

Automating Visitor Evaluation in the London Transport Museum



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london
transport
museum



WPI

Automating Visitor Evaluation in the London Transport Museum

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Abstract

The Learning Team at the London Transport Museum utilised paper and pen-based evaluations that were time-consuming and resource-intensive. Our project automated these evaluations by producing several digital surveys administrable with iPads. We created tools to analyze survey results and produced an analysis report showcasing the Learning Team's progress towards its target outcomes. To ensure continued success, we recommend the Learning Team continues to update and improve its Microsoft Forms, protect and maintain its iPads, and conduct more frequent evaluations.

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- Ruth Melville, the consultant who helped to show exactly what the LTM needed from their data
- The rest of the Learning Team for welcoming us and making us feel right at home

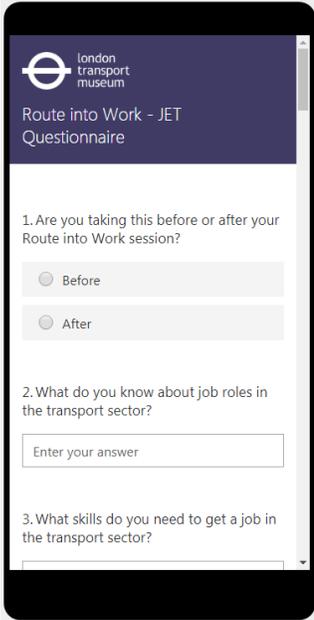
Executive Summary

The London Transport Museum is dedicated to preserving the history and importance of transport in London and to inspiring young people to pursue engineering careers. The Learning Team, a group of London Transport Museum staff, aims to empower and enable its participants to take the next steps towards a more fulfilling life and playing an active role of society. The team designs and administers collection-based learning programmes for different audiences, both in the museum, in communities, and in local schools. Wishing to better advocate the impact of its work to funders, the Learning Team created an evaluation framework coined *Journey of Change*. This was done using guidelines from Project Oracle, an organisation that validates educational programmes. This *Journey of Change* contains 21 target outcomes that outline the positive impacts of the Learning Team’s programmes on participants.

Previously, the Learning Team used only paper questionnaires and observation evaluation forms for measuring progress towards seven target outcomes. As a result of the **paper-based processes**, the Learning Team invested a lot of **time and resources** in the evaluation process. Our team was brought into the London Transport Museum’s Learning Team to **digitise and streamline** these processes. This will allow the Learning Team to better understand the impact of their learning programmes and how to report that impact to employees and funders. In order to examine the Learning Team’s current evaluation process, we conducted interviews with staff members and participated in programme evaluations. We identified the limitations of the current process based on information gathered and developed a list of specifications enabling us to design our **three main deliverables**:

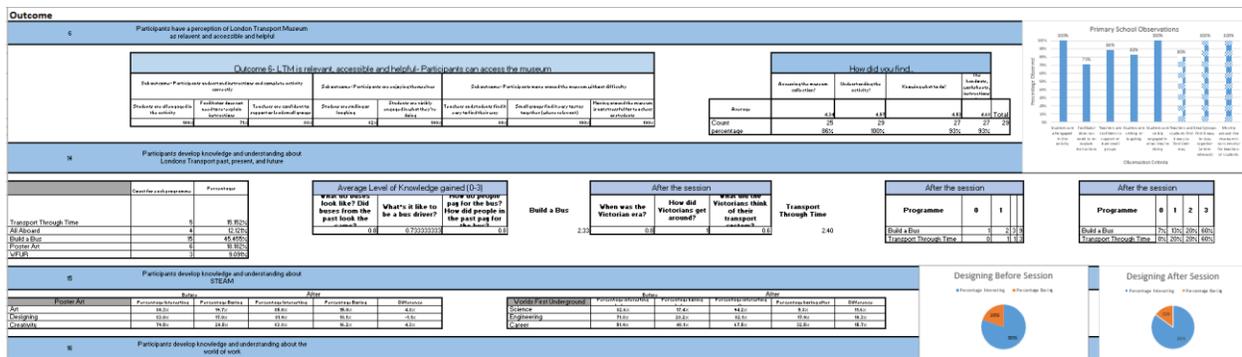
- a set of streamlined **digital survey forms** replacing all previous paper surveys,
- A suite of automated tools and dashboards to **analyse** the collected data, and
- A summary **report** showcasing progress towards the Learning Team’s target outcomes.

The first deliverable consisted of **9 Microsoft Forms** surveys. This number was condensed down from 16 paper surveys by combining similar forms and standardising language throughout all of the evaluations. The forms also allow for **conditional questions**, enabling us to combine multiple paper forms into fewer digital ones. The Learning Team purchased **5 iPads** in order to distribute the web-based forms to participants



and teachers in the museum. Microsoft Forms also generates QR codes to share forms and enable participants to use their own mobile devices to submit responses. Microsoft Forms collects and organises responses in Microsoft Excel spreadsheets, which can be downloaded by staff for data analysis.

Our second deliverable consisted of 5 Microsoft Excel documents with built in dashboards for primary **data analysis**. Each document contains spreadsheet tabs separating different types of questionnaires and observation forms based on age group. These spreadsheets were developed with built in analysis equations that automatically populate existing charts and tables once data is imported from the downloaded spreadsheets. The analysis is organised based on the outcomes highlighted by the Learning Team’s *Journey of Change*, which allows for easy referencing in biannual reports.



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Our final deliverable was a **data report** highlighting progress towards each of the Learning Team’s target outcomes. The report includes a performance overview table which gave RAG (Red, Amber, Green) ratings on the strength and quality of data supporting each outcome. This report is organised by outcomes and includes information on demographics and audience for each of the museum’s programmes. The sections include a variety of tables and charts that present the most important information from the data analysis we conducted. This report will be used as a template for future reports on a biannual basis. The target audience for this report is the

museum's staff with a variation being sent to funders.

Our team developed a number of recommendations for the Learning Team after interviewing staff and spending time working with them for a few months:

1. Protect and maintain the iPads:

The iPads purchased for the new Microsoft Forms are brand new and need to be maintained well to ensure longevity. Based on this, the first three recommendations are logistics focused but important, while the final recommendation is a longer-term goal for the Learning Team.

- Obtain **cases and screen protectors** to ensure longevity of iPads
- Find a convenient and safe **storage location** at the museum, as the iPads are more likely to be used there
- Create a **charging system** for the iPads that can be used at the museum
- Obtain **more iPads** to assist in gathering additional data

2. Update and Expand the use of Microsoft Forms:

Microsoft Forms were created for all of the programmes that currently had evaluation tools in place, but more will need to be added as programmes change or are produced. We also recommend looking into new ways that QR codes can be used around the museum to provide visitors with the ability to submit feedback at their convenience without the need for the iPads.

- Look to **post QR codes** for the surveys in locations around the museum
- Introduce **QR code as the main surveying method** for programmes with older audiences
- **Pull data more often** so the data analysis become statistically significant

3. Conduct frequent Evaluations to measure outcomes

These final recommendations are to support the Learning Team's future evaluating and reporting mechanism. The museum should continue to develop their evaluation methods by prioritising the below recommendations.

- **Evaluate more often** (2 weeks a term) to increase statistical significance of data
- Look into **Project Oracle's new website** and determine if the accreditation process still works the same way it did previously
- Continue to **update sub outcomes** anywhere they appear different than in the Project Oracle submission.

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I. Introduction

Museums serve the community by providing visitors with the opportunity to explore exhibits while receiving an education outside of traditional schooling. Across the world, they have taken on topics including history, science, art and even transport. Museums have also become some of the most famous tourist attractions in many cities due to their connection to the past and their ability to bring important aspects of society to the public's eye. The London Transport Museum (2019a) first opened in 1980 and was designed to preserve the history of transport within the city of London. The museum has grown greatly and now has two separate locations, the primary museum in Covent Garden and The Depot which is home to over 370,000 items not found in the Covent Garden exhibits. The physical growth of the museum has been spurred by an increase in exhibits and the launch of many learning programmes for different audiences, both within the museum, in the community, and in local schools (London Transport Museum, 2018a).

The Learning Team is a group of London Transport Museum staff in charge of designing and administering collection-based learning programmes. Due to difficult economic climate, the Museum needs to look for creative funding opportunities, including corporate sponsors. To show value for money to current corporate sponsors and to advocate for new sponsorship, the Learning Team has placed an emphasis on demonstrating the positive impacts its programmes have on participants. Therefore, the Learning Team has begun revitalizing its methods of evaluating programmes based on observer and participant feedback.

The previous programme evaluations did not provide the necessary information to prove positive, or tangible impacts on its participants. With the help of a specialised evaluation consultant, the Learning Team designed a new evaluation framework for its programmes in order to ensure the evaluation data collected is valid. The Learning Team then submitted its evaluation plans to a third-party organisation, Project Oracle, that helps organisations improve their learning programmes. The Learning Team was able to obtain Project Oracle's first level of evidence validation showing the staff knows what to measure and how they are going to measure it.

The Learning Team is interested in obtaining Project Oracle's second level of evidence validation, showing it can measure a positive impact on programme participants based on the framework designed for level one. However, the tools the Learning Team uses to collect this evidence and analyse change are not capable of collecting the quantity and quality of data needed to validate its impacts. Currently all the questionnaires are distributed and taken on paper and require an employee to manually input the data into a spreadsheet. Using today's modern technology this process could be dramatically improved. Additionally, the Learning Team is not currently utilising any comprehensive data analytics tools to draw conclusions from

the information collected. The conclusions drawn are not presented to its desired audiences in a productive manner. This leaves the Learning Team with a variety of data that are not effectively used, hampering the staff's ability to show the impact of its programmes on participants.

Therefore, the primary goal of this project was to identify methods of data collection, analysis, and reporting that allow the Learning Team to measure progress towards the target outcomes outlined in its evaluation plan. In order to complete this goal, we outlined three objectives:

1. Selecting the most effective tools to collect and store evaluation data,
2. Determining data analysis tools to quantify progress towards the Learning Team's outcomes,
3. Identifying the most useful data presentation documents to report on the impact of the Learning Team's programmes

Based on these objectives, we conducted interviews and observational evaluations with the Learning Team staff to better understand the programmes and to get a holistic view of our project. With our improved understanding of the team's evaluation process, we created new tools and protocols to help the Learning Team collect and analyse meaningful data to show the impacts of its programmes. Finally, with Project Oracle validation, the Learning Team will be able to obtain additional funding and improve its learning programmes.

2. Background

The London Transport Museum is dedicated to educating children and adults alike in the history and impact of transport in London. A portion of this education is conducted through structured learning programmes held at the museum for children aged 5-16. Past this age, the students can take part in more career-focused programmes led by STEAM (Science, Technology, Engineering, Arts, and Maths) industry professionals and hired museum workers. Overseeing these programmes is a group of museum staff called the Learning Team. The Learning Team ensures that the programmes are meeting targeted outcomes through multiple types of evaluation including observations and surveys. All evaluation is completed with the guidance of Project Oracle, an organisation that defined a set of guidelines for educational programme evaluation. In this chapter, we provide the context of our study by describing the Learning Team's learning programmes and its current methods of programme evaluation and validation.

2.1. The London Transport Museum (LTM)

The London Transport Museum is a **public museum** funded by Transport for London, the organisation responsible for public transport in the greater London area. The overall goal of the museum is to “[explore] the story of London and its transport system over the last 200 years,” while also encouraging enthusiasm for science and technology that could lead to a career in the transportation industry (London Transport Museum, 2018a, p.2). This goal is directly reflected in the London Transport Museum's (2018a) vision statement which depicts “a society which perceives transport as exciting, innovative and essential” (p.2). The London Transport Museum hopes to foster an ambition for better transport in London in all young people who visit the museum, particularly through its **learning programmes**.

The initial incarnation of the London Transport Museum, called the Museum of British Transport, opened in South London in 1963. A large garage housed a replica of Rocket, a pioneering train in the English railway history. Within the Museum of British Transport were various other artifacts relating to the roads, railways, and the Tube of London (Mapping Museums, 2017). This museum was threatened with shutdown in 1969 and relocated to Syon Park in West London in 1973. In 1980, the museum was relocated one more time to the Victorian Flower Market building in Covent Garden and renamed the London Transport Museum.

The museum continued to grow and evolve along with the public transport in London. One of the periods of highest growth for the London Transport Museum was when it underwent a major redesign from 2005 to 2007. According to Divall (2008), during this time the museum worked to make its layout more narrative-like. Following the shut down in 2007, the London Transport Museum was declared a

charity, enabling the museum to secure more stable funding, which now comes from a variety of diverse organisations, each of which may have its own goals in terms of museum education.

2.2. LTM Educational Programmes

In developing its learning programmes, the London Transport Museum’s Learning Team identified five targeted audience and grouped them into strands: **Primary Learning, Secondary Learning, Young People, Families, and Communities** (London Transport Museum, 2018a). The Learning Team created programmes for each of these strands that directly cater to the needs of visitors based on their age group or background. The communities strand is the newest and, as a result, there is no published documentation about it. Each strand has its own manager who is responsible for administering programmes and conducting evaluations that would ideally report progress towards the Learning Team’s target outcomes.

2.2.1. Primary Learning Programme (ages 4-11)

Primary Learning programmes are catered to museum visitors between the age of four and eleven (London Transport Museum, 2018a & 2018b). These children typically visit the museum at Covent Garden with their schools and participate in one of the four main programmes offered: **Build a Bus, Poster Art, Victorian Transport, and The World’s First Underground**. Each of these programmes engages the students in different ways through both physical (hands-on) and visual learning methods. The programmes are supervised by the students’ teachers, parent chaperones, museum volunteers, and museum staff. Programme evaluations are collected through various paper forms completed by the lead teacher, students, and an outside observer within the room. The primary school programme is evaluated on 5 outcomes:

- Participants have a perception of the London Transport Museum as relevant and accessible and helpful.

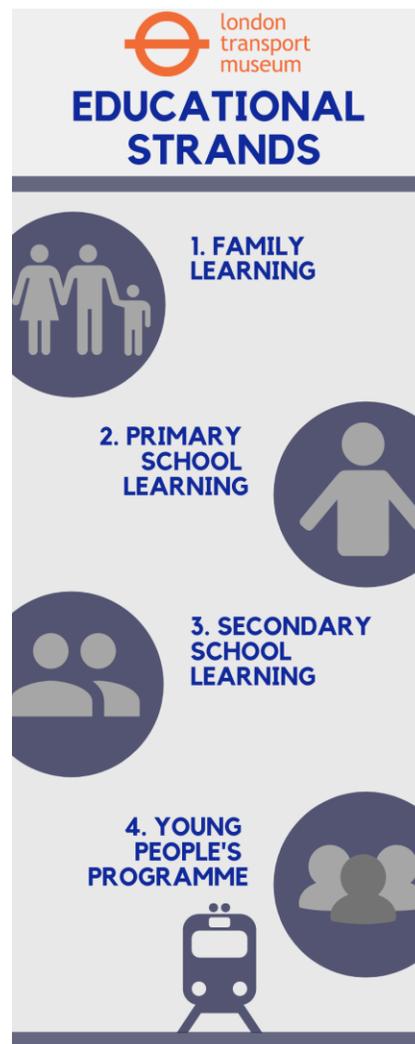


Figure 1. Educational strands

- Participants develop knowledge and understanding about London's transport past, present and future.
- Participants develop knowledge and understanding about STEAM.
- Participants learn life and employability skills.
- Participants choose to return to LTM for learning, enjoyment, and personal growth.

2.2.2. Secondary Learning Programme (ages 11-16)

Children ages eleven to sixteen are placed within the **Secondary Learning strand** (London Transport Museum, 2018a & 2018b). These students either visit the Depot or the museum at Covent Garden, depending on the programme. The **Inspire Engineering** programme, at the Depot, offers students the opportunity to participate in hands-on, STEAM-based activities. In other programmes, staff from the Learning Team travel to the students' schools and educate them on topics such as how to travel around London safely. This is prioritised because this age group is expected to travel independently on the public transport to and from school. The feedback collected in these programmes is typically from the students, teachers, and observers in a similar manner as the Primary Learning programme. Secondary school programmes are **evaluated on 4 outcomes**, similar to the ones of the primary school programme:

- Participants develop knowledge and understanding about STEAM.
- Participants develop knowledge and understanding about the world of work.
- Participants learn life and employability skills.
- People choose to return to LTM for learning, enjoyment, and personal growth.

2.2.3. Young People's Programme (ages 16-25)

The Young People's programme is designed for individuals ranging from age sixteen to twenty-five (London Transport Museum, 2018a & 2018b). More specifically, it is designed for individuals who are unsure of the next steps to employment or can be categorised as 'Not in Education, Employment, or Training' (NEET). The activities offered in this strand are **Route into Work**, a three-day employment class, as well as skills and employability events such as **Skills Late**, and **Progression Routes**, a **careers advice service**. Each of these programmes is designed to support the individuals in eventually obtaining employment, apprenticeships, or further training. These programmes typically take place at the Covent Garden museum location within the Luke's Skills Room. During these programmes, evaluation is completed by participants and by observers only, differing from the previous two strands. The young people's programme is **evaluated on 4 outcomes**:

- Participants develop knowledge and understanding about the world of work.
- Participants learn life and employability skills.
- People choose to return to LTM for learning, enjoyment, and personal growth.

- Participants develop and pursue further life opportunities (e.g. education, employment and volunteering).

2.2.4. Families Programme (ages 0-12)

A large portion of museum visitors are families (London Transport Museum, 2018a & 2018b). Data collected for the November 2018 interim report showed that over 50% of the museum's programme participants engaged in a family programme. These activities are designed for families who visit the museum with children up to the age of twelve. These programmes include both seasonal and ongoing sessions like **Singing and Storytime** and **Depot Family Tours**. Family programmes are also designed to break down social barriers and promote a diverse future workforce by engaging children at a young age with STEAM concepts. The family programmes are **evaluated on 4 outcomes:**

- Participants develop knowledge and understanding of London's transport past, present and future
- Participants develop knowledge and understanding about STEAM.
- Participants learn life and employability skills.
- People choose to return to LTM for learning, enjoyment, and personal growth.

2.3. Current Programme Evaluation and Impact Validation

Based on the Learning Team's desire to demonstrate the impact of its programmes and acquire funding, the team decided to evaluate its programmes based on a set of target outcomes for participants. The collection and analysis of visitor responses can prove to be challenging, especially because of the diverse audiences and the wide array of programme offerings. As a result, the London Transport Museum's Learning Team turned to a third-party organisation, **Project Oracle**, for guidance on how to best show the impact of their programmes.

Project Oracle is an organisation that works with educational and community programmes to achieve the best possible outcomes for their participants. They offer **five key Standards of Evidence** that validate the levels of impact an organisation wishes to claim about its programmes (Project Oracle, 2019b). The figure below shows the five successive and overlapping steps to obtain Project Oracle's highest level of validation.

