

# **Pulsar** A Science Podcast

## FORMATIVE EVALUATION FINDINGS

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Formative Evaluation  
for Education Product  
Development

# EXECUTIVE SUMMARY

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## EVALUATION PURPOSE

*Pulsar: A Science Podcast* is a science and technology podcast produced by the Museum of Science, Boston. The podcast has grown and expanded in recent months as the museum turned its attention to developing online resources during the coronavirus pandemic. This evaluation seeks to understand the ways the *Pulsar* team may improve their product in order to better suit listeners' preferences and to expand the podcast's reach.

## KEY FINDINGS

This evaluation is grounded in two primary objectives: (1) describing the podcast's current audience and (2) understanding factors that impact listeners' engagement with the podcast. Our evaluation utilized three main instruments – surveys, interviews, and analysis of podcast analytics – to achieve these goals. Though a lack of data from current *Pulsar* listeners forced our team to focus on the second objective, we made several interesting discoveries about the podcast's strengths and elements of the podcast that could be improved:

- **Pulsar succeeds in reaching listeners near and far**, with listeners residing in nearly all 50 states and numerous other nations.
- **The podcast caters to varying interests**, making *Pulsar* appealing to a wide audience.
- **Episodes make science education interesting and approachable**, motivating listeners to learn more and allowing non-experts to understand complex topics.
- **Listeners are not necessarily more interested in visiting the museum**, perhaps meaning the creators should focus more on advertising museum attractions.
- **The podcast could do more to appeal to listeners who like longer runtimes**, perhaps by making tweaks to the website.
- **The Pulsar team could build listenership in other countries and regions** utilizing interviews with experts from these places.

## RECOMMENDATIONS

- Consider inviting expert guests from other areas and using targeted ads to increase listenership in other regions and countries.
- Consider pushing episodes related to current events in science on social media.
- Consider adding a "play next" function to capture audiences who prefer longer runtimes.
- Consider attracting listeners to the museum by advertising new and current attractions.

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Instrumentation development and data analysis was divided as such: data analytics by Alia Qatarneh, survey by Abby Feldman, and interview by Mason Hill. All three authors contributed equally across this final report.

# INTRODUCTION

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## PRODUCT DESCRIPTION

*Pulsar: A Science Podcast* is a short-form science podcast produced by the Museum of Science, Boston (MOS). Described as a “playground for the mind,” the 7- to 17-minute podcast series produced by the museum’s Gordon Current Science & Technology Center allows listeners to explore diverse topics, such as “Do Spiders Have Personalities?” “How Can Half a Degree Ruin My Eggs?” and “What if the Dinosaurs Hadn’t Gone Extinct?” (*Pulsar: A Podcast*, n.d.). Each episode features interviews with prominent researchers, engineers, and scientists conducted by museum educators.

Though the podcast was first launched in 2018, production began in earnest in March 2020 – at the start of the pandemic – according to podcast host and museum educator, Eric O’Dea. As museum officials transitioned their focus to providing an online experience for patrons, O’Dea and his teammates began releasing one to two episodes per week, devoting between 5 and 6 hours to edit each piece. To date, more than 70 episodes have been published online.

The primary objectives of the podcast are (1) **to increase interest in science** and (2) **to increase the overall visibility of the museum**. Despite having already cultivated a number of listeners, museum staff working on *Pulsar* entered this evaluation with many questions about who their podcast reaches, as well as how the production’s format and content impacts audiences’ interest. Though the podcast targets a general audience and covers a wide array of topics, O’Dea and his team hope to grow their base of listeners by learning more about the demographics of current audience members. Museum staff also hope to broaden the podcast’s appeal by determining what topics are most interesting to listeners and how the podcast’s structure (in terms of length, number of interviewees, etc.) impact the number of downloads on each episode. Given that the museum has now reopened for visitors, the *Pulsar* team is additionally curious about how the podcast affects listeners’ interest in visiting the museum. This evaluation report explains our strategies for addressing each of these points of inquiry.

