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# Analysing and understanding your data

## Jisc Student digital experience tracker

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This Guide is designed to help you analyse the responses your students have given to the Digital experience tracker. It covers basic analysis, and includes sections on:

- » Accessing your organisational and benchmarking data
- » Analysing your data: some common operations
  - Your response rate
  - First pass data analysis
  - Making comparisons
  - Calculating significance
  - More about analysing quantitative data (scores)
  - More about analysing qualitative data (free text responses)
- » Working with more than one Tracker survey and with other data sources
- » Visualising and communicating your data

There is a separate *Question-by-Question Guide* that supports analysis and understanding of your findings for each question. The *Guide to Engaging your Learners* has ideas for running focus groups, consultations and other learner-led events to further explore your findings. Both are available from the [Guidance page](#) of the web site.

If you are a reasonably proficient statistician these Guides may not be appropriate. You may still need to consult our [Data mapping guide](#) to help you compare data from different tracker versions. **Note that in 2017/18 we removed the 'don't know' option from some questions due to confusion about how to analyse this data. If you want to compare 17/18 data with data from previous years you will have to remove 'don't know' responses before comparing percentages.**

## Accessing your data

If you are running **more than one version of the Tracker** (e.g. FE, HE or online) you will need to access your data for each Tracker separately.

Before accessing or downloading your data you should have closed your survey in BOS. You should be sure that you have all the responses you need for a representative sample or that you are not going to get more responses, for example by extending the deadline or trying alternative methods to engage participants. If you haven't reached your target number of responses, don't panic. You can still analyse the data, but you'll need to know how accurately your findings reflect the population overall, which we cover in the next section.

The *Guide to using the Tracker in BOS* tells you how to:

- » Access your organisational data in BOS
- » Access your sector benchmarking data in BOS
- » Download your organisational data as a pdf or as a raw data file for further analysis
- » Download partitioned, filtered or grouped data from BOS (data from different learner groups)

Statistical data can be opened in a quantitative analysis program such as **SPSS**, or in a spreadsheet application such as **MS Excel**. For free-text responses consider using a content analysis program such as **nVivo**, or a simple, visualisation tool such as **WordSift**.

### Merging and comparing data between different Tracker versions

You can merge data from more than one version of the 2017-18 Tracker into a single set of responses. For example, you might want to collate responses from your HE and FE learners, either globally or for some of the questions. You could equally decide to keep the responses from different versions (learner groups) separate, and to compare them.

You will be able to compare (but not merge) responses to equivalent questions in last year's tracker, if you used it. Note that the numbering of questions has changed, and you will need to use the **Data mapping guide** to track the equivalent questions. Last year's results were somewhat confused by the inclusion of a 'don't know' option, so you will need to remove 'don't know' responses from that data before comparing it with this year's. There are a small number of questions in the staff tracker that can be compared with equivalent questions in the student tracker(s), if you are trialling that.

## Analysing your data: some common operations

### Your response rate

The first step is to work out how well your responses reflect your target population. If you have gone for a randomised sample, you should aim for a 5% confidence interval. That means if the finding from your sample is (for example) “60% of respondents agreed or strongly agreed” you can say with confidence that between 55% and 65% of the total population would agree (i.e. 5% in either direction). If you have gone for a stratified random sub-sample, you will already (at the planning stage) have ensured that your sub-sample is representative according to some key demographics.

You can work out your confidence interval by using [this online calculator](#). In the grey ‘Find Confidence Interval’ box, put your response rate into the ‘sample size’ box and put the total size of your target population (e.g. all 1<sup>st</sup> year students, or all students) into the ‘population’ box. Leave the percentage as 50 (this assumes a balanced set of answers). Press calculate. This gives you the figure that describes the margin of error around your answers. Note that if you have significantly lower response rates for certain questions you will have to calculate the confidence interval for those questions separately. A larger sample size will always give you a smaller confidence interval and so you can be more certain that your responses accurately reflect the overall population.

### First pass data analysis

For many purposes it will be sufficient just to view your findings on a question-by-question basis. See our *Question-by-Question Guide* for further suggestions about this.