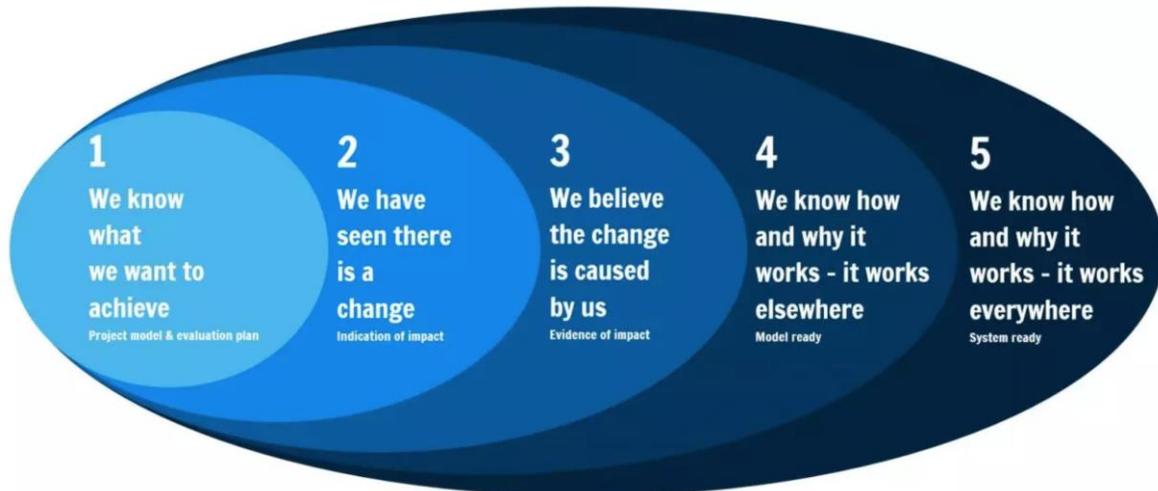


Figure 2. Five Levels of Validation. (Project Oracle, 2018, p. 1)

Each level requires a greater degree of evaluation, and organisations must provide **more specific evidence** for **successive levels of validation**. With the help of Ruth Melville, an evaluation consultant, the Learning Team was able to obtain level one validation and are now interested in gaining level two validation.

In the following section, we discuss **requirements of these standards** in relation to the Learning Team’s successful evaluation process. We identify the **tools already created** in order to obtain Project Oracle’s first level of validation, the **current limitations**, and the **tools needed** to obtain its second level of validation.

2.3.1. Project Oracle’s Standards of Evidence

Project Oracle’s **first level of validation** ensures an organisation knows **what they are trying to achieve** and **how they are going to measure progress** towards these achievements (Project Oracle, 2019b; Project Oracle, 2018). In order for the Learning Team to obtain this first level of validation, they created three sets of tools required by Project Oracle.

1. Theory of Change
2. Evaluation Plan
3. Impact Tools

An organisation’s Theory of Change ensures it evaluates programmes based on a specific set of target outcomes for its participants. An evaluation plan describes how each outcome in the Theory of Change is measured. For each outcome, it shows what, when, and how evidence will be collected, as well as who is responsible for collecting the information. A set of impact tools are then used to collect all needed information to prove its outcomes are being met.

For the **second level of validation**, organisations must **show a measurable impact** on their programme participants. In order for the Learning Team to obtain this second level of validation they must generate the following information in **reports required by Project Oracle**.

1. Participation Information
2. Evidence of Outcomes being met
3. Statistical Significance
4. Analysis Procedures
5. Ethical Procedures
6. Limitations and Weaknesses

The report must include participation information, evidence of positive change in at least one of the programme's main outcomes, and a discussion of the statistical significance of the results obtained. The analysis procedures must include the ethical procedures for obtaining evidence, and limitations or weaknesses of the its design.

The final three levels allow organisations to make stronger claims about the impact of their programmes. However, since the Learning Team is currently only interested in obtaining this second level, we will not discuss the specific requirements of these higher levels.

2.3.2. Journey of Change: An Evaluation Framework

Before collecting information about the impact of its programmes on participants, the Learning Team identified a set of **target outcomes**. Previously, the Learning Team was not able to collect objective and actionable information about the quality of its programmes. Project Oracle ensures this is accounted for in an organisation's Theory of Change. With the help of evaluation consultant Ruth Melville, the Learning Team was able to identify objectively measurable outcomes for participants in its programmes. Some of these contained **specific sub-outcomes** to indicate progressive steps in participant's knowledge and worldviews towards the overall outcome. These outcomes were then organised based on a timeline of the participants' progress through the programmes, and combined to create an overall Theory of Change, which the team identified as its *Journey of Change* ([Appendix A: Journey of Change](#)). Of the twenty-one outcomes listed in the *Journey of Change*, it identified the following seven outcomes as the **most important target outcomes**.

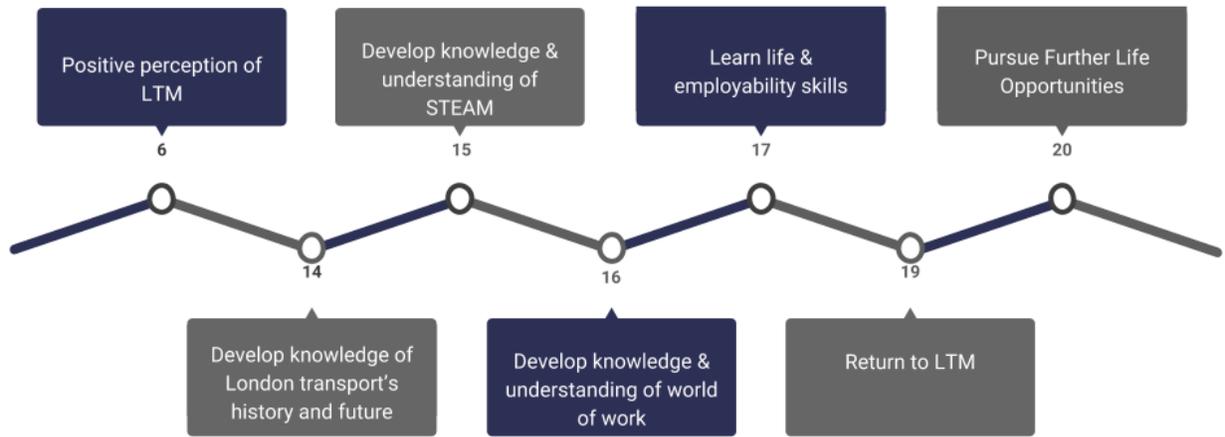


Figure 3. The Seven Most Important Target Outcomes. Adapted from London Transport Museum, 2018a.

The Learning Team then created a set of evaluation plans for all programmes that each measured two or more of these highlighted outcomes.

2.3.3. Evaluation Plan: Logistics for Evidence Collection

Once the Learning Team had identified the target outcomes for its participants, it developed a plan to obtain objective and actionable evidence of them. Based on the requirements of the evaluation plan outlined in Project Oracle’s specifications, the team designed its own plans based on the *Journey of Change* (Project Oracle, 2018). It outlined the necessary tools to obtain pre- and post-data from participants in order to measure change in their knowledge and worldviews. The evaluation plans indicated how participants would be selected for evaluation, considered all ethical limitations in collecting evidence from participants, and ensured reasonable sample sizes to make valid and significant conclusions from the evidence collected. The Learning Team **identified the tools** necessary to obtain this evidence during programmes, which individuals were responsible for using these tools, and at what points the different tools would be used to measure change in the evidence. Each strand of programming **created its own evaluation plan** to best cater to its unique audience. With the evaluation plans in place, the Learning Team’s last requirement was to create and document these various tools.

2.3.4. Impact Tools: Collecting Evidence of Outcomes

The tools required for the Learning Team to obtain the necessary evidence include questionnaires, observation frameworks, and feedback forms, each with the intention of gathering evidence from a different perspective. The content of these tools is extremely important because they must collect objective evidence from greatly varying audiences across the team’s programmes. Based on the Project Oracle specifications and general survey practice, the Learning Team designed

questionnaires, observation frameworks, and feedback forms to meet all of its needs. (Bernard, 2018; Project Oracle, 2018 & 2019b). With these three items: the *Journey of Change*, evaluation plans, and impact tools, the Learning Team was able to obtain Project Oracle's level one validation, showing that it knows what it wants to achieve and how it's going to measure success.

2.3.5. Analysis Tools: Highlighting Impacts and Proving Outcomes

Armed with the necessary framework and tools for obtaining evidence of its impact, the Learning Team's focus is now collecting and analysing data in order to obtain Project Oracle's **level two validation**. The Learning Team needs to report a **positive change** in one or more of the outcomes highlighted in its *Journey of Change* (Project Oracle, 2018). These changes need to be reported appropriately based on the outcomes and be statistically significant relative to the number of individuals participating in the Learning Team's programmes. Additionally, this report must outline the team's procedures for analysing the data. This includes any limitations in the design and execution of its impact tools that may lead to biased data. The aim of this report is to ensure the conclusions drawn about its impact are consistent with the evidence collected from participants. This report will also help the Learning Team obtain level three verification, showing the change was caused by its programmes and not due to any external factors.

2.4. Current Programme Evaluation Limitations

The Learning Team's current methods of using its impact tools do not collect the amount or quality of data needed to show significant change in its outcomes. All of the surveys and questionnaires distributed by the team are in paper format, forcing the staff to **manually enter** the results into spreadsheets for analysis. Additionally, the team has no way of ensuring participants complete the entire forms, often leading to **incomplete and biased results**. The team currently has very limited tools for analysing and calculating change in the pre- and post-data collected from these questionnaires and observation frameworks. Lastly, the Learning Team has no current framework for reporting on the evidence once it has been collected and analysed. All of these factors are currently preventing them from reporting on the positive change needed to obtain Project Oracle's level two validation.

Creating effective evaluations that focus on the key outcomes will help the London Transport Museum's Learning Team achieve their goal of a higher Project Oracle accreditation and increased funding. Knowing the current status of programme evaluations at the London Transport Museum, we assisted in designing and streamlining more effective tools and methods for data collection, aggregation, analysis, and presentation.

3. Methodology

The Learning Team's evaluation process is intended to demonstrate the value of its programmes internally and to funders in order to acquire additional funding. However, more efficient data gathering and analysis tools were needed to reliably collect evidence of their impact. Therefore, the **primary goal** of our project was to identify a set of tools for data collection, analysis, and reporting for the Learning Team to show its target outcomes are being met. We will identify and specify this set of tools needed by:

1. Selecting the most effective tools to collect and store evaluation data;
2. Determining data analysis tools to quantify progress towards the Learning Team's outcomes, and
3. Identifying the most useful data presentation documents to report on the impact of the Learning Team's programmes.

In the following sections we will outline the methods by which we have completed each of these objectives. To gain the necessary information, we conducted interviews with Learning Team staff and consultants, as well as directly participated in programme evaluation for Primary, Secondary, Family, and Young People's sessions.

3.1. Selecting tools to collect and store evaluation data

The collection of pre- and post-data allows the Learning Team to **track changes in participant knowledge and worldview** over the course of their sessions. Collecting evidence to **show these changes exist** is necessary for the Learning Team to gain Project Oracle's second level of validation for its programmes ([2.3.1. Project Oracle's Standards of Evidence](#)). However, any evidence collected is useless for this purpose if it **does not reflect** information about the team's **target outcomes**. Additionally, any evidence collected is useless if the methods of gathering data **introduce any error or bias** in them. Therefore, we first analysed the content of the existing collection tools and the methods which the Learning Team uses to distribute and collect results.

3.1.1. Analysing questionnaire content

The content of the questionnaires distributed by the Learning Team is important because they must collect evidence needed for Project Oracle's second level of validation. We discussed the objectives outlined in the *Journey of Change* during **interviews with programme managers** Jenny Kohnhorst and Rebecca Hill, as well as the consultant Ruth Melville who first outlined them ([2.3.2. Journey of Change](#), [Appendix A: Journey of Change](#)). The goal of these interviews was to determine how each strand measured these outcomes in slightly different ways and

guide us as we analysed the questionnaires. Our team then analysed the content of each survey based on the feedback received through our interviews ([Appendix B: Interviews](#)). The types of questionnaires included observations as well as student, teacher, and volunteer evaluations, but the questions in each survey share common themes and were developed based on the common Learning Team outcomes. In general, well-designed questionnaires are **exhaustive in the topics they cover**, reflecting all measures relevant to the outcomes of the programmes. Response options must be similarly exhaustive, allowing participants and observers the ability to reflect their sentiments as accurately as possible. Related questions and observation **indicators should be packaged together by the outcome they measure**. Additionally, questionnaires must use appropriate vocabulary for the programme's target audience, as well as avoid loaded, double-barreled, and emotionally-charged questions. Finally, since the Learning Team uses multiple questionnaires for different programmes and audiences, the tools must be **individually effective and consistent with each other** across all questionnaire variants. This evaluation was primarily completed to ensure that all questionnaires were objective and outcome oriented, particularly the observational evaluations.

3.1.2. Evaluating questionnaire distribution, collection, and aggregation

The paper survey process limited any analysis of the data collected, thereby slowing down the necessary reporting for Project Oracle's second level of validation. We decided to **directly observe and participate** in the **paper-based processes** to determine the best course of action to improve it. Working with the Learning Team, we were able to directly participate in evaluating the Primary, Secondary, Family, and Young People's programmes ([2.2. Museum Strands](#)). We completed 19 observational evaluations and 10 volunteer evaluations. Our team also **interviewed programme managers**, Liz Poulter and Jenny Kohnhorst, with the purpose of further investigating how they view current practices ([Appendix B: Interviews](#)). The primary goal of these observations and interviews was to **determine the requirements of collection tools that eliminate bias or error** in the data and ensure a sufficient amount of data could be obtained. We hoped that by observing these programmes directly and interviewing members of the London Transport Museum staff we would gain first-hand experience and professional advice allowing us to make the best possible recommendations.

3.2. Determining data analysis tools to measure progress

Measuring progress toward the Learning Team's target outcomes is not possible without quantifying the changes in participant feedback from the beginning to the end of programmes. The change in feedback for each individual represents the amount they learned from the programme, as well as how their perception

changed as a result. Given the diverse roles of the members of the Learning Team, we **identified the individuals who would most frequently use these tools** to analyse the data collected. Each employee within the Learning Team focuses on individual programme improvement in order to achieve the target outcomes and obtain additional funding. Therefore, we **interviewed the learning manager Liz Poulter**, to determine which members of the Learning Team would most frequently use these tools. We **identified the strand managers and data reporting consultants** as the individuals who would most frequently use these tools.

Thus, the main goal of this objective was to find the best analysis solution that could provide both relevant information for a given programme, and combine information collected to measure the progress of the learning programmes as a whole. To achieve this goal, we determined the measures of change most relevant to the primary users and created a list of specifications for the software tools.

3.2.1. Determining the requirements of data analysis tools

In order to identify the requirements of the Learning Team's analysis tools, we first **determined what metrics were most relevant** to its staff members, and how they wish to quantify meaningful changes in the feedback collected. To determine the requirements of these data analysis tools, we **interviewed** Megan Dowsett and Vicki Pipe, members of the **Learning Team staff** who will most frequently use these tools, as well as Trevor Blackman and other staff who need specific features within the tools ([Appendix B: Interviews](#)). These individuals were the most likely to know details about the information being collected within the strands and how the information needed to be analysed in order to validate the impact of their programmes. The **staff specified what changes they would like to quantify** in pre- and post-data compilation for their individual programmes. Based on the metrics desired by the staff, both in typical and more unique use cases, we **developed a list of specifications** for the analysis tools to best fit their needs. Finally, with this list of specifications, we will be able to make recommendations on how they should create purpose-built tools for programme evaluation while minimising the spending of funds.

3.3. Identifying data presentation documents to report on the impact

In order to identify the most useful data presentation documents, we **determined what information is valued most** and should be emphasised in the reports. In order to create reports that effectively present this information, we **identified the audience** who will be **viewing the reports**. For example, we needed to identify if the information from the reports was to become publicly available through the museum website, or if it was intended for internal purposes. Therefore, through **interviews with the learning manager**, Liz Poulter, we identified that these **reports are primarily used internally** within the Learning Team. **Some information**

from these reports is **compiled into reports for funders** and the general public, but this information is compiled by consultants or other members of the Learning Team. Therefore, the goal of this objective is to determine the information that is most useful to the museum's desired audiences.

3.3.1. Defining useful data presentation

A **data report** must be designed to **present the most useful information and figures** possible to its primary readers. For example, evidence of specific outcomes may be more important to programme managers than other less relevant outcomes. To determine what information needed to be present in the reports, we conducted **interviews** with Liz Poulter and Ruth Melville ([Appendix B: Interviews](#)). Our **interviews focused on the content and trends presented** in the document. These interviews were necessary to determine what the Learning Team should include and highlight within future reports.

3.4. Conclusion

The primary goal of this project was to identify a set of tools for data collection, analysis, and reporting for the Learning Team to show its target outcomes are being met. In order to achieve this goal, we: evaluated the content and distribution of questionnaires, created a list of specifications for digital analysis tools to measure change in participants knowledge and perceptions of the world, and identified the information most relevant to the Learning Team to show the impact of their programmes internally and to funders. In order to achieve these objectives, we conducted several interviews, directly observed, and participated in programme evaluation. Through the information collected, we have been able to identify the set of tools that best meet the needs of the Learning Team. In the next chapter, we will discuss our findings from these interviews and the knowledge gained through participating in programme evaluation. We will outline the requirements for all digital tools that needed to be created, as well as our processes for implementing these tools.

4. Findings and Implementation

After interviewing various members of the London Transport Museum's Learning Team and an external evaluation consultant, we better understood how the museum's evaluation process could be improved. First, we noted how the current methods of data collection are functional but could be improved to better align with target outcomes, strengthen objectivity, and eliminate the need for manual data entry by transitioning surveys online. Second, we identified better data analysis tools to extract meaningful data from the information being collected. Finally, we identified the required information and metrics in the Learning Team's reporting documents and created a report that will allow it to present its findings both internally and to funders. In this chapter, we discuss our findings and how we implemented data collection and storage tools, data analysis tools, and data presentation documentation.

4.1. Tools to collect and store data

Through interviews with staff and our participation in programme evaluation, we determined that the content of the tools used to collect data is strong enough to show that their target outcomes are being met. However, the Learning Team's methods for storing and organising the evidence collected needed to be redesigned in order to efficiently analyse and report on any data collected. In this section, we discuss the strengths and weaknesses of the evidence collecting tools, the limitations of the organisational tools, and the requirements of new tools to ensure efficient evaluation in the future.

4.1.1. Content of Current Evaluation Tools

The content of the tools the Learning Team created is robust and consistent enough with the outcomes identified in its *Journey of Change* to show the impact of its programmes on participants. The objectives across questionnaires and observation forms were consistent with other tools that measured the same outcomes. The observational forms in particular were identified to collect more qualitative than quantitative responses, while the feedback surveys collected almost strictly quantitative measures. This shows the Learning Team has a strong balance in the diversity of its evaluation data. On many of the questionnaires and observational forms, larger outcomes are split into multiple sub outcomes that allowed the staff to measure specific steps in progress towards the overall outcomes. The observational forms had unique indicators and examples for sub outcomes that allowed any observer to recognise the completion of that outcome more objectively and consistently. One limitation identified in these indicators was

seen specifically in Outcome 6 “Participants have a perception of LTM as relevant, accessible, and helpful.”