## EVALUATION OBJECTIVES

The stakeholders of the Museum of Science Pulsar Podcast – Eric O’Dea, the primary creator, and Sharon Horrigan, director and education and outreach programs at the museum – are interested in increasing the audience of the science-focused podcast. In order to expand the reach of the podcast, this evaluation is rooted in the following: (1) **describing the current audience** and (2) **understanding factors that impact engagement**. The first goal was to understand who the current audience base is composed of. In addition, we hoped to identify what title format, length, and content format is more effective for engagement. While not one of our primary goals, we explored how well the podcast achieves its main learning objectives, such as increasing listeners’ interest in science and increasing the museum’s visibility.

## EVALUATION QUESTIONS

The following questions guided our evaluation:

- **Who is listening to the podcast?**
  - How old are *Pulsar* listeners?
  - Where do listeners live?
  - How do listeners identify in terms of gender?
  - What levels of education have listeners earned?
  - Do listeners identify as educators?
- **How do listeners typically engage with podcasts?**
  - What sites/apps do they use to listen to podcasts?
  - Do listeners typically listen to science podcasts?
  - Do they tend to listen alone or with others?
  - When do they typically listen to podcasts?
- **What kinds of podcast topics are appealing to listeners?**
  - What episodes do they choose to listen to and why?
  - What episodes do they avoid and why?

- **How does the podcast format impact engagement?**
  - What kinds of titles do listeners prefer?
  - How many guest experts do listeners prefer to listen to in an episode, if any?
  - How long should episodes run?
- **How does the podcast impact listeners' interest in science and technology?**
  - To what extent does it motivate them to learn more about science?
  - To what extent does the podcast impact listeners' interest in visiting the museum?

# METHODS

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## DATA ANALYTICS METHODS

### BACKGROUND

The data collected for this analysis comes from two sources. The main source is Podbean, the podcast publishing platform that *Pulsar* utilizes. This platform not only allows for the publishing and hosting of podcasts, but includes analysis tools that allows users to track and compare key podcast statistics to understand performance engagement. Although the evaluation team did not have direct access to the *Pulsar* Podbean dashboard that uniquely displays collected data, raw data on audience geolocation, episode downloads, and download sources, have been exported and shared with the evaluation team. The second source of data comes from the Museum of Science Google Analytics. The Museum of Science team has acknowledged that Google Analytics had been broken from 12/3/20 to 2/3/21. These data were still analyzed for any notable patterns but the zero values captured during the dates above have been omitted. Two datasets had been shared with the evaluation team that capture unique URL page views, average time on these unique pages, as well as data on the sum of page of the *Pulsar*-related pages. The unit of time for average time on page was not defined, thus these data have been omitted from this report. Finally, it is important to state that these data are completely anonymous online metrics and only capture one year of data (from April 2020 to April 2021).

### COLLECTION METHODS

All six datasets (Podbean Pulsar Stats US States, Podbean Pulsar Stats Country, Podbean Pulsar Stats Downloads, Podbean Pulsar Stats Clients, MOS Google Analytics Dataset1, MOS Google Analytics Dataset2) were combined in one Excel workbook to streamline results and interpretation. Analyses of these data were performed both in isolation (for example, analysis of just the Podbean Pulsar Stats US States), as well as in tandem or cross-data analysis (for example, analysis of Podbean Pulsar Stats Downloads and MOS Google Analytics Dataset2).

## WHAT WE LOOKED FOR

The formative evaluation of *Pulsar* is rooted in two specific goals: **to describe the podcast's current audience** and **to understand the factors that impact engagement**. The analysis of the Podbean and MOS Google Analytics data provides a year-long (April 2020 to April 2021), historical snapshot that give insight to audience and engagement, informing the two main guiding questions of this evaluation. The following outlines the foundation of how the aforementioned data available to the evaluation team were used to explore this evaluation's questions and objectives.

**Demographics** - Who is listening? The data captures geographical information on where the *Pulsar* audience resides at the levels of US states and worldwide countries.