By default, BOS presents summary data as a bar chart comparing percentage responses to each item within the question. It also shows you the raw score in **bold** and the percentage (in brackets) for each response. In some cases the raw score will be more useful than the percentage. For example, in analysing responses about the use of different devices, you are likely to be interested in the raw score for each device, perhaps expressed as a percentage of the total number of respondents (e.g. “35% of all participants use their own tablet for learning”).

Notice that the response options for some questions imply a **scale**. For example, the three response options for Q5 are ‘weekly or more | monthly or less | never’, while those for Q9 are ‘agree | neutral | disagree’. These are *ordinal* scales: there is a logical order to them but the points on the scale may not be an equal distance apart. It would not be appropriate, for example, to score these responses as 1, 2, and 3, take a mean average of all the scores, and say that ‘on average’ learners carry out an activity ‘monthly or less’. It is entirely appropriate to say, for example, that ‘42% of our respondents do this weekly or more, as compared with a sector average of 29%’. And you can apply ordinal scale statistical tests if you have that expertise.

We suggest that you also look at the **benchmarking** data for your sector as a whole and pick out any questions to which your learners have given very different answers to the norm. You can carry out further tests on this data to find out whether the difference is significant (see below).

Also sift through your **free text responses** for any often-used words or phrases, e.g. using frequency analysis or a 'word cloud' type programme to help pick these out.

Consider how you could explore these issues further using valid qualitative techniques with smaller numbers, for example in a focus group, by triangulating with data from student engagement activities, or by collecting learners' own accounts of learning with technology. Some qualitative data techniques are included in this guide.

### Making comparisons

In benchmarking, you are interested in the *difference between your learners' responses and the responses of learners from the rest of your sector*. For example you might want to know whether the percentage of your learners who 'agree' with the statement: '*When digital technology is used on my course... I understand things better*' is significantly higher or lower than for other providers. When you access the 'Benchmarking' screen in BOS you will see one score for your own sample of learners, and one score for all the other learners across your sector. These are the scores you need to compare. Benchmarking can be useful if you want to show that your college or university is out-performing competitors, or is at risk of falling behind.

In grouping or partitioning your data, you are interested in *differences across different groups of learners* within your own sample. You may want to filter your data using responses to the demographic questions in the first section, or to look separately at the data from learners who identified themselves as having a disability or health issue. The **Guide to using the Tracker in BOS** has advice on filtering data in BOS, though you may prefer to do this using your own data analysis software. Once you have separate data sets for each group, you can then identify the different responses to each question you want to study and explore whether the differences are significant.

You can also compare the answers given by learners using different versions of the Tracker, for example learners taking HE or FE courses, or studying online.

Finally, you might want to compare the responses your learners gave to different questions or question items. If you have an interest in the *relationships among factors* in the Tracker data you can use non-parametric tests such as a chi-square (on discrete items) or Kruskal-Wallis (on an ordinal series of responses). For example if you hypothesise that there is a positive relationship between the number of personal devices used for learning and your learners' overall satisfaction with their learning experience, you might test for significant correspondences between responses to question 4 and responses to question 14 using a single-tailed hypothesis. Alternatively you may want to carry out some form of multivariate analysis (e.g. Factor Analysis) to investigate the relative importance of different factors in explaining the variation within your results.

Tests of this kind go beyond what most people said they wanted from the Tracker, but are possible with downloaded data and the use of a stats programme such as SPSS, or by manual application of the relevant statistical tests to figures derived from BOS.

### Calculating significance

For all kinds of comparison, it is useful to have access to a z test calculator like [this one](#) to find out whether a difference in the responses from two different groups is statistically significant. To use the calculator simply enter the percentage scores for each group and the sample size of each group. For example, enter the percentage of first year students that gave a particular response, and the percentage of final year students that gave the same response to the same question, with the relevant sample sizes. When comparing your data with benchmarking data, use the scores for your institution and for the rest of the sector. A significance level of 0.95 is usually used. This means that there is only a 0.05 or 5% chance that the difference you see has arisen by chance, and a 0.95 or 95% chance that there is a real underlying cause. Comparisons that are not significant to this level should be ignored: you should not consider the two groups to differ from one another, or in the case of benchmarking data you should not consider that there is a significant difference between your students' responses and the rest of the sector.