Outcome 6- LTM is relevant, accessible and helpful- Participants can access the museum		
Sub Outcome	Indicator	Observed?
Participants needs are met	Students are smiling or laughing	
	Students are visibly engaged in what they’re doing	

Table 1. Observational Evaluation Example Table.

Two indicators for this sub outcome were that students are visibly engaged in the activity and that students are smiling or laughing. However, it is unclear what percentage of the class must be smiling and laughing for this indicator to be met. This example, when discussed with programme managers, confirmed that any observational data is more qualitative than quantitative, and should be analysed and presented as such. We also confirmed that observational measures should be recorded on a scale, rather than a binary option, allowing the Learning Team to be as specific as possible in its programme evaluation.

The organisation of questions and indicators in all tools was also appropriate for the evidence collected. Sequential outcomes were listed in order on questionnaires, reflecting the logical progression of the *Journey of Change* as visitors make their way through the museum. Related questions and observation indicators were packaged together by outcomes to ensure the overall flow of the questionnaire or observation form was natural to complete. We concluded that each questionnaire or observation form is individually effective such that it provides unique, meaningful evidence of outcomes being met. We identified several questionnaires that collected very similar evidence of some outcomes and could be combined into a single questionnaire using conditional questions. This process is tedious and confusing on paper surveys. However, this effect can be reached easily using digital surveying tools. Conditional questions are a feature of many online tools and would allow these forms and questionnaires to be combined and condensed. Finally, we concluded that all of the impact tools combined show a holistic and detailed representation of the seven outcomes the Learning Team is evaluating, and that it does not need to make any major changes to the content of its evidence collecting tools.

Current limitation	Identified in interviews	Identified while conducting evaluation	Resolved by digital tools
Observation recording options	Yes	Yes	Yes
Total number of questionnaires	No	Yes	Yes

Table 2. Current Limitations of Questionnaires.

4.1.2. Requirements of Data Collection Solution

While conducting programme evaluations ourselves, we identified how questionnaires were distributed, collected, and stored in spreadsheets. Questionnaires were distributed by volunteers, programme leaders, and sometimes observers watching the session. They were similarly collected by the same group at the end of the session. One limitation we noticed in the primary school programmes, was collecting teacher feedback questionnaires at the end of sessions. Teachers were often in a hurry to continue their visits in the Covent Garden museum, and staff did not have the opportunity to collect the paper questionnaires from them. Another significant limitation was that some individuals did not answer all questions on a given survey, leading to gaps in the data collected. This was noted most significantly in Secondary School’s questionnaires given to students. The form was double sided, with most of the front side being completed at the beginning of the programme, and the back side at the end. Many students would complete the post-session questions at the bottom of the first page and not turn the page over to answer additional questions. Both of these limitations could be solved by implementing digital survey tools. Teachers are no longer responsible for handing back paper questionnaires and can simply submit their responses through an online tool. Additionally, online tools have the ability to ensure all questions are answered before the form can be submitted. This feature prevents students and teachers alike from submitting partially completed questionnaires.

Current limitation	Identified in Interviews	Identified while conducting evaluation	Resolved by digital tools
Missed responses from participants	Yes	Yes	Yes
Incomplete responses	Yes	Yes	Yes

Table 3. Current Limitations of Questionnaire Responses

4.1.3. Requirements of Data Storage Solution

Once all questionnaires had been collected, they were then inputted manually into Microsoft Excel spreadsheets. Each programme manager is responsible for creating their own spreadsheets for the data collected through their respective questionnaires. Therefore, the spreadsheets created were quite different from each other, even though the information they were showcasing was similar. Additionally, some strands had separate spreadsheets for observations and questionnaire data, while other strands had a single spreadsheet with multiple tabs for each kind of evidence collected. For some strands and tools used, there was no spreadsheet created, limiting the data entry and analysis process. The challenge of inputting data manually into spreadsheets could also be resolved by implementing digital survey tools. The challenges of organising the data for analysis could be resolved by creating one set of templates that is used for all data collected across the Learning Team's strands.

Current limitation	Identified in interviews	Identified while conducting evaluation	Resolved by digital tools
Manually entering results	Yes	Yes	Yes
No standardised data templates	Yes	Yes	Yes

Table 4. Current Limitations of Data Input and Storage.

4.1.4. Implementation: Digitised Surveying Methods

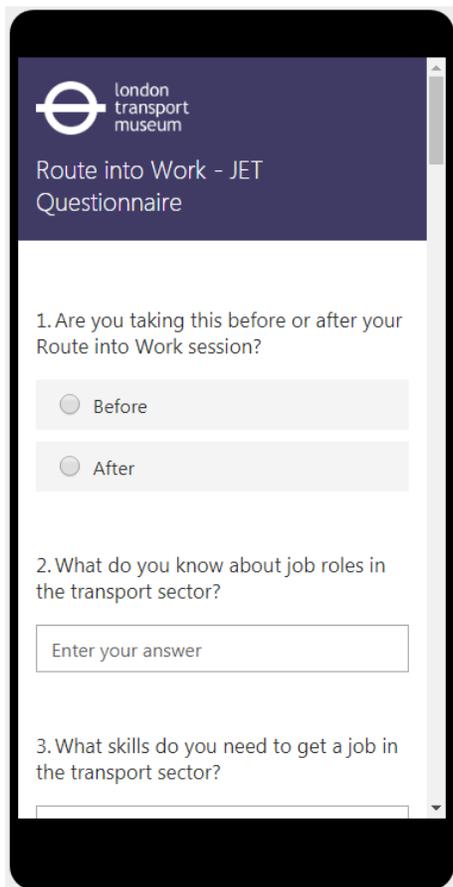


Figure 4. Digitised JET Questionnaire

Given the limitations found and the suggestions from Learning Team and IT specialists, we created a set of Microsoft Forms online survey tools. We reduced a total of 16 paper questionnaires into 9 digital forms. Additionally, we modified the observational forms to record indicators on a five-point scale ([Appendix F: Microsoft Forms](#)). The learning team is now able to administer these forms on iPads, ensuring all responses are recorded, and all questions are answered before the form is submitted. Microsoft Forms has features to generate QR codes for each questionnaire. These codes can be scanned by participants to complete the surveys on their own mobile devices, rather than requiring an iPad to collect responses. This was identified to be particularly useful for Family programmes and Young People’s programmes where many participants are completing questionnaires at the same time, and it would be impossible for staff to track all the iPads being used. We created a single bank of QR codes for all forms created, allowing the Learning Team staff to copy them and put them in the museum wherever it sees fit. Microsoft Forms also has standard procedures for exporting the data collected into

Microsoft Excel spreadsheets. This allows for much more standardised organisation of data for analysis. Finally, we created a set of documentation explaining how to create and modify Microsoft Forms online. ([Appendix G: Microsoft Forms How To Guide](#)). This documentation explains the procedures for creating and sharing forms, as well as how to use unique features within the forms, such as conditional branching. This ensures the Learning Team will be able to continue to use these tools and adapt them to their needs after our project is completed.

4.2. Data analysis tools

After collecting and compiling programme feedback, data analysis tools are utilised to quantify the change that occurs across each of the Learning Team’s target outcomes. The analysis tools quantify change across each outcome individually while comparing them to earlier national baseline metrics and city-wide demographic metrics. Through our interviews and research on the previously used

analysis tools, we identified the priorities and constraints for the future analysis tools. Based on this, we created tools that meet these requirements to ensure that the process is both corrected and sustainable.

4.2.1. Findings: Requirements of Data Analysis Tools

Previously, the Learning Team utilised several Excel documents located across the shared folders. These documents did not contain uniform content or entail methods of analysing data which were easy to use. Some of the content was quantitative while other pieces were qualitative. These documents also did not contain automated analysis tools, uniform formatting, and in some instances the analysis was nonexistent all together which resulted in large amounts of wasted time and energy when searching for specific statistics. Past practices were inefficient with regards to time and resources.

After researching and evaluating the current tools, we interviewed members of staff who will be involved with the future tools to understand their priorities. Through these interviews we found uniformity to be a large priority that could be addressed by having a single dashboard template to provide summary analytics of feedback. We also determined that having an individual document containing all feedback would save staff time that would be wasted searching for another document. We also found that uniformity with regards to the formatting of the summary statistics was important which would be reflected primarily in the representation of visuals. Improved simplicity and automation were also important to team members, ensuring that all could successfully view, understand, and report on the data analysed. Another priority was to have metrics on and organised by both outcomes and sub outcomes which makes the presentation of progress towards these easier. From all of these findings we were then able to outline them and ensure that our deliverable document met all requirements and would be sustainable for the future.

Required Features of New Analysis Tools	Identified in interviews	Identified while conducting evaluation	Resolved by new tools
Dashboard summary for each strand	Yes	Yes	Yes
Summary for all strands combined	No	Yes	Yes
Organised analysis by sub outcome	No	Yes	Yes
Standard format for visuals	Yes	Yes	Yes
Automated analysis equations	No	Yes	Yes

Table 5. Required Features of New Analysis Tools.

4.2.2. Implementation: Data Analysis Dashboard

The analysis tools we created were based on the format of data exportation from Microsoft Forms to ensure compatibility. The new tools also contain a dashboard that summarises the analysis being completed on one page and provided both uniform visuals and summary charts that are easily exportable to other documents (Figure 5). This dashboard is also well labeled to ensure that anyone looking at it can understand the data it presents and where to locate various statistics. The tools contained in this document also automatically analyse the data that is exported from Microsoft Forms and also supports the constant change in length and formatting of data being analysed. The automated analysis is also conducted and organised based on the preferred findings that were provided by Liz Poulter. Each of these are based on the target outcomes outlined by the museum’s Learning Team. Another benefit of the spreadsheets implemented was the supporting documentation that allows members of the staff to update the spreadsheet data and analytics tools regularly to fit their needs.

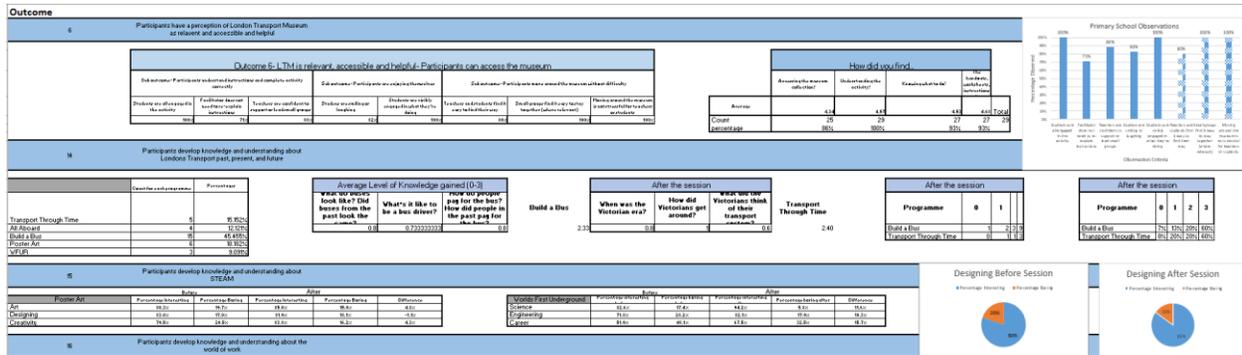


Figure 5. Microsoft Excel Analysis Dashboard.

4.3. Data presentation documents

Through interviews with Learning Team staff and external consultants, we identified the requirements of their data reporting documents. These reports are used to showcase what information was collected and whether or not the museum is reaching its *Journey of Change* outcomes, and if not, what progress has been made and any limitations to acquiring stronger evidence. In this section, we outline the requirements of the Learning Team’s data reporting procedures, and the data reports created for the museum.

4.3.1. Findings: Requirements of Data Presentation Documents

Through interviews with the Learning Manager, Liz Poulter, we learned that the primary audience of the data presentation documents is internal. Some information compiled in these reports is then used to make separate reports for funders and the general public, but these reports were not our project focus as the museum staff are in charge of external reports. Through a separate interview with Ruth Melville, our team was given a set of guidelines, both for what information the Learning Team wanted to show in the report and for how the report was to be laid out. These guidelines matched with Project Oracle’s level two validation requirements, which the London Transport Museum’s Learning Team eventually hopes to obtain ([2.3.1. Project Oracle’s Standards of Evidence](#)). The Learning Team wanted the report to be organised by outcomes, as defined by the *Journey of Change*, and include many figures that could be copied into external reports. Liz Poulter and Ruth Melville also indicated that all of our reports should be replicable, meaning that the report will be recreated in years to come and used in the same fashion.

4.3.2. Implementation: Effective Data Presentation Document

Based on the needs of the Learning Team, and given the data collected and analysed while participating in programme evaluation, we created an internal data analysis report consisting of eleven sections ([Appendix D: E2E Report - Main Deliverable](#)):

- Performance overview table
- Introduction
- Audiences and Diversity section
- Seven sections organised by outcome
- Conclusion and Recommendations section.

The performance overview table was designed to show a short synopsis of the Learning Team’s outcomes that could be removed from the rest of the report and understood on its own. Following the data analysis completed by our team, specific statistics were matched to each sub outcome and placed in the appropriate sections. Each sub outcome was given two RAG ratings (red-amber-green ratings). The first rating indicated how strong the evidence was, showing that that sub outcome was met by their programmes, and the second rating indicated the quality of the data collected.

Outcome	Sub Outcomes	Example Evidence	Strength of Findings	Quality of Data Collected
6. Participants have a perception of the London Transport Museum as relevant and accessible and helpful.	Participants can access the Museum	Teachers rate the museum collection as accessible	Green	Green
	Participants needs are met	Students are visibly engaged in what they’re doing	Green	Amber

Table 6. Excerpt of RAG Rating from E2E Report.

Another extremely important portion of the report was the audiences’ section, which detailed the analysed demographic data for multiple programmes. The London Transport Museum cares very deeply about their diversity statistics and compared them to the diversity of London as a whole. This section of the report consists of ethnicity data as well as other diversity statistics, like age and gender. The bulk of the report consisted of analysis of the evaluation data with in-depth

explanations of the results. For each outcome, we explained how the data showed either 'strong', 'some', 'limited', or 'no evidence' of the outcome being met. We then noted any limitations that prevented stronger evidence from being collected and provided recommendations for how the Learning Team can acquire stronger evidence in the future. Particular attention was paid to trends in the data, as all of the data was statistically insignificant. Our conclusion and recommendations section summarised how well outcomes were being met and reiterated any recommendations made for specific outcomes.

Finally, to ensure this report could be created annually, we created an outline template for how to recreate a similar report in the future ([Appendix E: E2E Report Outline](#)). We detailed how to rank sub outcomes in the RAG report in the performance overview table. This described the qualifying levels of evidence to conclude strong, limited, or no evidence of their outcomes being met. It was required to ensure multiple RAG reports can be compared to show progress in their outcomes being met and the quality of the data collected. We included information for each section explaining which analysis spreadsheet the relevant information could be found for that sub outcome. This outline ensured the report can be recreated as needed by the Learning Team.

5. Recommendations & Conclusion

Our team developed a number of recommendations for the Learning Team after interviewing staff and spending time working alongside of them for a few months. Some recommendations can be completed in the coming weeks but could not be accomplished in the time we were here, while others will require additional time and energy from the Learning Team moving forward.

5.1. Protect and maintain the iPads

The iPads purchased for the new Microsoft Forms are brand new and need to be maintained well to ensure longevity. The iPads will be used by a number of people depending on the programme they are being used for, so the first three recommendations are logistics focused but important. The final recommendation is a longer-term goal for the Learning Team. They currently have five iPads to use between the programmes but buying more would allow more people in the Families and Young People's programmes to easily participate in surveys thus increasing the amount of data collected.

- Obtain **cases and screen protectors** to ensure longevity of iPads
- Find a convenient and safe **storage location** at the museum, as the iPads are more likely to be used there
- Create a **charging system** for the iPads that can be used at the museum
- Obtain **more iPads** to assist in gathering more data

5.2. Update and Expand the use of Microsoft Forms:

Microsoft Forms were created for all of the programmes that currently had evaluation tools in place, but as more programmes are created or changes are made to existing ones, they will need to develop additional forms. We also recommend looking into various ways that QR codes can be used around the museum to provide visitors or programme attendees with the ability to submit feedback at their convenience.

- Create **forms for Communities** programme once the form design is fully established
- Look to **post QR codes** for the digital surveys in convenient locations around the museum (on tables that family programmes are working at, in the Transportorium for Primary School teachers, etc.)
- Introduce **QR code as the main surveying method** for Young People's programmes with iPads as a secondary method as all surveys could happen at once this way
- Create a **dropdown for family programme sessions** to update every term
- **Pull data more often** so that the process becomes familiar and easy

5.3. Conduct frequent Evaluations to measure outcomes:

These final recommendations are to support the Learning Team's future evaluating and reporting mechanism. In order to produce statistically significant documentation of the impact the programmes are having on students, we recommend the Learning Team increases the number of evaluation weeks every year. The Learning Team recently received level I accreditation from Project Oracle with an interest in pursuing future levels, and we recommend looking into Project Oracle's new website to determine if any changes have been made to the process.

- **Evaluate more often** (2 weeks a term) to increase statistical significance of data
- Look into **Project Oracle's new website** and determine if the accreditation process still works the same way it did previously
- Continue to **update sub outcomes** anywhere they appear different than in the Project Oracle submission

We created a total of twelve recommendations for the Learning Team to implement after we leave. The handling and care of iPads section can be completed easily but given feedback from our sponsor we recognise that the final recommendation of obtaining more iPads is unlikely to happen due to budget constraints. The maintenance of the Microsoft Forms is not anticipated to be difficult for the Learning Team to do, but it will take a joint effort to invest in. They have already begun trialling new locations to post QR codes around the museum, and they are well informed on how to edit and produce new Microsoft Forms. The evaluation recommendations will be the most difficult for the Learning Team to implement. We recommend that they evaluate two weeks per term instead of just one. The Learning Team has indicated that they want to adapt this recommendation, but it will require a constant effort to continue doing moving forward. With these tools in place the Learning Team will be able to collect and analyse all evidence needed to prove the positive impact of their programmes.