**Engagement** - How are listeners engaging with *Pulsar*? The data captures when, how, and how often listeners interact with *Pulsar* by analyzing downloads by time of day, download sources, and user retention. The data also provides details on how long listeners spend on the episode pages hosted on MOS.org, as well as general daily page views.

Additionally, specific themes have been identified by the evaluation team based on the data collected for the analysis. They include the following:

- Geolocation descriptive statistics - summary of the proportion of listened in specific states and countries
- Patterns of downloads rates month-to-month
- Patterns of downloads rates episode-by-episode
- Patterns of downloads rate by day of the week and relation to podcast release date
- Peak day patterns
- Unusual download patterns - episodes that have unusually high or low download rates



## SURVEY METHODS

### BACKGROUND

Given the fact that *Pulsar* is a product accessed online, we felt it was best to construct data-collection instruments that likewise reach people over the Web. We also knew that we needed more information about *Pulsar*'s audience to make this evaluation a success. While the *Pulsar* creators have some sense of where and how people are listening to the podcast, they have little data about *who* is listening and *why*. With this in mind, we created the "Current Listeners" survey to quickly gather qualitative and quantitative data – including demographic information – from a relatively large number of current *Pulsar* listeners (Diamond et al., 2016).

Unfortunately, after a couple weeks of gathering little data, our team realized that it was time to implement a backup plan. Though our team and stakeholders did our best to advertise the Current Listeners survey through social media, newsletters, and the podcast itself (as described in our Sampling Strategies below), the survey collected responses from only six individuals between March 13 and April 15. Of these responses, only two included data for three or more questions, and just one represented a completed survey.

This lack of data led us to release a second survey with a similar but adjusted set of questions. This second survey, distributed with instructions to listen to at least one *Pulsar* episode before completing, was targeted toward a general sample of people who had not yet listened to *Pulsar*, but who might nevertheless be interested in providing feedback. Termed the "Potential Listeners survey, this second survey collected responses from 17 individuals.

An unforeseen consequence of releasing the second survey was that it directed some non-listeners to respond to the initial survey, which remained linked to the *Pulsar* website. This small group of respondents (four individuals) indicated that they had listened to at least one episode before responding (as requested in the instructions accompanying the link) but answered a set of questions designed for regular listeners. We assumed all respondents who participated after April 13, the date the Potential Listeners survey was published, belonged in this category, and this assumption was bolstered by the fact that most of these respondents indicated having listened to only one episode.

To account for discrepancies, we included from this set of responses only data from questions that were identical or nearly identical on both surveys. Data from questions that were missing or that differed semantically in the Potential Listeners survey (i.e. "Have you

used or shared Pulsar with learners in your educational setting or classroom” versus “*Would you use or share Pulsar with learners in your educational setting or classroom*”) were analyzed separately. Both surveys were created using Qualtrics and took approximately five minutes to complete.

As explained in our report’s introduction, the main objectives of this evaluation were to (1) describe the podcast’s current audience, and (2) to understand the factors that impact engagement. Given that the majority of our data came from responses to the Potential Listeners survey, the findings from these instruments cannot give us a good understanding of who *Pulsar* listeners actually are, nor can it give us direct insights in their preferences regarding engagement. The limited data from the Current Listeners survey is nevertheless helpful for providing context about how we might best interpret our Potential Listeners results. We used this and data collected by our other instruments to paint a general picture of what *Pulsar* listeners are like and how they engage with the podcast.

## SAMPLING METHODS

**Current Listeners:** Since this instrument was meant to target people already engaging with the *Pulsar* podcast, we aimed to recruit participants by advertising the survey in online spaces where we expected listeners to visit. The most obvious recruitment tool was the podcast itself. Two podcast episodes released in mid-March included a short advertisement for the survey that directed listeners to check out the *Pulsar* site, where the survey link was prominently displayed. We hoped placing the survey link on the Pulsar site would be easier than asking listeners to look up the survey URL, and would catch individuals who already frequent the site to check out new episodes. The survey was also advertised on MOS social media and newsletters that already advertise the podcast.

