, you can create a customized message that notifies the individual they are not eligible to participate in your survey.

What is margin of error?

There is a 95% chance that your sample mean is expected to vary this much from the population mean. (Assuming 95% for this presentation, because that's the standard across social science.)

Margin of error is the amount you expect your sample mean to vary from the true population mean.

Eg. There is a 95% chance that 67% of Harvard students believe that climate change is highly concerning, **with a margin of error of $\pm 4\%$** . (this is not actually true - just a pedagogical example!)

Is there a difference between margin of error and confidence interval?

A very slight one, but they are extremely closely related. Let's take our example again: There is a 95% chance that 67% of Harvard students believe that climate change is highly concerning, **with a margin of error of $\pm 4\%$** .

Margin of error: $\pm 4\%$.

Confidence interval: $67\% \pm 4\%$, often written as (63%, 71%).

Confidence level: 95%.

What is margin of error?

The size of your margin of error is a function of your sample size, confidence interval, and sample error.

This is why when creating your own surveys, you want to start by estimating the sample size you need based on the margin of error you're okay with.

Otherwise, you're selecting a sample size and hoping that margin of error will be low enough for your audience to respect it!

When do we care about calculating margin of error?

When you're stuck with a particular sample size (you only have access to a certain number of people) and want to know what margin of error you should expect to see.

Eg. I survey a representative sample of 100 Harvard students. Then, I find in my sample that 67% of Harvard students consider climate change to be highly concerning. What's my margin of error?

There is a 95% chance that 67% of Harvard students believe that climate change is highly concerning, **with a margin of error of \pm ___%**.

When do we care about calculating margin of error?

Let's assume that we are sampling less than 10% of the total population (so we can use the simpler formula, without finite population correction or sampling without replacement correction).

There is a 95% chance that 67% of Harvard students believe that climate change is highly concerning, **with a margin of error of \pm ___%**.

n = sample size

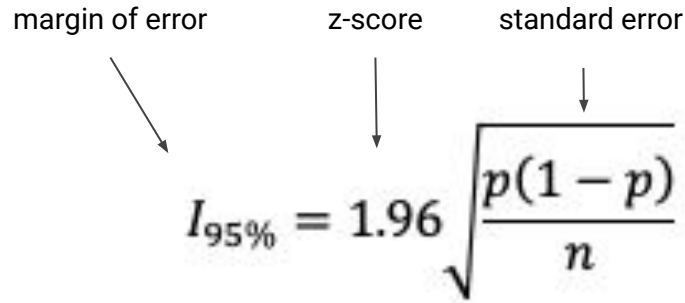
$I_{95\%}$ = margin of error (the interval we are trying to find!)

p = sample proportion

When do we care about calculating margin of error?

Here is the formula for finding the margin of error for a sample proportion:

margin of error z-score standard error



The diagram shows the formula for the margin of error for a sample proportion. Three labels are positioned above the formula with arrows pointing to specific parts: 'margin of error' points to the left side of the equation, 'z-score' points to the number 1.96, and 'standard error' points to the square root term.

$$I_{95\%} = 1.96 \sqrt{\frac{p(1-p)}{n}}$$

In our case, the z-score is 1.96 because we care about calculating the margin of error with a 95% confidence level.

When do we care about calculating margin of error?

Here is the formula for finding the margin of error for a sample proportion:

$$I_{95\%} = 1.96 \sqrt{\frac{p(1-p)}{n}}$$

Since we've already run the survey and collected the data, let's plug in the sample proportion we found (67%, or .67) into the formula for p.

When do we care about calculating margin of error?

Done! We know that we sampled 100 people, so let's plug into into our n:

$$I_{95\%} = 1.96 \sqrt{\frac{.67(1 - .67)}{n}}$$

When do we care about calculating margin of error?

Perfect. Now, let's crunch the numbers and we get...

$$I_{95\%} = 1.96 \sqrt{\frac{.67(1 - .67)}{100}}$$

When do we care about calculating margin of error?

Perfect. Now, let's crunch the numbers and we get...

$$I_{95\%} = .09216$$

Now we can officially say: There is a 95% chance that 67% of Harvard students believe that climate change is highly concerning, **with a margin of error of $\pm 9.216\%$.**

In-class activity

Start creating your surveys! Work with your group to navigate the Qualtrics website, sharing your tips and tricks as you begin crafting survey questions for your research topics.