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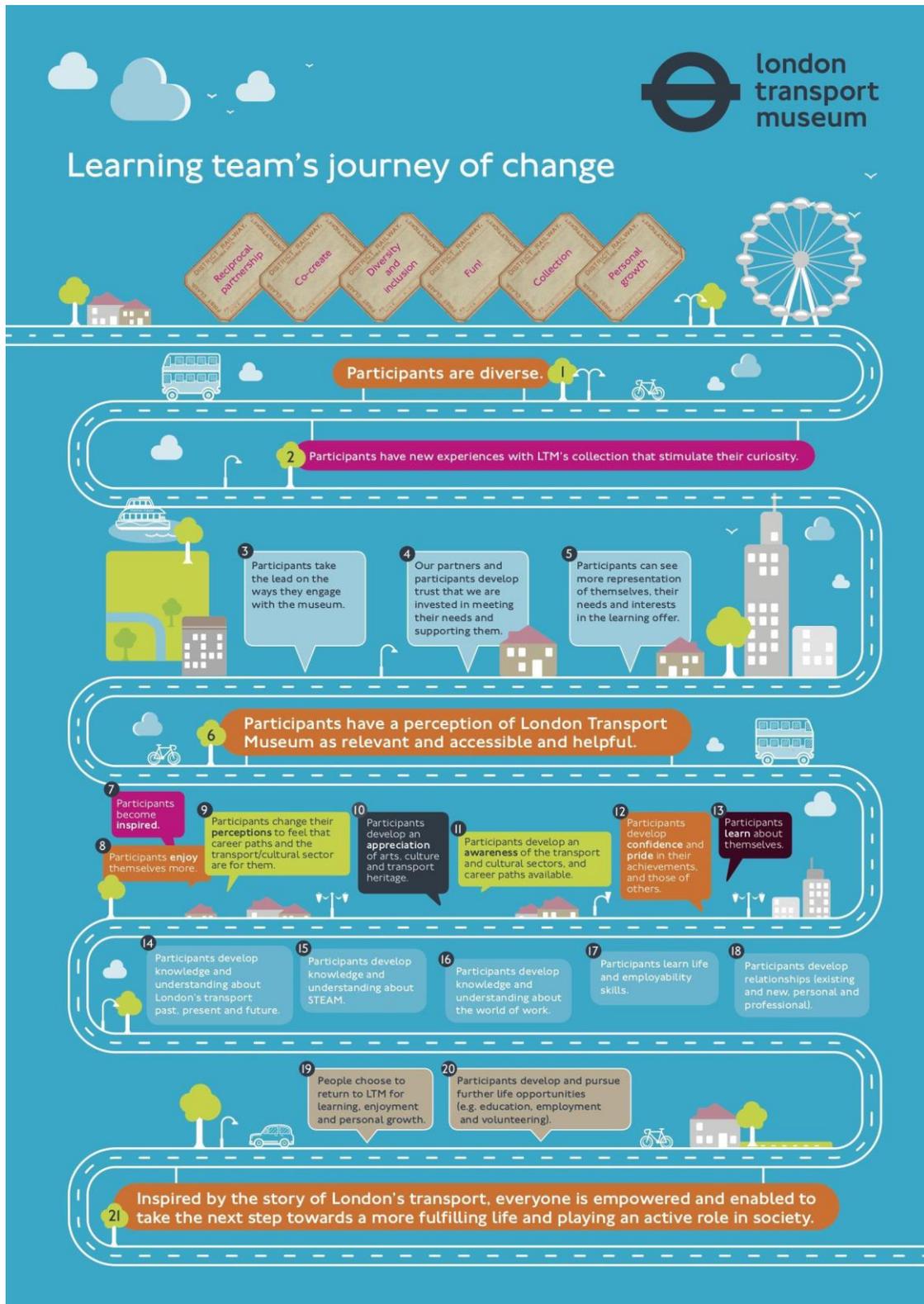
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Appendix A: Journey of Change



Appendix B: Interviews

Basic Disclaimer: Hello! We are a team of four student placements from the United States, working with the Learning team to digitize and streamline the evaluation of the London Transport Museum's learning programmes. We would like to speak to you in order to better understand [specific programme strand/expertise] as it applies to our project. We will not ask any questions not relating to our project. Would you be willing to speak with us, understanding that parts of your responses may be published in our final report?

Interview With Jenny Kohnhorst:

Jenny Kohnhorst
Programme Manager for Primary Schools
11Mar19 - 3PM

Disclaimer: Hello! We are a team of four student placements from the United States, working with the Learning team to digitize and streamline the evaluation of the London Transport Museum's learning programmes. We would like to speak to you in order to better understand primary school programme evaluation as it applies to our project. We will not ask any questions not relating to our project. Would you be willing to speak with us, understanding that parts of your responses may be published in our final report?

Interview

- Currently programme evaluations are done twice per term and are done by
 - Observation
 - During evaluation week there are 3 of these sheets filled out per day and it's the same sheet for all sessions.
 - Teachers
 - One paper survey that they fill out near the end providing information on the school and the teachers opinions of their visit as a whole
 - Students
 - The students within the primary school programmes do not actually fill out the surveys themselves, the questions are asked to the class as a whole and the results are recorded by a volunteer who then writes them down
 - Students supply answers to the same questions before and after the session
- All primary school programmes done within the museum are in the "transporarium" room
 - Some primary school programmes have a portion where you walk through the museum to look at objects related to the session

- During evaluation week when the programmes are being evaluated, there are different sessions everyday and each session has its own pre/post questions
 - pre/post questionnaires are filled out by the museum volunteer also observing and helping with the session
- In the past they only asked for the school teacher's feedback and they would get 15 forms a week for 35 weeks
 - That's 525 paper forms a year that need to be input into a computer
 - Too many surveys to gather every year so now only administer during the evaluation weeks
- She would like to more teacher feedback outside of evaluation week if possible

Interview With Vicki Pipe:

Interview with Vicki Pipe
Programme Manager for Families and Communities
18Mar19 - 10am

Disclaimer: Hello! We are a team of four student placements from the United States, working with the Learning team to digitize and streamline the evaluation of the London Transport Museum's learning programmes. We would like to speak to you in order to better understand family and community programme evaluations as they applies to our project. We will not ask any questions not relating to our project. Would you be willing to speak with us, understanding that parts of your responses may be published in our final report?

Interview:

- Families
 - History/Background
 - Core funded by LTM
 - Never had to produce feedback to museum prior to Project Oracle push
 - Previous evaluations were for internal evaluation only - most questions related to fun rather than learning
 - Outcomes evaluated on: 14, 15, 17, 19
 - *Is it necessary to ask the same questions for all three of the types of sessions (sing-along, storytime, large-scale outreach)?*
 - Yes
 - *Some of the programs are funded by the Arts Council. Is the information they are looking for already in the now-current evaluation program?*
 - Not yet - the arts council has number targets and that is currently all they want to know
 - Looking to combine with current evaluation
 - *Any outcomes or indicators that you are most interested in seeing in terms of improvement?*
 - Very interested in progress on outcomes 14 and 17
- Communities
 - History/Background
 - Previously programmes have only been conducted based off of where the money came from
 - Most recently was a 5 year programme about Battle Bus/WWI
 - Currently and previously no evaluations have been conducted
 - Outcomes evaluated on: 6, 14, 17, 19
 - *Who is the audience of the community program?*
 - Want to work mostly with underrepresented people
 - Can include just about everyone (children, adults, English as a second language)

- On a surface level the programme is meant to show what the LTM is

Interview With Rebecca Hill:

Interview with Rebecca Hill
Programme Manager for Secondary Schools
13Mar19 -3:30pm

Disclaimer: Hello! We are a team of four student placements from the United States, working with the Learning team to digitize and streamline the evaluation of the London Transport Museum's learning programmes. We would like to speak to you in order to better understand secondary school programme evaluation as it applies to our project. We will not ask any questions not relating to our project. Would you be willing to speak with us, understanding that parts of your responses may be published in our final report?

Interview:

- Discussed how our day observing the secondary school programmes went
 - Well overall
- What we thought about the programme as a whole
 - Great programme and all students are engaged in all activities
 - The opportunity to interview TfL engineers is fantastic
- Discussed improvements to eggspirement
 - Display science-based pieces earlier to reinforce concepts
- Observations sheet
 - Comment/quotation based
 - Things that were unclear/oddly phrased
 - Formatting for different portions
 - Forms are still being modified
 - May be difficult to put online in a google form

Currently all qualitative data being collected

Interview With Trevor Blackman:

Interview with Trevor Blackman
Programme Coordinator for Young People
19Mar19 - 1pm

Disclaimer: Hello! We are a team of four student placements from the United States, working with the Learning team to digitize and streamline the evaluation of the London Transport Museum's learning programmes. We would like to speak to you in order to better understand young people's programme evaluation as it applies to our project. We will not ask any questions not relating to our project. Would you be willing to speak with us, understanding that parts of your responses may be published in our final report?

Interview:

- Needs to know what we need from him and how the evaluations will work
- **JET questionnaires**
 - Handed paper copy (one used in sessions)
 - Once on iPads - do one-on-one?
 - Might be helpful, especially at first
 - Could take in groups (5 at a time) to a slightly quieter location
 - Measures outcomes 16, 17, 20
 - All outcomes important in final analysis (dashboard)
 - Pay particular attention to
 - Ethnicity
 - Gender (female)
 - Disabilities
 - TfL wants more diverse upper level management and RiW is the way they intend on completing this goal
 - "Distance traveled" by these groups also seems to be a good measurement
- RiW currently does not have observations
- Schedule/content
 - All three days are different
 - Egg drop, TfL focused, review, assessment, etc.
- Transitioning all surveys online for RIW might not be helpful because there are only 5 iPads and this would require students cycling in and out of the room to complete the surveys, meaning they would miss parts of the programme

Interview With Ruth Melville:

Interview with Ruth Melville
External Evaluation Consultant
12Mar19 - 11:30AM

Disclaimer: Hello! We are a team of four student placements from the United States, working with the Learning team to digitize and streamline the evaluation of the London Transport Museum's learning programmes. We would like to speak to you in order to better understand the London Transport Museum evaluation framework as it applies to our project. We will not ask any questions not relating to our project. Would you be willing to speak with us, understanding that parts of your responses may be published in our final report?

Interview:

- **Project oracle-** accreditation to raise the quality of analysis that is happening on the social side by getting people to claim causation and be more focused on what people are measuring
 - First stage of accreditation was submitted in november
 - Find specific things to measure and achieve
 - Created a list of 20 outcomes after
 - **Journey of change-** arrows need to matter
 - Can you justify the objectives
 - One journey of change (flow chart) created for each strand
 - 6 or 7 highlighted but each team is only focusing on around 3
- Each strand has own plan designed for objectives of each programme
- Originally had no physical proof or data that aims were being achieved
 - New documents and surveys help provide claims
 - Need new observational tool or model
- E2E- Enjoyment to Employment
 - 1. Improve practice
 - 2. Prove the benefit
 - 3. Funders
- Challenge: fun vs. science within programmes
 - Need to balance both, especially with small children

Question: what does the oracle accreditation do for the museum? Gives the "sense of kudos" for the museum to say it has it, and it shifts the aims of the museum to be more educational and pushes best practice up

- Oracle is very london based and in youth sector
 - Designed for 16+ ish age groups which does not align with most of LTM programmes
- Evidence based vs. claims
- JET questionnaire was one example of a previous accredited surveys but deemed bad by LTM learning team staff due to wording
- STEAM- questions
 - Used a lot of scales with positive/negative wording scales

- Very similar wording
- Better for secondary strand at least

Question: Is there any emphasis on linking the different strand programmes through the outcomes?

- Enjoyment to employment
 - Enjoy is the young people
 - Employ is the older people
- There are different funders for certain things

Question: Can you track returners? They want to but they want to add it in, currently do not have a way to do that

Question: What does the museum care about?

- Need to prove to the museum the value of the outcomes
- Need 3 new funders in calendar year
- They want more diverse workers- potential main reason as for why TfL supports the museum

Interview With: Liz Poulter, Jenny Kohnhorst, Rebecca Hill, Megan Dowsett

Group Interview with Liz Poulter, Jenny Kohnhorst, Rebecca Hill, Megan Dowsett
26Mar19 - IIAM

Disclaimer: Hello! We are a team of four student placements from the United States, working with the Learning team to digitize and streamline the evaluation of the London Transport Museum's learning programmes. We would like to speak to you in order to better understand Enjoyment to Employment evaluation as a whole as it applies to our project. We will not ask any questions not relating to our project. Would you be willing to speak with us, understanding that parts of your responses may be published in our final report?

Interview:

Rebecca Hill: Secondary School Programmes

- Currently using 2 evaluation forms: student and observation
 - Student forms
 - Fill out questions Pre/Post programme- kids filled out the forms well and there were very few issues with them, but some did not fill out the back
 - Will add a little arrow of some kind at the bottom corner
 - Outcome 17- secondary uses CREST booklet
 - Crest award
 - Observation forms
 - Cannot do 2 days of observation by yourself because you need to jump back and forth between the groups and end up missing a lot
- Issues with form:
 - Trying to observe all 3 outcomes is hard
 - Outcome 16 is awkward to measure because it is objective, it could be taken out
- A new spreadsheet needs to be designed to enter data

Jenny Kohnhorst: Primary School Programmes

- Biggest issue is with the final 3 questions within the first outcome do not pertain to all of the primary school programmes and she wants us to help looking at how to improve them
 - Should we gather that info just from teachers or the CSA's?
 - Need to figure out the logistics
- Help the individual group leaders can get more guidance
 - Possibly re-design of the information cards
- Asked how the evaluations have gone for us so far
 - Overall good, logistically done 3 rounds and isn't challenging but difficulty with observation and navigation, space to support freelancers to integrate pre/post questions into sessions (some are good some feel disconnected)

- Team training day in september- eval was brought in half way through first term so it wasn't included in training, but will be included from now on
- Looking towards adding pre/post to all sessions, not just evaluation week
- Interested in what comes out of the data
 - What story can we tell with the data from this year

Liz Poulter: E2E Manager

- Is there a way to capture more information from the groups throughout the day?
- The past year has seen a huge shift in what learning team has done in evals
- Evaluations are done one week ever term
 - Could consider adding pre/post questions to all sessions could be beneficial
- Could add career outcome to primary

Megan Dousett: Schools Programme and Interpretation Manager

- Should embed pre/post questions into all new sessions that are being created and in the slides for every session not just the sessions during evaluation week
- Could re-evaluate the reports and data we gathered at the end of the year and see if the 6 outcomes need to switch for the sessions

Appendix C: Strand Outcomes

Outcome	Strands Collecting Evidence	Data Collected in 2018-19
Outcome 6 - Participants have a perception of the London Transport Museum as relevant and accessible and helpful.	Community Programmes	None
	Primary School Programmes	Observation, Teacher Feedback
Outcome 14 - Participants develop knowledge and understanding about London's transport past, present and future.	Family Programmes	None
	Primary School Programmes	Knowledge Questions
Outcome 15 - Participants develop knowledge and understanding about STEAM.	Family Programmes	None
	Primary School Programmes	Modified STEAM Questionnaire
	Secondary School Programmes	EBM Inspire, Observation
Outcome 16 - Participants develop knowledge and understanding about the world of work.	Secondary School Programmes	EBM Inspire, Observation
	Young People's Programmes	JET Questionnaire
Outcome 17 - Participants learn life and employability skills.	Community Programmes	None
	Family Programmes	None
	Primary School Programmes	Observation
	Secondary School Programmes	Observation, CREST Award Booklet
	Young People Programmes	JET Questionnaire
Outcome 19 - People choose to return to LTM for learning, enjoyment, and personal growth.	Community Programmes	None
	Family Programmes	Audience Finder
	Primary School Programmes	Teacher Feedback
Outcome 20 - Participants develop and pursue further life opportunities (e.g. education, employment and volunteering)	Young People Programmes	JET Questionnaire, Linked Assessment Positive Progression

Appendix D: E2E Report - Main

Deliverable

LONDON TRANSPORT MUSEUM – ENJOYMENT TO EMPLOYMENT

April 2019

Lauren Francis, Sebastian Hamori, Andrew Robbertz, Kylie Sullivan

Performance Overview Table

Outcome	Sub Outcomes	Example Evidence	Strength of Findings	Quality of Data Collected
6. Participants have a perception of the London Transport Museum as relevant and accessible and helpful.	Participants can access the Museum	Teachers rate the museum collection as accessible	Green	Green
	Participants needs are met	Students are visibly engaged in what they're doing	Green	Amber
14. Participants develop knowledge and understanding about London transport's past, present, and future	Participants gain knowledge	Participants gained knowledge, shown in pre-post session feedback	Green	Amber
	Change their perception	No evidence collected for this sub outcome	Red	Red
	Participants apply their knowledge	No evidence collected for this sub outcome	Red	Red

15. Participants develop knowledge and understanding about STEAM	Participants gain knowledge	All participants were observed telling others what they know	Green	Amber
	Participants change their perception	Minor Increase in view of engineering as interesting	Amber	Amber
	Participants apply their knowledge	No evidence collected for sub outcome	Red	Red
16. Participants develop understanding about the world of work	Participants gain knowledge	Increase in rating of knowledge in engineering careers	Green	Green
	Participants change their perception	Increase in desirability of STEM careers	Green	Green
	Participants apply their knowledge	No evidence collected for this sub outcome	Red	Red
17. Participants learn and develop employability skills	Participants use skills	furthered problem solving, teamwork and communication skills	Green	Amber
	Participants are positive about their skills	No evidence collected for this sub outcome	Green	Amber
	Participants apply their skills in real life scenarios	Participants felt more positive about their future aspirations after the programme	Green	Amber
19. People choose to return to LTM for learning, enjoyment and personal growth	People return to learn / get new skills	Participants have returned to the LTM	Green	Green
	People enjoy their visit	Observers saw moments of student	Green	Amber

		enjoyment (smiling and laughing)		
20. Participants develop and pursue further life opportunities	Participants know about career opportunities available	Participants felt more secure about their career direction after the programme	Green	Green
	Participants plan their progression routes	No evidence collected for this sub outcome	Red	Red
	Participants take action	No evidence collected for this sub outcome	Amber	Green

The RAG rating chart above was generated to show the museums current performance towards meeting the desired outcomes. We based the ratings on statistical evidence, the quantity of data, and the trends we observed.

- Green - There is good evidence
- Amber - There is some evidence
- Red - There is no evidence

Introduction

The Enjoyment to Employment (E2E) programmes are fun, educational programmes currently offered to primary schools, secondary schools, young people, families, and the community at large. The E2E staff recognised a need to show the impact of these programmes on their audiences, and therefore aimed to obtain multiple levels of Project Oracle’s evidence validation. In order for these programmes to achieve Project Oracle’s first level of validation E2E managers created a Journey of Change, an evaluation plan for each of these programmes, and a set of tools to collect evidence of change. With these methods of evidence collection in place, the E2E staff is now concerned with showing a positive impact on their programmes participants using the data collected. Therefore, the aim of this report is to

- Analyse the evidence gathered thus far to measure progress towards target outcomes,
- Determine if there exists a verifiable positive change in these outcomes,
- Identify any limiting factors in the evidence collection and analysis process
- Provide recommendation on how these processes can be changed

Of the 21 outcomes in the Learning Team’s Journey of Change, they identified the following 7 as the most important to show the impact of their programmes. The following table highlights these outcomes, and the programmes that intend to collect evidence of these outcomes.