**Potential Listeners:** When it became clear that we could not focus on collecting responses mainly from actual listeners, we began targeting a wider category of individuals. Since we did not have much information about the demographics of listeners, the challenge we faced was determining from whom we ought to seek responses. While we took cues from our stakeholders’ analytics data and sought out individuals from various states and countries, our team ultimately decided it was best to reach out to as many people as we could. The three of us contacted friends and family, advertised on our personal social media accounts, and linked the survey in HGSE Slack channels. This sampling method has undoubtedly biased the data in ways that may say more about our evaluation team than about the survey itself. The majority of our respondents are young U.S. residents – mostly educators – with advanced degrees. We are mindful of these biases in our interpretation of the results.

## WHAT WE LOOKED FOR

The following list of questions offers an idea of the many different types of information we sought using with both the Current and Potential Listeners surveys:

**Demographics** - Who is listening? This includes information about age, sex, location, and level of education.

**Use of the product** - Has the participant listened to Pulsar? This includes information about when, how, how often, and with whom listeners tune into the podcast.

**Interests** - What are listeners most interested in? This includes information about topics and aspects that interest listeners most and least.

**Features** - What features of the podcast suit listeners' tastes? This section asks about listeners' opinions regarding the podcast's runtime and number of speakers

**Podcast goals** - To what extent does the podcast achieve its main goals? This includes information about how well the podcast broadens listeners' understanding of science and technology and interest in science education

Copies of the full surveys can be found in the Appendix.

## INTERVIEW METHODS

### BACKGROUND

As Patton (2002) describes it, interviews are one of the most frequently-used methods for understanding the users of an educational product. In the broadest sense, an interview is a guided conversation where one person gathers information from another.

The evaluators of this study decided to include a semi-structured interview instrument to capture additional data through open ended questions that could not be captured through a survey. With a semi-structured interview structure, Patton (2002) indicates that an interviewer might begin with a set of questions for the interviewee to answer, either closed-ended or open-ended), but can stray away from the order or set of questions from time to time.

The benefits of a semi-structured interview are qualitative and quantitative feedback as well as the opportunity for following up with interviewees. The cons of this structure are the additional time it takes to analyze responses and the inconsistencies that arise when participants have freedom in their answer choices. As such, the evaluators of this study factored the additional time it would take into our analysis timeline and created a coding rubric when analyzing the qualitative data.

### SAMPLING METHODS

The interview metric was initially created to be conducted after the survey data was collected, with interviewees volunteering from the pool of survey respondents, ideally yielding 10 - 20 respondents.

### WHAT WE LOOKED FOR

For the interviews, the team was to measure how audience members started listening to *Pulsar*, how they currently engaged with the material, and how they suggested to improve the podcast's content and format to inform future episodes.

<p><b>How audience members started listening to Pulsar: A Science Podcast</b></p>	<ul style="list-style-type: none"> <li>• How did you come to know the Pulsar podcast?</li> <li>• What is your preferred format? 1 or 2 interviewees? Length? Live chat?</li> </ul>
<p><b>How audience members engage with the material</b></p>	<ul style="list-style-type: none"> <li>• What are you typically doing while listening to the podcast?</li> <li>• What aspects of the Pulsar podcast(s) do you enjoy the most?</li> <li>• What types of topics do you find most appealing?</li> </ul>
<p><b>How to improve the podcast's content and format</b></p>	<ul style="list-style-type: none"> <li>• How can the podcast be improved?</li> <li>• What else would you like to tell us about the content, format, or anything else relating to <i>Pulsar: A Podcast</i>?</li> </ul>

However, there were not enough respondents to the original survey, and zero who indicated interest in following up with an interview. As a response, the evaluation team changed tactics and coordinated in person interviews with visitors of the Museum of Science Podcast. Two members of the team, Abigail and Alia, visited the MOS on Saturday, April 10 to interview 30 patrons on the museum floor over the course of 2 hours.

With this new plan, we hoped to find out how people would respond to podcast topics, titles, and format and inform how people who listen to a science-related podcast like *Pulsar* would prefer to engage with the material.