Beware, though, that the very high sample size in the benchmarking group means you are likely to find that almost any difference is statistically significant, even if it is small. In this case you should be looking at the size of the difference as well, before deciding whether it is of any real-world, practical significance. Also be aware that if you run many statistical tests with a p value of 0.95, then by chance alone you would expect to find a significant difference in one test out of every twenty. So be careful before you make important decisions based on one significant result.

### Analysing qualitative data (free text responses)

Some of the Tracker questions produce short free text responses. You can copy and download these from BOS for separate analysis. You should remove null responses from the data before analysing, and you will probably want to include not only empty returns but responses such as 'nothing', 'NA' or 'don't know' as well.

Any qualitative analysis software such as [Nvivo](#) will allow you to code the responses, and also to build theories about the coded data relating to the number of responses in each code category, relationships between them, and the terms that appear most frequently. Coding is generally more valid if it is carried out by more than one person. However, with short responses like these you can use simple colour coding, tagging, or sorting, and tally the number of similar responses in (e.g.) Excel. You can also use word frequency analysis. Word cloud tools such as [WordSift](#), [wordle](#) or [wordclouds](#) produce attractive visuals, but the underlying word counts can be more useful. One approach to analysing a large volume of short text data is to carry out a frequency analysis, pick out the top 50, 100 or 150 words and sort these into categories (e.g. 'VLE navigation', 'voting tools in lectures', 'basic IT skills'. Note the summed frequency for each group of items to give a picture of which issues are coming up the most. Then you can go back to the original data and find a representative number of response items that contain each of the common words.

You can simply use some of the statements as quotes to illustrate your findings, or you could go further and code the statements to provide a more rigorous picture of the context for each issue.

As with numerical data, it is important to look for *patterns* in qualitative data, including frequency of responses. But qualitative data analysis allows you to look for patterns of other kinds such as which codes tend to be found together, and to value minority and outlying responses.

Free text responses allow you to use *learners' own words* to illustrate and support key findings, which is always powerful. Make sure you have permission to do this and ensure no learner can be identified individually, or to within a small group, from the words you use.

You may have free text responses from other surveys you may have conducted and from non-survey activities such as focus groups, consultation events, course feedback, learner voice activities and student reps. You should not combine free text responses from different sources and treat them as if they were a single set of data. They have been collected in different ways, from different populations, and in response to different questions. Once you have analysed them separately you can look for common themes, or use one data set to build a theory and look for supporting evidence in another. This is called triangulation.

### Different perspectives on the data

The main aim of the Tracker is to help you to improve the digital experience for learners, and to involve learners in that process. Even without the use of advanced analysis, different people will see different patterns and points of interest in your data. Aim to present your data to stakeholders in ways they will find accessible (see 'Visualising your data' below). Then ask them, for example:

- » How does the data confirm your own experience? How is it surprising or contradictory?
- » How does the data show that we are doing well in our sector? How does it show that we are doing less well? Does that conform to your experience?
- » What are our learners least satisfied with, and what do our learners most want us to change? What should our priorities be for development?
- » Who needs to be persuaded, and what (presentation of) data will be most persuasive to them?

The *Question-by-Question Guide* has ideas for which stakeholders you might engage around each question, and how you might make use of the data to effect change.

## Working with other data sources

If you have run more than one version of the Tracker you will have two or even three discrete sets of data. Questions are either identical or very similar – sometimes with slightly different response options (see our [Data mapping guide](#))

If you have used ID tracking with your students (see our [Guide to uploading student data](#) into BOS) you can use these unique IDs to merge tracker data with other sources of learner data and look for relationships. You may want to use a data dashboard such as [Tableau](#) to facilitate this. If you are not using this option, you can still look for relationships between your tracker data and other data sources through triangulation: a way of creating a '*rich, robust, comprehensive and well-developed*' explanation for evidence from multiple sources (see '[Triangulation](#)' from the Qualitative Research Guidelines project). Triangulation does not mean merging your sources. It might mean:

- identifying common themes;
- adding detail or explanation to findings from one method (e.g. the NSS or LSS) using findings from another method (e.g. the Tracker, or focus groups);
- generating a hypothesis from one set of data and test it against another.