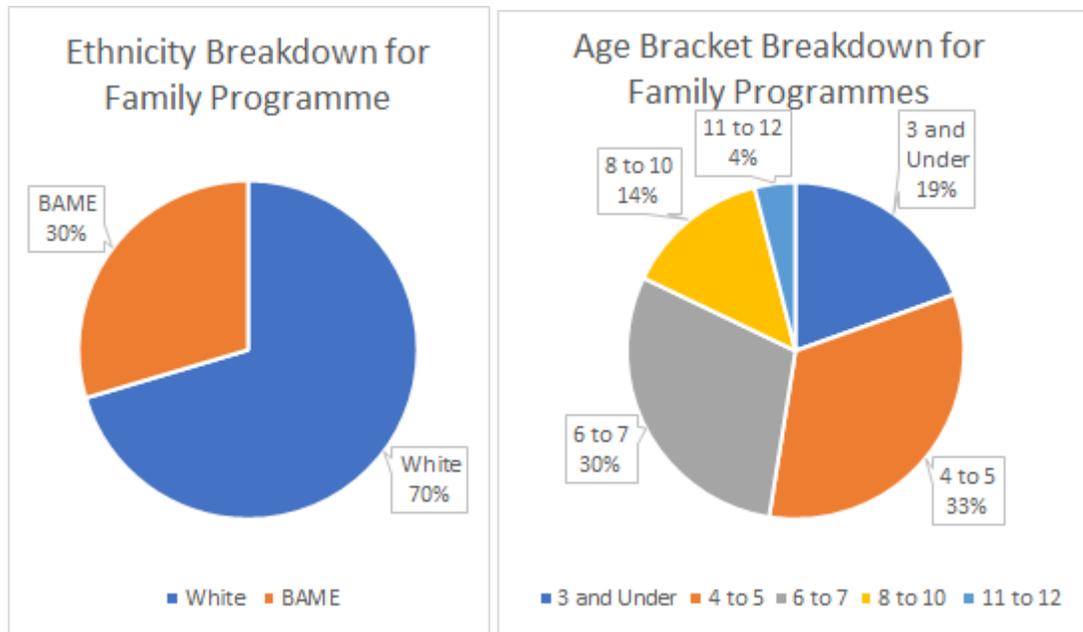
Outcome	Programmes Collecting Evidence	Data Collected in 2018-19
Outcome 6 - Participants have a perception of the London Transport Museum as relevant and accessible and helpful.	Community Programmes	None
	Primary School Programmes	Observation, Teacher Feedback
Outcome 14 - Participants develop knowledge and understanding about London's transport past, present and future.	Family Programmes	None
	Primary School Programmes	Knowledge Questions
Outcome 15 - Participants develop knowledge and understanding about STEAM.	Family Programmes	None
	Primary School Programmes	Modified STEAM Questionnaire
	Secondary School Programmes	EBM Inspire, Observation
Outcome 16 - Participants develop knowledge and understanding about the world of work.	Secondary School Programmes	EBM Inspire, Observation
	Young People's Programmes	JET Questionnaire

Outcome 17 - Participants learn life and employability skills.	Community Programmes	None
	Family Programmes	None
	Primary School Programmes	Observation
	Secondary School Programmes	Observation, CREST Award Booklet
	Young People Programmes	JET Questionnaire
Outcome 19 - People choose to return to LTM for learning, enjoyment, and personal growth.	Community Programmes	None
	Family Programmes	Audience Finder
	Primary School Programmes	Teacher Feedback
Outcome 20 - Participants develop and pursue further life opportunities (e.g. education, employment and volunteering)	Young People Programmes	JET Questionnaire, Linked Assessment Positive Progression

This report will not comment on progress towards the outcomes where no evidence has been collected. It will simply recommend ways to collect evidence in these areas to later measure a positive impact on programme participants. Additionally, the lack of statistical evidence showing progress towards these outcomes does not mean the outcomes are not being met. This could be because the tools used to collect evidence do not reflect all outcomes highlighted by the Learning Team. Changing the design of impact tools may show great progress in meeting the highlighted outcomes without introducing any bias or subjectivity in the evidence.

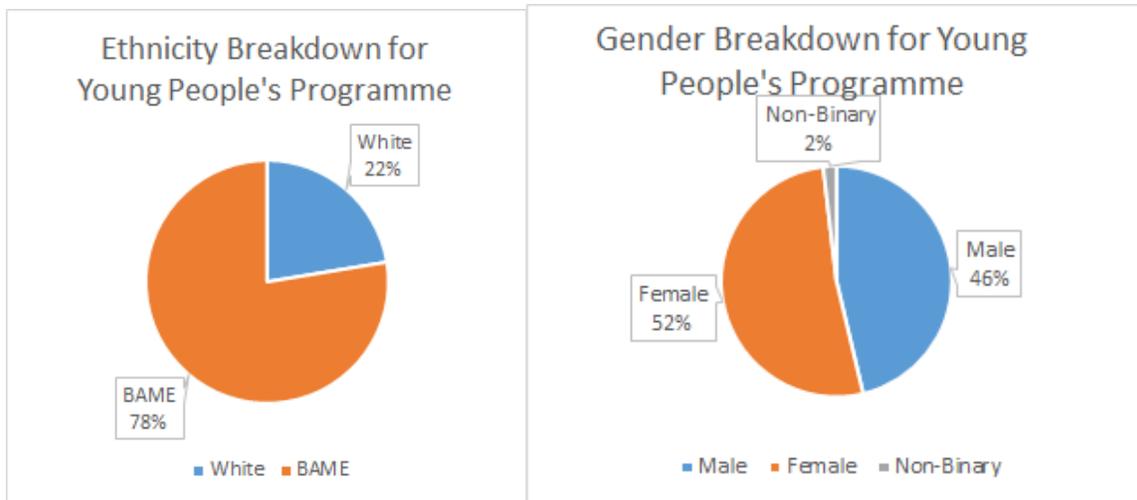
Audiences

Along with the outcomes highlighted previously, the Learning Team would like to ensure the outreach of their programmes is broad and can reach disadvantaged audiences who may typically have less access to educational resources. As seen in the graph below (created from the family programme survey data), **30% of audiences reached by the programme fall into BAME categories**. This indicates that the museum is reaching diverse audiences and barriers to access are being broken. A total of **114 families** shared demographic information in their responses.

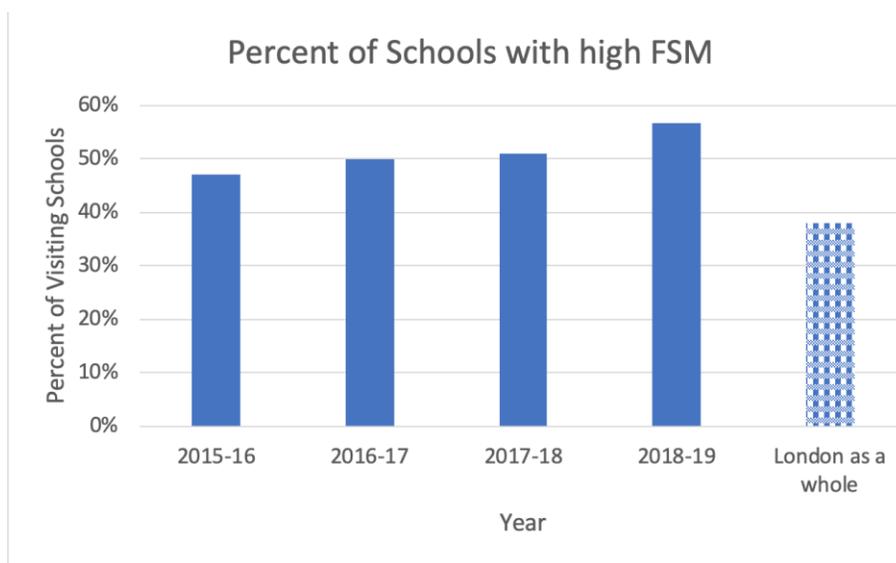


Beyond ethnic demographics, the museum also measures age demographics for its family programme participants. Many of the participants, **more than 50%, are under the age of 5**.

There is also strong evidence of diversity in **Young People's** programmes. The ethnic and gender distribution of the **58 surveyed participants** can be found below. The BAME population in London is 40.2%, much lower than the young people's demographic statistic, meaning that **the young people's programme is more diverse than London as a whole**.



The programmes the Learning Team offers also show to reach areas of multiple disadvantage. The bar chart below shows the percentage of all schools visiting LTM with high FSM rates.



As seen in the chart, the **London Transport Museum achieves greater diversity in their audiences than London as a whole**. Additionally, the London Transport Museum reached audiences with

- 44.4% FSM for Primary Schools in 2018-19
- 62.1% FSM for Secondary Schools in 2019-19

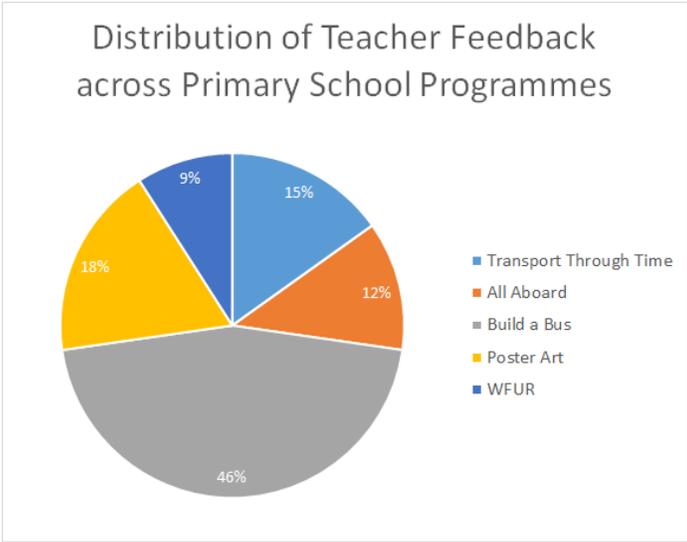
These data show clear trends that the **museum is reaching diverse audiences** and barriers to accessing the museum are being broken. However, there has not been enough data collected to make any conclusions with statistical significance.

Outcome 6: Participants have a perception of London Transport Museum as relevant and accessible and helpful

The evidence of this outcome is collected through **primary school programmes** and **community programmes**. Since there is no evidence collected for community programmes, we have only presented evidence collected from primary school programmes in Covent Gardens and outreach programmes at schools. Based on the data collected, there is **strong positive evidence** that participants view the museum as relevant, accessible, and helpful. However, there is not enough data to make any conclusions with statistical significance.

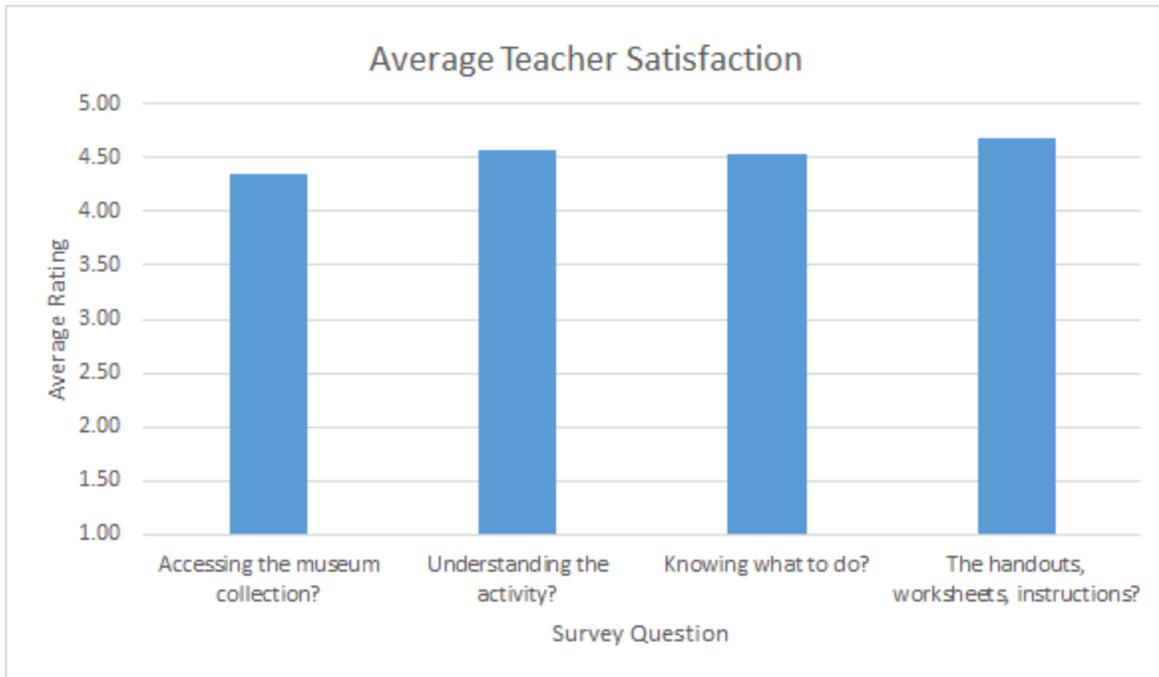
6.1. Participants Can Access the Museum (Primary School Session Observation)

In each of the **primary school** programmes observed, as well as some outreach programmes, teachers were asked to complete feedback surveys about their experience with the London Transport Museum. Below is the distribution of teacher feedback collected from each of the programmes.



As seen in the figure, data is collected from a variety of sources. However, the data should be split as evenly as possible to remove bias from any one of the programmes offered. The majority of the data presented is collected from the *Build a Bus* programme, which may introduce bias relating to that specific programme.

Each teacher was asked about accessibility of the museum to their school group , and recorded their answer on a scale (1-5) with 1 being the least positive experience, and 5 being the most positive experience. Below is the average satisfaction across all teachers who submitted feedback about their session.



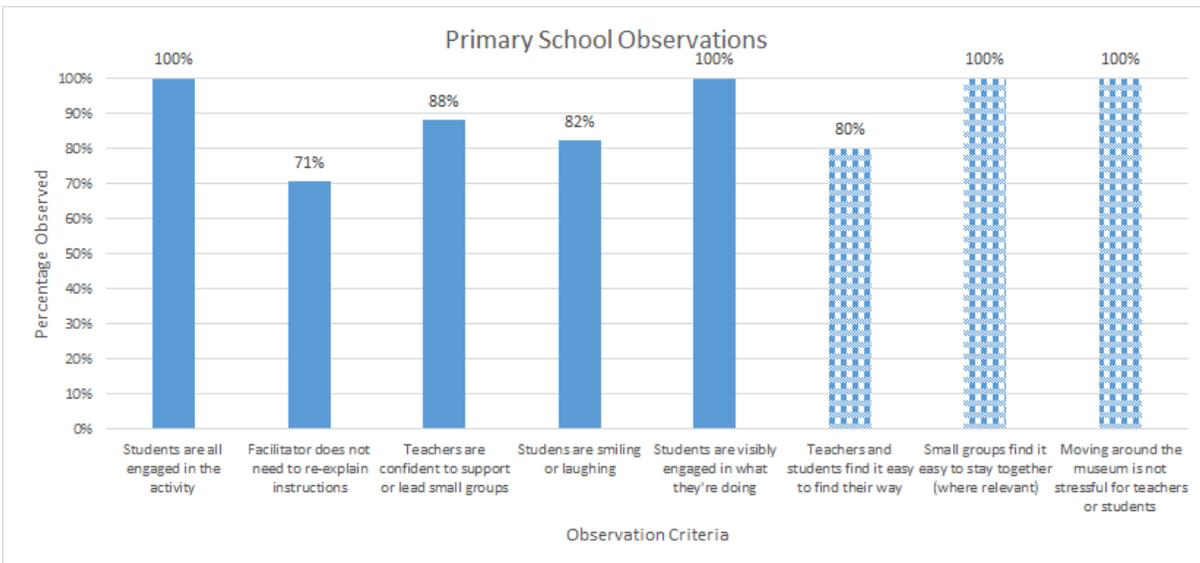
Of the 29 total teachers that submitted feedback

- 25 (86% of responders) rated “Accessing the museum collection” as 4 or above
- 29 (100% of responders) rated “Understanding the activity” as 4 or above
- 27 (93% of responders) rated “Knowing what to do” as 4 or above
- 27 (93% of responders) rated “The handouts/worksheets/instructions” as 4 or above

These data show **strong positive evidence** that the outcome is being met. However, more data is required to make any conclusions with statistical significance.

6.2. Participant’s Needs are Met (CG Teacher Feedback, Outreach Feedback)

Primary school session observation was completed in the Covent Gardens location with a variety of school groups. The data collected is from the World’s First Underground Railroad, Transport through Time, Build a Bus, and Poster Art sessions. Based on student and teacher activity in these sessions evaluators collected the following data over 17 total observations.



The patterned bars highlight indicators that could not be measured in specific programmes. For example, in the the Build a Bus and Poster Art sessions (12 in total), students do not get the opportunity to leave the Transportorium. Therefore there is no chance for these indicators to be met during the sessions observed, and they were not included in the data presented. In all, these data show **strong positive evidence** that the outcome is being met. However, more data is required to make any conclusions with statistical significance.

Outcome 14: Participants develop knowledge and understanding about London’s Transport past, present and future

The evidence of this outcome is collected through **primary school programmes**. Unfortunately, there is no data collected by the family programmes so no conclusions can be made about their outcomes being met. The quality and objectivity of data collected is limited because of the analysis process, outlined below. This may introduce limited error bias in evidence collected. However, based on the data collected, there is **strong positive evidence** that participants develop knowledge and understanding of London transport’s past, present, and future.

14.1. Participants Gain Knowledge (Primary)

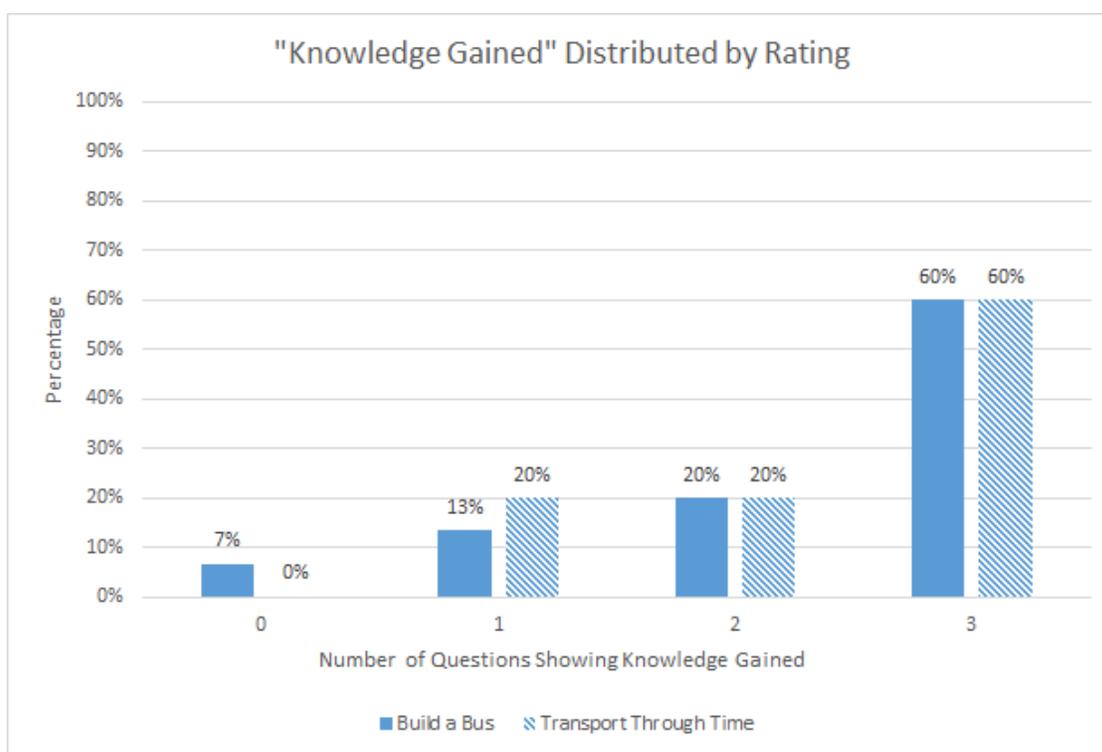
In **primary school session** students are asked three questions at the beginning and end of the session. Students would answer these questions as they were called on by session leaders, and volunteers or observers would write down key answers the students said. For Build a Bus sessions students were asked:

- What do busses look like? Did busses from the past look the same?
- What’s it like to be a bus driver?
- How do people pay for the bus? How did people in the past pay for the bus?