<p><b>Previous experience with podcasts</b></p>	<ul style="list-style-type: none"> <li>• Do you listen to podcasts?</li> <li>• Have you ever listened to a science podcast? If so, which ones and why?</li> <li>• Have you listened to the MOS podcast, Pulsar?</li> </ul>
<p><b>How audience members engage with the material</b></p>	<ul style="list-style-type: none"> <li>• Which of these topics would interest you the most for a science podcast?</li> <li>• Podcasts can come in different formats: <b>solo commentary, one-on-one interviews, conversations with a panel of experts, or storytelling formats</b>. If you were to listen to a science-related podcast, what formats would you find most appealing? Why?</li> <li>• Based on the titles on the back of the clipboard, which podcast would you <b>most</b> want to listen to? Why? <b>[Show titles list]</b></li> <li>• Based on the titles on the back of the clipboard, which podcast would you <b>least</b> want to listen to? Why? <b>[Show titles list]</b></li> <li>• What else would you like to tell us about the content, format, or anything else relating to science podcasts and <i>Pulsar</i>?</li> </ul>

The protocol for the in-person interviews was as follows. Our evaluation team members coordinated with the Museum of Science for on-site data collection, printed materials for the interviews, and positioned themselves in the Museum of Science on Saturday, April 10<sup>th</sup>. As guests walked by, they stopped them and asked to interview them, following this script:

*Hello, I hope you're enjoying your visit to the museum today - I have a quick question for you. My name is \_\_\_\_\_ and I'm a student at Harvard. We're doing a formative evaluation about the Museum of Science Boston's science podcast called Pulsar: A Podcast. Would it be alright if I ask you a couple of questions? The interview should only take a few minutes, it will be completely anonymous, and you can stop at any time.*

They then asked them the interview questions and took notes while respondents were speaking. Whenever necessary, evaluators asked follow-up questions, answered clarifying questions, and paused to let participants view materials (topic and title pages). 30 people participated in the interview pool.

## ETHICAL CONSIDERATIONS

To ensure that our evaluation duly respects individuals' autonomy, all survey and interview participants were provided with information about our evaluation and its purposes before data was collected. Participants were assured that they could choose to end their participation at any time, and were informed about the time commitment before beginning the data collection process (Diamond et al., 2016).

Our primary ethics-related concern regards respect for the privacy of individuals surveyed and interviewed. Though we collected demographic information from survey and interview participants (such as age, sex, and in the case of the survey, location), we did not seek identifying information (such as the individual's name and email address) except in the case that the survey participant wished to provide contact information for a follow-up interview. As no one provided information for a follow-up interview, this concern was irrelevant.

When gathering interview and survey data, we were careful to exclude minors from taking part by asking participants for their age upfront. Both the survey and interview format begin by asking participants to indicate their age or age range. All participants who indicated that they were "17 or younger" in the survey were automatically redirected to the end screen. All interviewees who were younger than 18 were told they could not participate and thanked for their time.

Additionally, it is important to state that the analytics data provided by the Podbean platform and the Museum of Science Google Analytics reports are completely anonymous online metrics captured between April 2020 and April 2021.

The majority of our data is reported here in aggregate form. When we do speak about individual participants, it is never in the context of any information that might identify them in a way more specific than "a female Massachusetts resident," for example. Since we did not collect any names or email addresses, none of our participants are at risk of having their identities exposed in the case of a data breach. We are grateful for our participants' help and hope the data we have collected can be used to create a product that better suits their interests and desires.

## TIMELINE

Evaluation of *Pulsar* took place over 10 weeks. To take advantage of increased listenership expected after new podcasts were released, we timed the release of our Current Listeners survey with the release of the podcast episode scheduled for March 15<sup>th</sup>, 2021.

We presented our findings to our stakeholders on April 27<sup>th</sup> and 29<sup>th</sup>, and this final report was completed by May 10. Included below is a draft timeline that includes podcast publications, notable events, and deliverables.