You are likely to have other data about students' digital experience that you can look at alongside responses to the Digital Experience Tracker. For example, in **Higher Education**:

- The National Student Survey (NSS) asks students to respond on a five-point likert scale to the prompt: *I have been able to access general IT resources when I needed to*. From 2017 the prompt will change to: *IT resources and facilities have supported my learning well*.
- The UK Engagement Survey (UKES) does not ask explicitly about the digital experience, but could in future offer an [optional module on learning with technology](#), developed by EDUCAUSE. This is available to international users of the National Survey on Student Engagement (NSSE).
- The (International) Student Barometer ((I)SB) asks about students' satisfaction with 'Technology', 'Virtual Learning and the 'online library'.

- The Postgraduate Experience of Research and Teaching surveys (PRES and PTES) run by the HEA include a question about *access to general IT resources*, and questions about research and teaching resources without specific reference to digital resources.
- All of these surveys ask for free text responses about the factors that have made students more or less satisfied with their overall experience. You may be able to access these comments as a data file and to run keyword searches for any that refer to digital issues, or someone else at your institution may already have coded the responses.
- You may run your own institutional surveys, either regularly or one-off, with reference to students' digital experiences. For example you might survey them about the digital technologies they are using, their experiences of using the library or IT services, their views on the VLE, or as part of an externally funded project with a digital agenda.
- You may take part in UCISA's **Digital Capabilities survey** and so have some background evidence about your university's approach to staff and student digital skills.
- You may have gathered evidence for QAA review that relates to **student engagement**, or to students' **digital literacies**.

And in **FE, ACL and Skills**:

- The FE Choices/Learner Satisfaction Survey (LSS) asks broad questions about (Qu 1) satisfaction with teaching on course and (Qu 4) satisfaction with support received, but with no opportunity to provide free text responses.
- You may run your own provider surveys, either regularly (e.g. in conjunction with FE choices) or as a one-off in relation to specific issues in learners' digital experience.
- If you have used the **Coralesce Ed-Tech self-assessment** tool, you (or another member of staff) will have made an assessment of your college's digital policies, practices and culture. This provides useful background evidence against which to view your learners' responses.
- You will have considered how learners' views are represented in your Ofsted inspections and reports.



You will have feedback from learners and their representatives, whether they are course reps, learner voice reps, dedicated digital change agents, or regular students providing course feedback. You may have learner representatives on user groups for the library/learning resources and IT. When you review learner feedback, whether from student reps, surveys or other sources, remember that learners don't usually focus on their digital experience unless they have a specific problem with it. So picking out 'digital' issues from general feedback may give you an unduly negative picture. It may be better to formulate some specific questions you can ask learner representatives, to encourage them to explore digital aspects of the learning experience in a more rounded way.

You may have data from a variety of **systems** that tell you for example when students visit the library, submit assignments, or log on to the VLE. You may use a **learning analytics** approach to analyse some of this data and to relate it – at the level of individual learners – to factors such as their overall grades or progression. Jisc has a **variety of resources to help you make good use of learning analytics**.

We developed the Tracker because our stakeholders told us that information about the student digital experience was not reliably available from other sources. So although from a strategic point of view it may be useful to see the Tracker in relation to other key metrics, the Tracker itself is likely to give you the most reliable and relevant information on that core issue.

## Visualising and presenting your data

It is important to consider how you will visualise and present your data to stakeholders. Visual communication needs to be clear and accessible if Tracker findings are to be acted on. For 2017/18 we are offering a number of templates in Word, Excel and Powerpoint to help you quickly create reports of your high level messages.

BOS automatically presents your data for each question as a bar chart, and these charts can quickly be pasted into reports. Numerical analysis programs such as SPSS and spreadsheet programs such as Excel offer a wider variety of charting options, which is one reason why you may choose to download your data and work with it outside of BOS. MS Office provides **tutorials** to help you use the 'charts' function of Excel accurately and creatively. Also check out Jisc's **Guide to Data Visualisation**.

Simple things can really make a difference to the readability and impact of your data, such as optimising the way labels appear on axes and charts, using coherent colour schemes, mixing chart types (if appropriate), and creating a visual narrative or infographic for key messages. There are now a range of online infographic services to help you, but you can just use basic shapes and icons to make your data more meaningful and eye-catching.