For Transport through Time sessions students were asked:

- When was the Victorian Era?
- How did victorians get around?
- What did the Victorians think of their transport system?

Showing significant knowledge gained for a given question received a score of 1 for that question; no significant knowledge for a given question received a score of 0. The responses were quantified (either 0 or 1) based on the level of detail and accuracy in their answers as they related to the topics of the programme. With three questions in total, the greatest possible score for a session is +3. The percentage of sessions that received an overall score of 0, 1, 2, or 3 can be found below. There were 15 Build a Bus sessions and 5 Transport through Time sessions included in the data.



Limited Knowledge Gained	Some Knowledge Gained	Good Knowledge Gained
0-1	1.01-2	2.01-3

The rating of average number of questions showing knowledge gained for each of these programmes is

- Build a Bus - Good Knowledge Gained (2.33)
- Transport through Time - Good Knowledge Gained (2.40)

In all, the data collected show **strong positive evidence** that participants gain knowledge about London transport’s past present and future. Again, there is limited ability to calculate the statistical significance of these changes. Another limitation in making conclusions about this evidence is the lack of objective scoring based on the qualitative responses collected. An evaluation chart, with specific keywords for each question, could act as indicators to make conclusions more objective.

Outcome 15: Participants develop knowledge and understanding about STEAM

Evidence of this outcome is collected in **primary school** and **secondary school** programmes. Unfortunately, there is no data collected by the family programmes so no conclusions can be made about their outcomes being met. Based on the data collected, there is **some positive evidence** that participants develop knowledge and understanding about STEAM. One secondary school student was quoted as saying “I learned that there is a lot more to being an engineer than I thought” while another student said “Engineering means problem solving and not just building things.” However, there is not enough data to make any conclusions with statistical significance.

15.1. Participants Gain Knowledge (Secondary)

In **secondary school programmes**, observers collected information about certain indicators demonstrating the outcomes have been met. In the Inspire engineering sessions, a total of 12 observations were completed. The percentage of observations that met specific indicators is found below.

- 100% of Participants tell others what they know
- 100% of participants are enjoying learning
- 92% of participants can summarise what they have learnt

The data show **strong positive evidence** of the outcome being met based on the indicators. However there is not enough data to make any conclusions with statistical significance.

15.2. Participants Change their Perception (Primary and Secondary)

For **primary school programmes**, evidence of change in perception is obtained by asking whether students consider each of the STEAM areas as interesting or boring. Students raise their hands for either interesting or boring, and the results are recorded by a volunteer or observer. The following chart shows students interests in these areas as they were asked at the beginning and end of the session, as well as the difference between the two. The data presented is based off of 3 sessions of the World’s First Underground and 6 sessions of Poster Art.

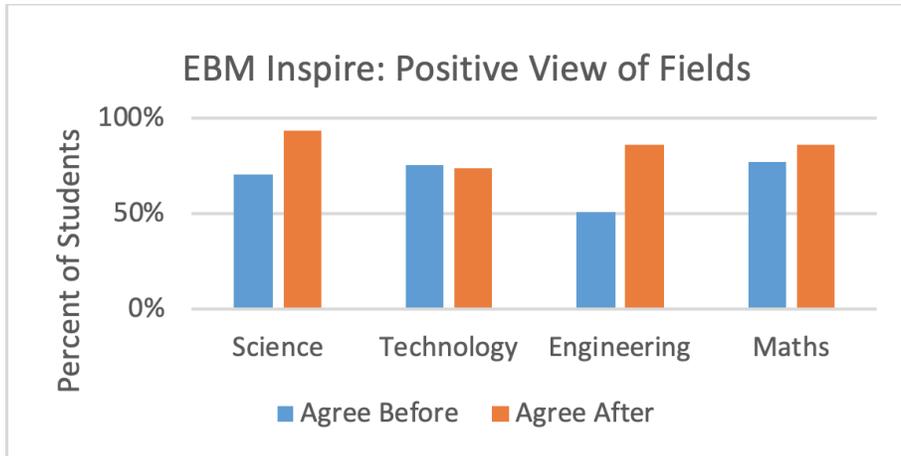
	Boring	Interesting	
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World's First Underground	Percentage before	Percentage after	Percentage before	Percentage after	Difference
Science	17.4%	5.8%	82.6%	94.2%	+11.6%
Engineering	28.2%	17.9%	71.8%	82.1%	+10.3%
Career in Engineering	48.1%	32.5%	51.9%	67.5%	+15.7%

	Boring		Interesting		
Poster Art	Percentage before	Percentage after	Percentage before	Percentage after	Difference
Art	19.7%	15.0%	80.3%	85.0%	+4.8%
Designing	17.0%	18.1%	83.0%	81.9%	-1.1%
Creativity	20.5%	16.2%	79.5%	83.8%	+4.3%

Based on the evidence collected, there is **limited positive evidence** of these outcomes being met by the primary learning programmes. The World's First Underground programme does show a greater positive difference in student's interests, however, this does not indicate that students in the Poster Art programmes do not change their perceptions of STEAM.

For **secondary school programmes**, evidence of change in perception is obtained by asking about students interest in STEAM areas. Students were asked, "How positive or negative is your view of the following?" Students rate their interests on a scale (1-5) at the beginning and end of the session. The percentage of students who reported "somewhat positive" or "very positive" interest (4 or greater) in the areas is found in the graph below. A total of 115 students reported on their interests in these areas.

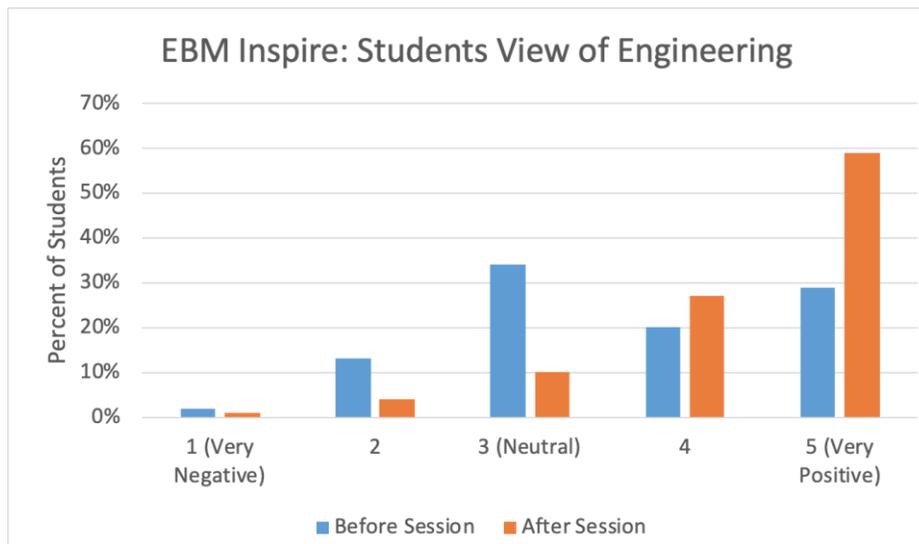


The Engineering Brand Monitor baseline report (2015) shows that, among individuals age 11-14,

- 64% find maths subjects interesting
- 71% find science subjects interesting
- 73% find technology subjects interesting

This baseline is somewhat consistent with the interests recorded at the beginning of the programme. Therefore the **increase is very significant compared to the UK average interest in STEM fields.**

The chart below shows the same data expanded for all interest rankings (1-5) as it relates to student's interests in Engineering specifically.



As seen in the graphs, the data show **strong positive evidence** that outcomes are being met. More specifically to engineering, there are strong trends showing an decrease in lower scores (1, 2, and 3) and increase in higher scores (4 and 5) before and after the session.

However, based on the limited data collected, no conclusions can be made with statistical significance.

Outcome 16: Participants develop knowledge and understanding about the World of Work

Evidence of this outcome is collected through **secondary school programmes** and **young people’s programmes**. Based on the data collected, there is **strong positive evidence** that participants develop knowledge and understanding about the world of work. However, there is not enough data to make any conclusions with statistical significance.

16.1. Participants Gain Knowledge (Secondary and Young People)

In **secondary school programmes**, students are asked to rank how much they know about careers in STEAM industries. Students rank their own knowledge on a scale (1-5) at the beginning and end of the programme. Below is the number and percentage of students who ranked a “somewhat strong” or “very strong” (4 or above) knowledge about careers in STEAM industries. A total of 115 students reported their knowledge in these areas.

EBM Inspire: How much would you say you know about people working in the following areas?					
	Number of students with positive view		Percent of students with positive view		
Sample size ~115	Before	After	Before	After	Difference
Science	52	68	45%	67%	+21%
Technology	55	70	48%	69%	+21%
Engineering	41	82	35%	81%	+46%

The Engineering Brand Monitor baseline report (2015) shows that, among individuals age 11-14,

- 42% had a positive view of their knowledge of working in Maths areas
- 46% had a positive view of their knowledge of working in Technology areas
- 30% had a positive view of their knowledge of working in Engineering areas

This baseline is relatively consistent with the knowledge recorded at the beginning of the programme. Therefore the **increase is very significant compared to the UK average** knowledge of working in these areas.

Within the observations conducted for the **secondary school programmes** observers measured students perceptions along several indicators. Observers simply recorded responses of whether or not the action was observed. With twelve observations conducted within one programme, 92% of observers noted that participants asked questions regarding the world of work. Based on the evidence collected, there is **strong positive evidence** that participants gain knowledge of the world of work. There is a positive change in all STEAM areas measured, showing participants believed they gained some knowledge from the programme. However, due to minimal data, no conclusions can be made with statistical significance.

The **young people’s programme** evaluates this sub outcome using observations, which indicated that **all participants could answer questions about the world of work** and that **all participants could demonstrate what they had learnt**. These demonstrations were done through group activities and presentations. As a result of these observations, there is **strong evidence** that the young people’s programme is meeting this objective, despite the **small sample size (12 people)**.

16.2. Participants Change their Perceptions (Secondary)

In **secondary schools programmes**, students are asked to rate how desirable a career in STEAM industries would be for their future. Students rank the desirability of each on a scale (1-5) at the beginning and end of the programme. The table below shows the number and percentage of students who rated each STEAM industry as “somewhat desirable” or “very desirable” (4 and above). A total of 115 students reported their desires to enter careers in STEAM industries.

EBM Inspire: How desirable do you believe a career in the following areas to be?					
	Number		Percent		
Sample size 115	“Desirable” Rating Before	“Desirable” Rating After	“Desirable” % Rating Before	“Desirable” % Rating After	Difference
Science	52	68	45%	67%	+21%
Technology	67	77	58%	76%	+17%
Engineering	59	77	51%	76%	+25%

The Engineering Brand Monitor baseline report (2015) shows that, among individuals age 11-14,

- 53% consider a career in engineering to be something for them.

This baseline is consistent with the desirability recorded at the beginning of the programme. Therefore the **25% increase is very significant compared to the UK average** interest in careers in engineering.

Additionally, students are asked to rate their motivation to study STEAM subjects in the future. Students are asked to rate on a scale (1-5) how much the sessions have changed their motivation. The table below shows the number of students and percentage of respondents who reported a somewhat positive or very positive (4 or above) change in their motivation based on the session. A total of 115 students reported how their motivations had changed.

EBM Inspire: These are some of the things which other people have said about the impact the activity has had on them. To what extent do you agree or disagree with them? Sample size=101	
It has motivated me to choose maths as an option when I have the choice	60.38%
It has motivated me to choose physics as an option when I have the choice	54.37%
It showed me engineering is suitable for boys and girls	89.22%
It made me feel a job in engineering would be interesting	81.19%

Lastly, students are asked to rate their perceptions of pursuing a career in STEAM industries. Students rate on a scale (1-5) how their perceptions of these careers have changed as a result of the session. The table below shows the number of students and percentage of respondents who reported a somewhat positive or very positive (4 or above) change in their perception based on the session. A total of 115 students reported how their perceptions had changed.

EBM Inspire: To what extent do you agree with the following statements Sample size 101	
I know what to do next in order to become and engineer	69.31%
Taking part in this activity has inspired me to want to work in engineering in the future	57.14%
Maths is important in all careers	67.35%

The Engineering Brand Monitor baseline report (2015) shows that, among individuals age 11-14,

- 26% believe they know what to do next in order to become an engineer.

Therefore the **increase is very significant compared to the UK average** knowledge of what to do next to become an engineer.

As mentioned, in **secondary school programmes**, observers measured students perceptions along several indicators. Observers only recorded responses of whether or not the event occurred. No scale was used to measure the degree to which each was observed. With 12 observations conducted,

- 67% of them noted students awareness in career direction considering the different routes of engineering and the importance of maths and science
- 100% of the students were observed talking about engineering in a positive way
- 66% of them were observed seeing engineering as a career for everyone.

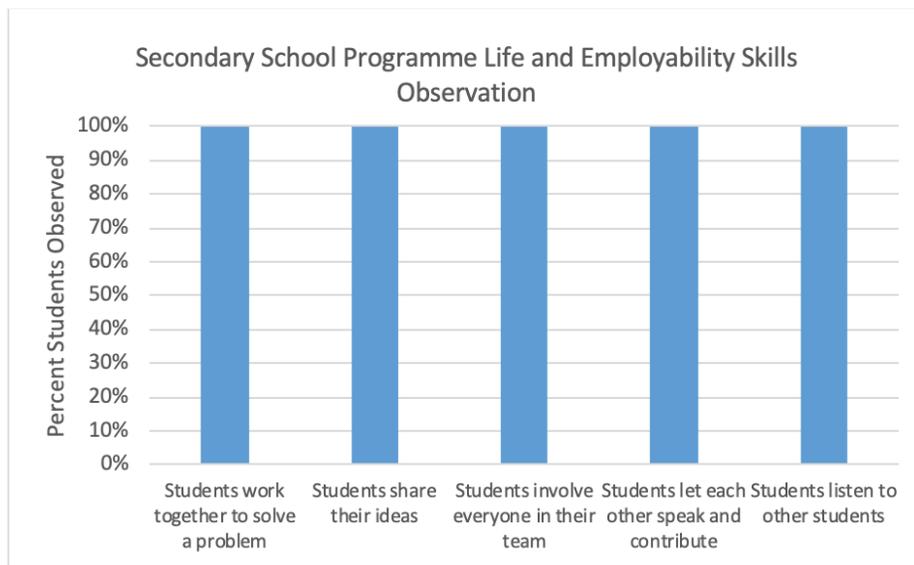
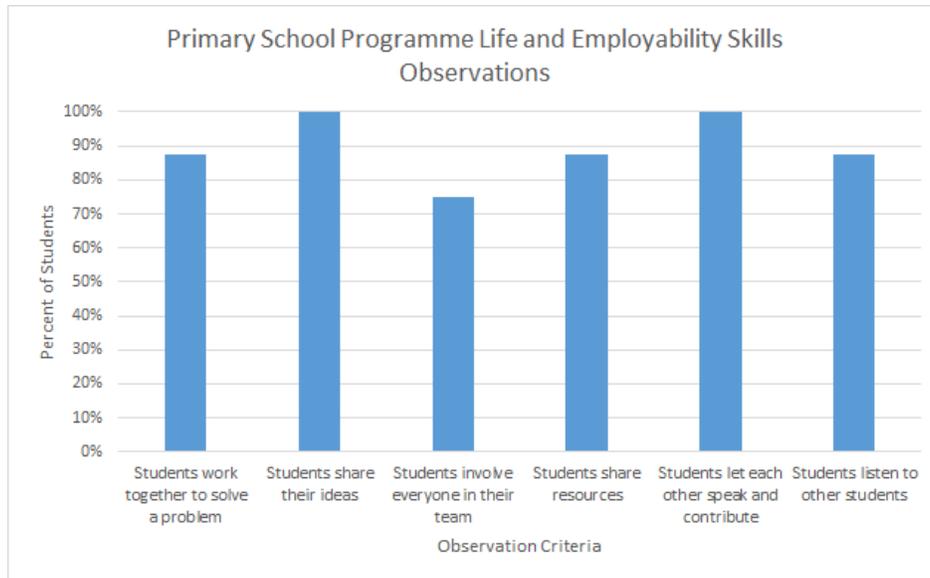
Based on the data collected, there is **strong positive evidence** that the outcome is met by the secondary learning programmes. There is a positive change in all STEAM careers measured, showing participants found STEAM careers more desirable after the programme. There is a positive indication in motivation to pursue STEAM related subjects in school. Lastly, there is a positive indication that students know what they need to do to pursue STEAM careers in their future. However, due to minimal data, no conclusions can be made about the outcome with statistical significance.

Outcome 17: Participants learn life and employability skills

Evidence of this outcome is collected through **primary school, secondary school and young people's programmes**. Based on the data collected, there is **strong positive evidence** that participants learn life and employability skills. However, there is not enough data to make any conclusions with statistical significance.

17.1. Participants Use Skills (Primary, Secondary, CREST)

In **primary school and secondary school programmes**, observers evaluate students ability to use key life and employability skills including problem solving, teamwork, and communication. Observers simply recorded responses of whether or not the event occurred. No scale was used to measure the degree to which each was observed. The percentage of sessions that met each of these indicators is found in the table below. A total of 16 and 6 observations were completed for primary and secondary schools, respectively.



In data gathered from the sample of 6 CREST Awards students wrote free response questions on skills they achieved throughout the programme. Among skills highlighted were: teamwork, communication, problem solving, research, creativity, organisation and trust. Below are some highlighted statistics from the sample.

- 83% of students said they achieved teamwork skills
- 66% of students said they achieved communication skills
- 66% of students said they achieved problem solving skills

Based on the information collected through observations, there is **strong positive evidence** showing participants use life and employability skills. For secondary schools, observers in all sessions observed students developing their problem solving, teamwork, and

communication skills. However, there is not enough data to make any conclusions with statistical significance.

17.2. Participants Feel Positive About Their Skills (Young People)

In the **young people's programme** evidence of this sub outcome is collected through JET questionnaires and observations. As noted through pre- and post-programme JET questionnaires, the participants of Route into Work experienced the following (**sample size 8**):

- Average change of +4.2% in their future aspirations
- Average change of +3.9% in their confidence in finding employment

This is further emphasized by the Route into Work observations. During these observations (**sample size 12**), **all participants had aspirations to find a job**. This is a **strong indicator** that Route into Work is achieving this sub outcome on behalf of the young people's programme. Based on the number of observations and JET questionnaires collected, the data presented is not statistically significant, but that does not negate the strong indication of positive evidence that programme participants feel positive about their skills.

17.3. Participants Apply their Skills in Real Life Scenarios (Young People)

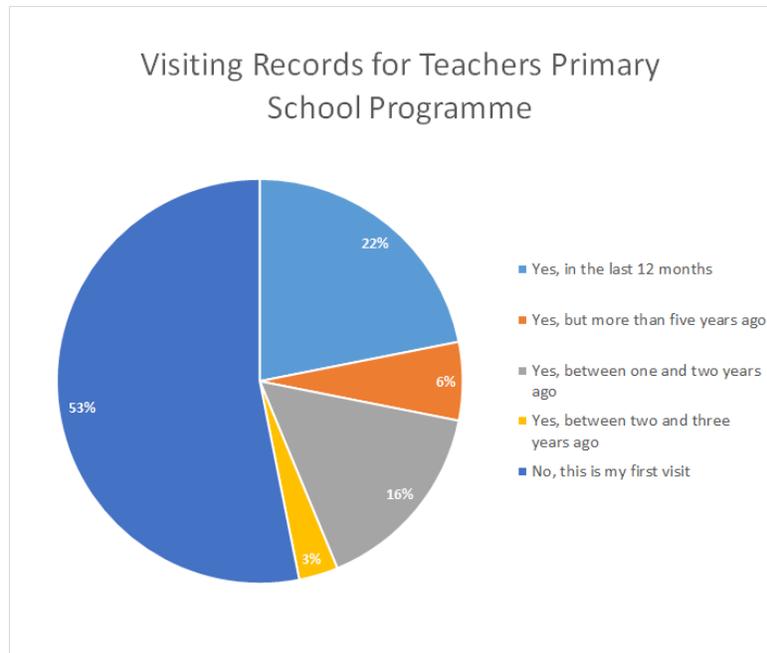
In **young people's programmes** participants are tasked with various real-life scenarios to work through. **All participants of Route into Work created a CV and participated in a multiple practice interviews** across the multi-day programme, as noted through direct observations (**sample size 12**). This is **strong positive evidence** that this sub outcome is being met by the young people's programme. However, there is not enough data collected to prove this claim.

Outcome 19: People choose to return to LTM for learning, enjoyment and personal growth

Evidence of this outcome is collected through **primary school programmes** and **family programmes**. Based on the data collected, there is **some positive evidence** that participants return to LTM for learning, enjoyment, and personal growth. However, there is not enough data to make any conclusions with statistical significance.

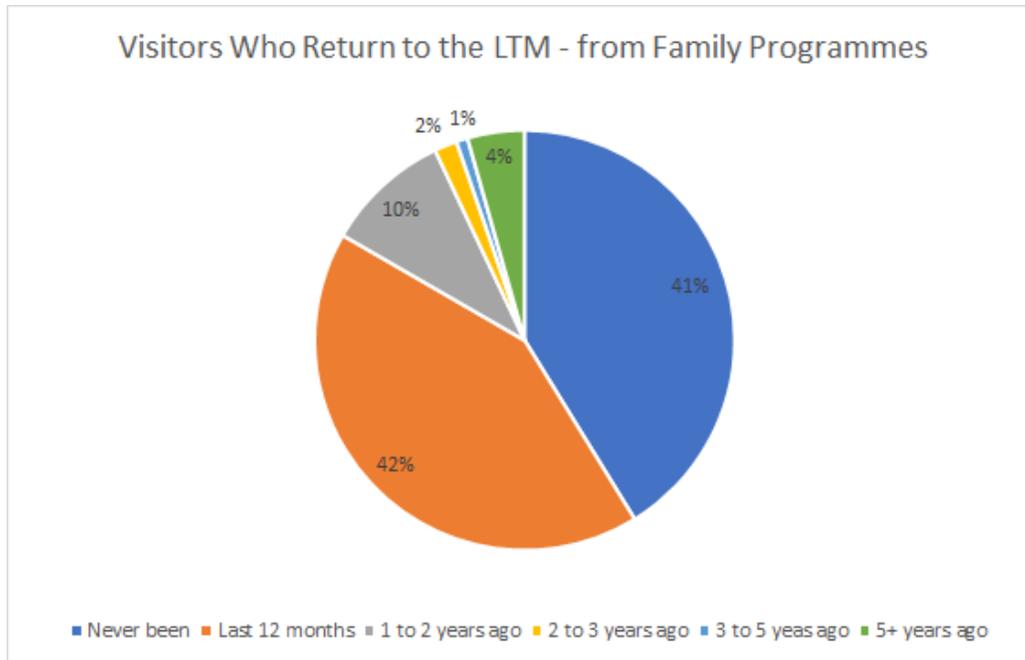
19.1. Participants Return to LTM (Primary and Family)

In **primary school programme** teacher evaluation forms, they are asked if they have visited the London Transport Museum in Covent Garden before, and if so, when. The chart below shows the distribution of teachers visiting the museum at the time of the evaluation. A total of 34 teachers responded to the questionnaire giving the following results.



In addition to this, teachers were asked how likely they were to recommend the session they participated in. The average response from teachers on a scale (1-10) was 9.22, indicating that **teachers are very likely to recommend** the primary learning session to other teachers and families.

The **family programmes** use exit surveys (here, given to a group of 114 programme participants) to collect extensive feedback on the programme and overall experience of programme participants. One of the questions asked specifically about prior museum visits, with a variety of options available to gather as much prior data as possible. As seen in the graph below, **more than 50% of programme participants had visited the museum before**. Of those who had been to the museum before, **41% of people surveyed had been more than once in the past year**. This is a good indication that museum visitors generally enjoy the museum, particularly if they have small children (as that encompasses most of the visitors surveyed for this programme). The evidence itself is compelling enough to say that people tend to return to the museum.



Outcome 20: Participants develop and pursue further life opportunities

Evidence of this outcome is collected through **young people’s programmes**. Based on the data collected, there is **some positive evidence** that participants develop and pursue further life opportunities. However, there is not enough data to make any conclusions with statistical significance.

20.1. Participants Know about Career Opportunities Available

In **young people’s programmes** participants are asked to rate their perception in a number of areas. They rate their perception of their personal networks and career direction on different numeric scales for each. The chart below shows the average participant’s summed perceptions towards the target areas at the beginning and end of the session. As noted through pre- and post-programme JET questionnaires, the participants of Route into Work experienced the following (**sample size 8**):

- Average change of +3.7% in their personal career networks
- Average change of +2.2% in their feelings on their career direction

The evidence collected by RiW programmes shows **some evidence** that the outcome is being met. However the changes in perception are minimal. This does not mean that the outcome is not being met; perhaps the impact tools used to collect the evidence are not working as effectively as they could be.

20.2. Participants Plan Their Progression Routes

This sub outcome is evaluated by the **young people's programme** through their workbooks, which have not been collected yet.

20.3. Participants Take Action

This sub outcome is evaluated by the **young people's programme** through their linked assessments. Based on these assessments, 40 out of 58 participants made a positive progression, yielding a **68.9% positive progression rate**. This is below the museum standard of 70% positive progression rates, meaning that there is **some positive evidence** that this outcome is being met.

Conclusion

Collectively, the LTM educational programmes appear to reach a wide number of people for varying backgrounds. Additionally, the data collected for all of the programmes show **strong trends that outcomes are met**. Participants in all programmes evaluated (primary schools, secondary schools, families, and young people's) seemed to thoroughly enjoy their respective programmes. Participants also seemed to learn from their programmes, as seen in the way they spoke about engineering after participating.

Based on the number of questionnaires and observations obtained, no conclusions made are statistically significant. In order to truly prove that the educational programmes are achieving their desired effect, more data must be collected to show statistical significance of the trends identified. However, the lack of statistical evidence does not mean the outcomes are not being met. Changing the design of impact tools may show great progress in meeting the highlighted outcomes without introducing any bias or subjectivity in the evidence. We believe the trends of positive impact currently seen in the data should continue, solidifying the effect the programmes have on their participants.

In the creation of this report, limitations were identified in the methods of collection. The methods of data collection are limited by the surveys and questionnaires themselves as word choice and document structure can influence decisions in the form of bias. Other limitations were the based around the collection itself which includes the session time constraints, the influence participants were observed to have on fellow classmates decisions, and the possibility of participants not completing documents in their entirety.

In order to improve comprehensibility and ease of analysis of the collected evaluation data, the following is **recommended**:

- Clarify which questions measure which sub outcomes more clearly in the evaluation plans
- Standardize the language and wording across programmes evaluation documents
- Provide more specific examples for indicators on observation sheets
- Create an evaluation chart for “knowledge questions” measuring objective I4
- Increase the number of surveys administered

Appendix E: E2E Report Outline

Performance Overview Table

Outcome	Sub Outcomes	Example Evidence	Strength of Findings	Quality of Data Collected
6. Participants have a perception of the London Transport Museum as relevant and accessible and helpful.	6.1. Participants needs are met			Green
	6.2. Participants see LTM as relevant			Amber
	6.3. Participants can access the Museum			Red
14. Participants develop knowledge and understanding about London transport's past, present, and future	14.1. Participants gain knowledge			
	14.2. Participants change their perception			
15. Participants develop knowledge and understanding about STEAM	15.1. Participants gain knowledge			
	15.2. Participants change their perception			
16. Participants develop understanding about the world	16.1. Participants gain knowledge			
	16.1 Participants			

of work	change their perception			
17. Participants learn and develop employability skills	17.1. Participants learn life skills			
	17.2. Participants are positive about skills			
	17.3 Participants are prepared to take the next step			
19. People choose to return to LTM for learning, enjoyment and personal growth	19.1. People return to learn / get new skills			
	19.2. People enjoy their visit			
20. Participants develop and pursue further life opportunities	20.1. Participants know about opportunities, plan their progression routes			
	20.2. Participants take action			

The RAG rating chart above was generated to show the museums current performance towards meeting the desired outcomes. We based the ratings on statistical evidence, the quantity of data, and the trends we observed.

- Green - There is good evidence
- Amber - There is some evidence
- Red - There is no evidence

Introduction

The aim of this report is to

- Analyse the evidence gathered thus far to measure progress towards target outcomes,
- Determine if there exists a verifiable positive evidence of these outcomes,
- Identify any limiting factors in the evidence collection and analysis process
- Provide recommendation on how these processes can be improved

This report does not comment on progress towards outcomes where no evidence has been collected. It will simply recommend ways to collect evidence in these areas to later measure a positive impact on participants. Additionally, the lack of statistical evidence showing progress towards these outcomes does not mean the outcomes are not being met. This could be because the tools used to collect evidence do not reflect all outcomes highlighted by the Learning Team. Changing the design of impact tools may show great progress in meeting the highlighted outcomes without introducing any bias or subjectivity in the evidence.

Of the 21 outcomes in the Learning Team’s Journey of Change, the following 7 were identified as the most important to show the impact of its educational programmes. The following table highlights these outcomes, and the programmes that intend to collect evidence of these outcomes.

Outcome	Programmes Collecting Evidence	Data Collected in 2018-19
Outcome 6 - Participants have a perception of the London Transport Museum as relevant and accessible and helpful.	Community Programmes	None
	Primary School Programmes	Observation, Teacher Feedback
Outcome 14 - Participants develop knowledge and understanding about London's transport past, present and future.	Family Programmes	None
	Primary School Programmes	Knowledge Questions
Outcome 15 - Participants develop knowledge and understanding about STEAM.	Family Programmes	None
	Primary School Programmes	Modified STEAM Questionnaire
	Secondary School Programmes	EBM Inspire, Observation
Outcome 16 - Participants develop knowledge and understanding about the world of work.	Secondary School Programmes	EBM Inspire, Observation
	Young People’s	JET Questionnaire

	Programmes	
Outcome 17 - Participants learn life and employability skills.	Community Programmes	None
	Family Programmes	None
	Primary School Programmes	Observation
	Secondary School Programmes	Observation, CREST Award Booklet
	Young People Programmes	JET Questionnaire
Outcome 19 - People choose to return to LTM for learning, enjoyment, and personal growth.	Community Programmes	None
	Family Programmes	Audience Finder
	Primary School Programmes	Teacher Feedback
Outcome 20 - Participants develop and pursue further life opportunities (e.g. education, employment and volunteering)	Young People Programmes	JET Questionnaire, Linked Assessment Positive Progression

Audiences

The evidence museum audiences is collected through _____ programmes. Based on the evidence collected there is **(strong/some/limited) evidence** that the museum is reaching **diverse audiences** and **barriers to accessing the museum are being broken**. There **(has/ has not)** been enough data collected to make conclusions with statistical significance.

Family Programme

- Ethnicity Breakdown for Family Programme (BAME inclusion)
 - Data -> Families -> FAM Q Analysis
- Age Breakdown for Family Programmes
 - Data -> Families -> FAM Q Analysis

Young People's Programmes

- Ethnicity Breakdown for Young People's Programme
 - Data -> Young People's -> YP AF Analysis
- Gender Breakdown for Young People's Programme
 - Data -> Young People's -> YP AF Analysis

Schools Programmes (Both Primary and Secondary)

- Percent of Schools with FSM
- Compare LTM's audience to London as a whole

Outcome 6: Participants have a perception of London Transport Museum as relevant and accessible and helpful

The evidence of this outcome is collected through _____ programmes. Based on the data collected, there is **(strong/some/limited) positive evidence** that participants view the museum as relevant, accessible, and helpful. There **(has/ has not)** been enough data collected to make conclusions with statistical significance.

6.1. Participant's Needs are Met

Primary Schools

- Primary School Observations (Note any sessions where not all indicators can be met based on the design of the session)
 - Data -> Primary Schools -> PS OE Analysis

6.2. Participants See LTM as Relevant

6.3. Participants Can Access the Museum

Primary School Programmes

- Distribution of Teacher Feedback from Primary School Programmes
 - Data -> Primary Schools -> PS TSE Analysis
- Average Teacher Satisfaction
 - Data -> Primary Schools -> PS TSE Analysis
- Observation Forms (Note any sessions where not all indicators can be met based on the design of the session)
 - Data -> Primary Schools -> PS OE Analysis

Outcome 14: Participants develop knowledge and understanding about London's Transport past, present and future

The evidence of this outcome is collected through _____ programmes. Based on the data collected, there is **(strong/some/limited) positive evidence** that participants develop knowledge and understanding about London's Transport past, present and future. There **(has/ has not)** been enough data collected to make conclusions with statistical significance.

14.1. Participants Gain Knowledge

Primary School Programmes

- Knowledge Check Questionnaire (Build a Bus, Transport through Time)
 - Data -> Primary Schools -> PS VE Analysis

Limited Knowledge Gained	Some Knowledge Gained	Good Knowledge Gained
0-1	1.01-2	2.01-3

14.2. Participants Change their Perception

Outcome 15: Participants develop knowledge and understanding about STEAM

The evidence of this outcome is collected through _____ programmes. Based on the data collected, there is **(strong/some/limited) positive evidence** that participants develop knowledge and understanding about STEAM. There **(has/ has not)** been enough data collected to make conclusions with statistical significance.

15.1. Participants Gain Knowledge

Secondary School Programmes

- Observation Forms - Percentage of observations that met each indicator for sub outcomes
 - Data -> Secondary Schools -> SS OE Analysis

15.2. Participants Change their Perception

Primary School Programmes

- Steam Questionnaire (World's First Underground, Poster Art)
 - Data -> Primary Schools -> PS VE Analysis

	Boring		Interesting		Difference
	Percentage before	Percentage after	Percentage before	Percentage after	
World's First Underground					
Science					X > 10%
Engineering					0% < X < 10%
Career in Engineering					X < 0%

	Boring		Interesting		Difference
	Percentage before	Percentage after	Percentage before	Percentage after	
Poster Art					

Art					X > 10%
Designing					0% < X < 10%
Creativity					X < 0%

Secondary Schools

- EBM Inspire: Positive View of STEAM Fields (Before and after the session)
 - SS EBM Inspire Analysis
- Compare to EMB Baseline report (2015)
 - 64% find science fields interesting
 - 71% find technology fields interesting
 - 47% find engineering fields interesting
 - 62% find maths fields interesting

Outcome 16: Participants develop knowledge and understanding about the World of Work

The evidence of this outcome is collected through _____ programmes. Based on the data collected, there is **(strong/some/limited) positive evidence** that participants develop knowledge and understanding about the World of Work. There **(has/ has not)** been enough data collected to make conclusions with statistical significance.

16.1. Participants Gain Knowledge

Secondary School Programmes

- EBM Inspire: Knowledge of careers STEAM industries (Number & percentage of students with positive views, Percentage change before and after)
 - Data -> Secondary Schools -> SS EBM Inspire Analysis

EBM Inspire: How much would you say you know about people working in the following areas?					
	Number of students with positive view		Percent of students with positive view		
Sample size ~115	Before	After	Before	After	Difference

Science					X > 10%
Technology					0% < X < 10%
Engineering					X < 0%

- Compare to EBM Baseline report (2015)
 - 42% had a positive view of their knowledge of working in Maths areas
 - 46% had a positive view of their knowledge of working in Technology areas
 - 30% had a positive view of their knowledge of working in Engineering areas
- Observation Forms
 - Data -> Secondary Schools -> SS OE Analysis

Young People Programmes

- Observation Forms:
 - Data -> Young People's -> YP OE Analysis

16.2. Participants Change their Perceptions

Secondary School Programmes

- EBM Inspire: Desirability of career in STEAM industries (Number & percentage of students with positive views, Percentage change before and after)
 - Data -> Secondary Schools -> SS EMB Inspire Analysis

EBM Inspire: How desirable do you believe a career in the following areas to be?					
	Number		Percent		
Sample size 115	“Desirable” Rating Before	“Desirable” Rating After	“Desirable” % Rating Before	“Desirable” % Rating After	Difference
Science					X > 10%
Technology					0% < X < 10%
Engineering					X < 0%

- Compare to EBM Baseline report (2015)
 - 53% consider a career in engineering to be something for them.

- EBM Inspire: Motivation to chose STEAM subjects in the future, Perception of Engineering (Percentage who rate somewhat positive or very positive)
 - Data -> Secondary Schools -> SS EBM Inspire Analysis

EBM Inspire: These are some of the things which other people have said about the impact the activity has had on them. To what extent do you agree or disagree with them?	
It has motivated me to choose maths as an option when I have the choice	X > 65%
It has motivated me to choose physics as an option when I have the choice	35% < X < 65%
It showed me engineering is suitable for boys and girls	X < 35%
It made me feel a job in engineering would be interesting	

- EBM Inspire: Pursue careers in engineering (Percentage of students who reported a somewhat positive or very positive)
 - Data -> Secondary Schools -> SS EBM Inspire Analysis

EBM Inspire: To what extent do you agree with the following statements	
I know what to do next in order to become and engineer	X > 65%
Taking part in this activity has inspired me to want to work in engineering in the future	35% < X < 65%
Maths is important in all careers	X < 35%

- Compare to EBM baseline report (2015)
 - 26% believe they know what to do next in order to become an engineer.
- Observation Forms
 - Data -> Secondary Schools -> SS OE Analysis

Outcome 17: Participants learn life and employability skills

The evidence of this outcome is collected through _____ programmes. Based on the data collected, there is **(strong/some/limited) positive evidence** that participants learn life

and employability skills. There **(has/ has not)** been enough data collected to make conclusions with statistical significance.

17.1. Participants Use Skills

Primary Schools

- Observation Forms
 - Data -> Primary Schools -> PS OE Analysis

Secondary Schools

- Observation Forms
 - Data -> Secondary Schools -> SS OE Analysis
- CREST Award Data - Percentage of students that learned skills
 - Data -> Secondary Schools -> SS CA Analysis

17.2. Participants Feel Positive About Their Skills

Young People's Programme

- JET Questionnaire (Change in future aspirations, Change in confidence in finding employment)
 - Data -> Young People's -> YP RiW JET Q Analysis
- Observation Forms
 - Data -> Young People's -> YP OE Analysis

17.3. Participants Apply their Skills in Real Life Scenarios

Young People's Programme

- Observation Forms
 - Data -> Young People's -> YP OE Analysis

Outcome 19: People choose to return to LTM for learning, enjoyment and personal growth

The evidence of this outcome is collected through _____ programmes. Based on the data collected, there is **(strong/some/limited) positive evidence** that people choose to return to LTM for learning, enjoyment and personal growth. There **(has/ has not)** been enough data collected to make conclusions with statistical significance.

19.1. Participants Return to LTM

Primary Schools

- Teacher Feedback Forms (Return visits by teachers, Recommend programme to a friend)

- Data -> Primary Schools -> PS TSE Analysis

Family Programmes

- Family Evaluation Forms (Return visits among families)
 - Data -> Families -> FAM Q Analysis

19.2. Participants Enjoy their Visits

Outcome 20: Participants develop and pursue further life opportunities

The evidence of this outcome is collected through _____ programmes. Based on the data collected, there is **(strong/some/limited) positive evidence** that participants develop and pursue further life opportunities. There **(has/ has not)** been enough data collected to make conclusions with statistical significance.

20.1. Participants Know about Career Opportunities Available

Young People's Programmes

- Jet Questionnaire (Change in personal career networks, Change in feelings on career direction)
 - Data -> Young People -> YP RiW JET Q Analysis

20.2. Participants Plan Their Progression Routes

Young People's Programmes

- Workbook (Not Collected Previously)

20.3. Participants Take Action

Young People's Programmes

- Linked Assessment - Positive Progression Rates

Conclusion

Collectively, the LTM educational programmes appear to reach a wide number of people for varying backgrounds. Additionally, the data collected for all of the programmes show **(strong/some/limited) positive evidence that outcomes are met**. Participants in all programmes evaluated (primary schools, secondary schools, families, and young people's) seemed to thoroughly enjoy their respective programmes. Participants also seemed to learn from their programmes, as seen in the way they spoke about engineering after participating.

Recommendations:

Appendix F: Microsoft Forms

Observational Evaluation



* Required

1. Date of session: *

Please input date in format of M/d/yyyy

2. Time of session (if applicable):

Select your answer

3. Session name: *

Select your answer

4. Name of person observing: *

Enter your answer

5. What educational programme are you observing? *

- Primary Schools
- Secondary Schools
- Families
- Young People

6. Outcome 14 - Knowledge and understanding of London transport's past, present, and future *

	Observed all	Observed most	Observed some	Observed a bit	Not observed at all
Participants talk about London transport during the activity	<input type="radio"/>				
Participants are able to ask and answer questions about London transport's past, present, and future	<input type="radio"/>				
Participants can summarise what they have learnt in terms of London transport	<input type="radio"/>				
Participants can explain the skills they are/have been using	<input type="radio"/>				

7. Outcome 15 - Knowledge and understanding of STEAM

	Observed all	Observed most	Observed some	Observed a bit	Not observed at all
Participants talk about science topics during the activity	<input type="radio"/>				
Participants are able to ask questions and answer questions about engineering	<input type="radio"/>				
Participants can summarise what they have learnt in terms of engineering	<input type="radio"/>				
Participants can explain the skills they are/have been using	<input type="radio"/>				

8. Outcome 17 - Life and employability skills *

	Observed all	Observed most	Observed some	Observed a bit	Not observed at all
Participants work together to solve a problem	<input type="radio"/>				
Participants share their ideas	<input type="radio"/>				
Participants involve everyone in their team	<input type="radio"/>				
Participants share resources	<input type="radio"/>				
Participants let each other speak and contribute	<input type="radio"/>				
Participants listen to other students	<input type="radio"/>				

9. Outcome 19 - People choose to return to LTM *

	Observed all	Observed most	Observed some	Observed a bit	Not observed at all
Participants positively comment about what they are doing	<input type="radio"/>				
Participants are enjoying themselves	<input type="radio"/>				

Audience Finder for Young People



Audience Finder for Young People

This questionnaire is about you, it's a little more personal but it's really useful to use. The questions have been designed to align with the way the UK Government collects Census data. This enables us to compare our visitor profile to the general population. By answering these questions, you will help us to see the extent to which we're serving everyone in our community. If there are any questions that you'd rather not answer, please select "prefer not to say" or skip to the next questions.

Your personal information will be properly safeguarded and processed in accordance with the requirements of data protection legislation. Please see our Privacy Policy at www.ltmuseum.co.uk/privacy to learn more about the information we hold and how we use it.

1. Have you visited LTM before?

- Yes, in the last 12 months
- Yes, between 1 and 2 years ago
- Yes, between 2 and 3 years ago
- Yes, between 3 and 5 years ago
- Yes, but more than 5 years ago
- No, this is my first visit

2. How would you describe your gender?

3. How old are you?

- 16 - 19
- 20 - 24
- 25 - 29
- Prefer not to say

4. How would you describe your ethnicity?

5. Are your day-to-day activities limited because of a health problem or disability?

- Yes, limited a lot
- Yes, limited a little
- No
- Prefer not to say

6. Do you live in the UK?

- Yes
- No

Young People's JET Questionnaire



Young People's JET Questionnaire

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* Required

1. What are your initials? *

2. At what point are you taking this questionnaire? *

3. What programme are you participating in? *

4. Personal development (17-1) *

How do you feel about the following things, even if you have never done them before? Put a tick in the box which best matches how you feel.

	Very confident	Confident	Neither confident nor unconfident	Unconfident	Very unconfident
Meeting new people	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Explaining my ideas clearly	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Getting things done on time	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Having a go at things that are new to me	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Working with other people in a team	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Putting forward my ideas	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Being the leader of a team	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Family Learning Questionnaire



* Required

1. What date did you visit London Transport Museum? *

2. What is the activity that you have just taken part in? *

3. Have you visited the LTM before? *

4. Are you visiting with other people today? *

 Yes
 No

5. If yes, how many of those you are visiting with are under 16?

6. If yes, how many of those you are visiting with are over 16?

7. Would you be willing to answer some demographic based questions? *

This section is about you. It's a little more personal but it's really useful to use. The questions have been designed to align with the way the UK Government collects Census data. This enables us to compare our visitor profile to the general population. By answering these questions, you will help us to see the extent to which we're serving everyone in our community. If there are any questions that you'd rather not answer, please select "prefer not to say" or skip to the next questions.

 Yes
 No

8. Which of the following age groups do your children belong to?

 3 and under
 4 - 5
 6 - 7
 8 - 10
 11 - 12

9. Are your day-to-day activities limited because of a health problem or disability?

10. Do you live in the UK?

 Yes
 No

11. If you live overseas, what is your country of residence?

12. What is your ethnic group?

13. Is there anything else that you would have liked to get from your experience? *

14. What was the best part of your experience? *

15. Which of the following describes your motivations for visiting LTM today? *

Tick all that apply from the list

 To spend time with friends/family
 For a special occasion
 For peace and quiet
 To be intellectually stimulated
 To be entertained
 To be inspired
 To do something new/out of the ordinary
 To learn something
 To enjoy the atmosphere
 For reflection
 Transport is an important part of who I am

16. Which of the following describes your main motivation for visiting LTM today? *

17. How would you rate your experience? *

	Very good	Good	Neither good nor poor	Poor	Very poor	Don't know or not applicable
Quality of the activities	<input type="radio"/>					
Value for money of tickets	<input type="radio"/>					
The whole experience	<input type="radio"/>					

18. On a scale of 0-10, how likely is it that you would recommend this activity to a friend, family member or colleague? *

0	1	2	3	4	5	6	7	8	9	10
---	---	---	---	---	---	---	---	---	---	----

Not at all likely Extremely likely

19. Is there anything else you would like to say about your visit?

Families STEAM Questionnaire



London Transport Museum

Families STEAM Questionnaire

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* Required

1. How do you rank the following? *

	1 - Fascinating	2	3	4	5	6	7 - Ordinary
To me, SCIENCE is...	<input type="radio"/>						
To me, MATH is...	<input type="radio"/>						
To me, ENGINEERING is...	<input type="radio"/>						
To me, TECHNOLOGY is...	<input type="radio"/>						
To me, ARTS (drama, theatre, dance, festivals, etc.) is...	<input type="radio"/>						
To me, a CAREER in science, technology, engineering, or mathematics is...	<input type="radio"/>						

2. How do you rank the following? *

	1 - Appealing	2	3	4	5	6	7 - Unappealing
To me, SCIENCE is...	<input type="radio"/>						
To me, MATH is...	<input type="radio"/>						
To me, ENGINEERING is...	<input type="radio"/>						
To me, TECHNOLOGY is...	<input type="radio"/>						
To me, ARTS (drama, theatre, dance, festivals, etc.) is...	<input type="radio"/>						
To me, a CAREER in science, technology, engineering, or mathematics is...	<input type="radio"/>						

3. How do you rank the following? *

	1 - Exciting	2	3	4	5	6	7 - Unexciting
To me, SCIENCE is...	<input type="radio"/>						
To me, MATH is...	<input type="radio"/>						
To me, ENGINEERING is...	<input type="radio"/>						
To me, TECHNOLOGY is...	<input type="radio"/>						
To me, ARTS (drama, theatre, dance, festivals, etc.) is...	<input type="radio"/>						
To me, a CAREER in science, technology, engineering, or mathematics is...	<input type="radio"/>						

4. How do you rank the following? *

	1 - Means a lot	2	3	4	5	6	7 - Means nothing
To me, SCIENCE is...	<input type="radio"/>						
To me, MATH is...	<input type="radio"/>						
To me, ENGINEERING is...	<input type="radio"/>						
To me, TECHNOLOGY is...	<input type="radio"/>						
To me, ARTS (drama, theatre, dance, festivals, etc.) is...	<input type="radio"/>						
To me, a CAREER in science, technology, engineering, or mathematics is...	<input type="radio"/>						

5. How do you rank the following? *

	1 - Interesting	2	3	4	5	6	7 - Boring
To me, SCIENCE is...	<input type="radio"/>						
To me, MATH is...	<input type="radio"/>						
To me, ENGINEERING is...	<input type="radio"/>						
To me, TECHNOLOGY is...	<input type="radio"/>						
To me, ARTS (drama, theatre, dance, festivals, etc.) is...	<input type="radio"/>						
To me, a CAREER in science, technology, engineering, or mathematics is...	<input type="radio"/>						

Submit

Volunteer Evaluation Form - Primary



Volunteer Evaluation Forms - Primary

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* Required

1. Year group: *

- 1
- 2
- 3
- 4
- 5
- 6

2. Date of session: *

Please input date in format of M/d/yyyy

3. Time of session: *

Select your answer

4. Which session are you volunteering for? *

- Build a Bus
- Poster Art
- World's First Underground
- Transport Through Time

5. Before: For me art is INTERESTING *

The value must be a number

6. Before: For me art is BORING *

The value must be a number

7. Before: For me designing is EXCITING *

The value must be a number

8. Before: For me designing is UNEXCITING *

The value must be a number

9. Before: For me creativity is IMPORTANT *

The value must be a number

10. Before: For me creativity is NOT IMPORTANT *

The value must be a number

11. After: For me art is INTERESTING *

The value must be a number

12. After: For me art is BORING *

The value must be a number

13. After: For me designing is EXCITING *

The value must be a number

14. After: For me designing is UNEXCITING *

The value must be a number

15. After: For me creativity is IMPORTANT *

The value must be a number

16. After: For me creativity is NOT IMPORTANT *

The value must be a number

Submit

Early Explorer Morning Feedback



Early Explorer Morning Feedback

Your personal information will be properly safeguarded and processed in accordance with the requirements of data protection legislation. Please see our Privacy Policy at www.tlmuseum.co.uk/privacy to learn more about the information we hold and how we use it.

Hi Kylie, when you submit this form, the owner will be able to see your name and email address.

* Required

1. Where have you travelled from? *

2. How did you find out about the Early Explorer Morning? *

3. Have you visited London Transport Museum before? *

- Yes
 No

4. Did your family use the Visual Story before your visit? *

- Yes
 No

5. Please rate your experience this morning with exploring the museum galleries.

If you didn't do this this morning, feel free to skip the question.

1 2 3 4 5 6 7 8 9 10

6. Please rate your experience this morning with playing on the All Aboard! Playzone.

If you didn't do this this morning, feel free to skip the question.

1 2 3 4 5 6 7 8 9 10

7. Please rate your experience this morning with using a sensory Explorer bag.

If you didn't do this this morning, feel free to skip the question.

1 2 3 4 5 6 7 8 9 10

8. Please rate your experience this morning with handling the objects.

If you didn't do this this morning, feel free to skip the question.

1 2 3 4 5 6 7 8 9 10

9. How likely would you be to recommend this morning to other families with children with special educational needs? *

10. Would you have considered visiting the Museum outside of an EE Morning? *

11. What was your favourite part of the morning?

12. What improvements could we make to the morning?

Submit

Teacher Outreach Evaluation Form - Primary



* Required

1. Year group: *

2. Teacher position: *

3. Date of activity: *

4. Session name: *

5. Have you visited LTM before? *

Yes
 No

6. What is the main reason for you booking this Outreach session? Did you get it? *

7. Is there anything else that you would have liked to get? *

8. What was the best part of your experience? *

9. On a scale of 0-10, how likely is it that you would recommend the activity to a friend, family member, or colleague? *

0	1	2	3	4	5	6	7	8	9	10	
Not at all likely											Extremely likely

10. How do you find the following? *

	Excellent	Above average	Average	Below average	Very poor
Understanding the activities	<input type="radio"/>				
Knowing what to do	<input type="radio"/>				
Understanding the handouts/worksheets/instructions	<input type="radio"/>				

11. Is there anything else that you would like to say about your Outreach session? *

12. Would any of the following be of interest to you? *

	Very interesting	Interesting	Might consider	Not interesting	Haven't heard of it
Teacher Events - e.g. CPD/INSET/Private Views	<input type="radio"/>				
Other Primary School sessions (including Nursery sessions)	<input type="radio"/>				
Early Explorer Mornings (SEN)	<input type="radio"/>				
Opportunities to work with us on bespoke projects	<input type="radio"/>				
Secondary School sessions	<input type="radio"/>				
Action Depot Open Weekend	<input type="radio"/>				
Actor Depot tour for families	<input type="radio"/>				
Family holiday activities	<input type="radio"/>				
Apprenticeships	<input type="radio"/>				

13. If you would like to hear more about our School Programme please leave us your information:

Name, email address, school name

Teacher Session Evaluation - Primary



london transport museum

Teacher Session Evaluation Form - Primary

Your personal information will be properly safeguarded and processed in accordance with the requirements of data protection legislation. Please see our Privacy Policy at www.ltmuseum.co.uk/privacy to learn more about the information we hold and how we use it.

* Required

1. Year group: *

2. Teacher position: *

3. Date of visit: *

4. Session name: *

5. Number of children: *

6. Number of adults: *

7. What is the main reason for you coming to the museum? Did you get it? *

8. Is there anything else that you would have liked to get? *

9. What was the best part of your experience? *

10. On a scale of 0-10, how likely is it that you would recommend the activity to a friend, family member or colleague? *

0	1	2	3	4	5	6	7	8	9	10
---	---	---	---	---	---	---	---	---	---	----

Not at all likely Extremely likely

11. How do you find the following? *

	Excellent	Above average	Average	Below average	Very poor
Accessing the museum collections	<input type="radio"/>				
Understanding the activity	<input type="radio"/>				
Knowing what to do	<input type="radio"/>				
Understanding the handouts/worksheets/instructions	<input type="radio"/>				

12. Is there anything else you would like to say about your visit? *

13. Would any of the following be of interest to you? *

	Very interesting	Interesting	Might consider	Not interesting	Haven't heard of it
Teacher events - e.g. CPD/INSET/Private Views	<input type="radio"/>				
Other Primary School sessions (including Nursery sessions)	<input type="radio"/>				
Early Explorer Morning (SEN)	<input type="radio"/>				
Opportunities to work with us on bespoke projects	<input type="radio"/>				
Secondary School sessions	<input type="radio"/>				
Acton Depot Open Weekends	<input type="radio"/>				
Acton Depot tour for families	<input type="radio"/>				
Family holiday activities	<input type="radio"/>				
Apprenticeships	<input type="radio"/>				

14. If you would like to hear more about our Schools Programme please leave us your information:

Name, email address, school name

Submit

Appendix G: Microsoft Forms How-To Guide

Microsoft Forms – How to Guide

Creating a Form:

1. Go to portal.outlook.com and open up the 'Forms' tab
2. Hit 'New form' on the menu
3. Title as appropriate and add the LTM logo (white usually looks best) using the 'Insert image' button next to the title box
4. Change the background colour to an LTM theme colour (as noted in the design handbook) using the 'Theme' button in the upper right-hand corner. Then press the '+' button and add a new colour (you will need the hex colour code).
5. Change the viewing settings to 'Anyone with the link can respond' by using the '...' button in the upper-right hand corner and hitting 'Settings'.
6. Add questions as necessary.

Creating and Editing Questions:

1. Hit the '+ Add questions' button, located in the centre of the screen or directly below the previous question.
2. Select the appropriate type of question. Multiple choice, text answers, star ratings, and date questions are all located on the main options page. Pressing the '...' will give you more question types including ranking, Likert scales, and a 0-10 rating known as 'Net Promoter Score'.
3. All questions can be made required by using the toggle switch below the question.
4. A subtitle can be added to all questions by clicking the '...' button in the lower right-hand corner of the question.
5. Multiple choice questions:
 - a. Allow multiple answers using the toggle switch below the question.
 - b. Use the '...' button in the lower right-hand corner of the question to shuffle answers and make the options show up as a dropdown.
6. Text answer questions:
 - a. Allow longer responses using the toggle switch below the question.
 - b. Apply restrictions using the '...' button and hitting restriction. This most common use of this will probably be the first option for restriction, number only responses.
7. Star rating questions:
 - a. This question style is replaced by the Net Promoter Score.
8. Ranking questions:
 - a. This question style is not necessary based on current surveys.

9. Likert scale questions:
 - a. Add more columns and statements using their respective '+' button.
10. Net Promoter Score questions:
 - a. A basic 0-10 rating question.

Branching:

1. Ensure all questions are created prior to using branching options.
2. Branching allows for the use of conditional questions (questions that depend on the answers of previous questions). To see branching options go to the '...' button in the upper-right hand corner and hit 'Branching'. This will open a new screen.
3. Change follow-up questions using the drop-down next to any questions. The automatic option is 'Next question', but 'End of form' and any other question on the form are also options.
 - a. Multiple choice, single-answer questions allow you to choose a different follow up question for every answer.