DATE	EVENT/TASK
February 25	Evaluation plan submitted
March 1	Podcast episode release: <i>What Do a Honeybee and a Chicken Have in Common?</i>
March 8	Human subjects training complete
March 9	Survey instrument tool submitted for review
March 11	Data analytics and interview tools submitted for review
March 15	Podcast episode release: <i>A Shark the Size of a School bus...What Did It Eat?</i>
March 16	Survey live on Pulsar's MOS website page
March 25	Podcast episode release: <i>What Happened to Megalodon, The Biggest Shark Ever?</i> Survey advertised at the beginning of episode
April 5	Podcast episode release: <i>How Is an Ear Like a Fingerprint?</i>
April 10	In-person interviews conducted at the Museum of Science
April 15	Data analysis complete
April 27	Presentation to T523
April 29	Presentation to stakeholders
May 10	Final report submitted



# FINDINGS

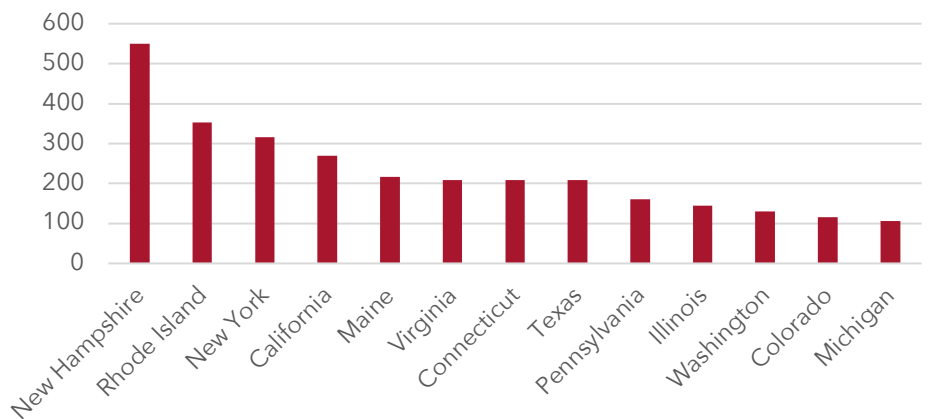
## DATA ANALYTICS FINDINGS

### DEMOGRAPHIC DATA

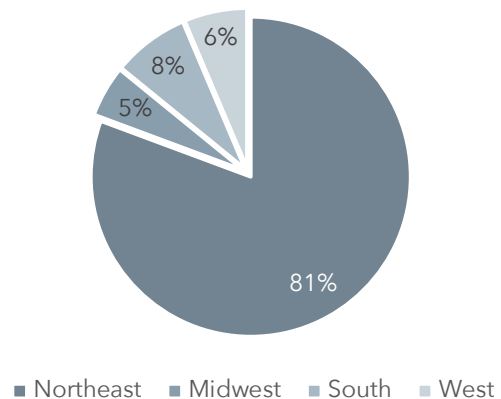
The *Pulsar* audience in the United States between April 2020 and April 2021 includes all states besides Montana and Wyoming. For feasibility, the top states were chosen by selecting states that have at least 100 downloads of the podcast. These states include Massachusetts ( $n = 5965$ ), New Hampshire ( $n = 549$ ), Rhode Island ( $n = 352$ ), New York ( $n = 316$ ), California ( $n = 270$ ), Maine ( $n = 217$ ), Virginia ( $n = 209$ ), Connecticut ( $n = 208$ ), Texas ( $n = 208$ ), Pennsylvania ( $n = 161$ ), Illinois ( $n = 144$ ), Washington ( $n = 130$ ), Colorado ( $n = 116$ ), and Michigan ( $n = 106$ ).

There is also a *Pulsar* presence in the District of Columbia. When grouped by US region as defined by the US Census Bureau, the Northeast (Connecticut, Delaware, D.C., Maine, Maryland, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, and Vermont) has the highest number of total downloads (8,018 total downloads).

Pulsar Downloads from States Ranked 2 to 14



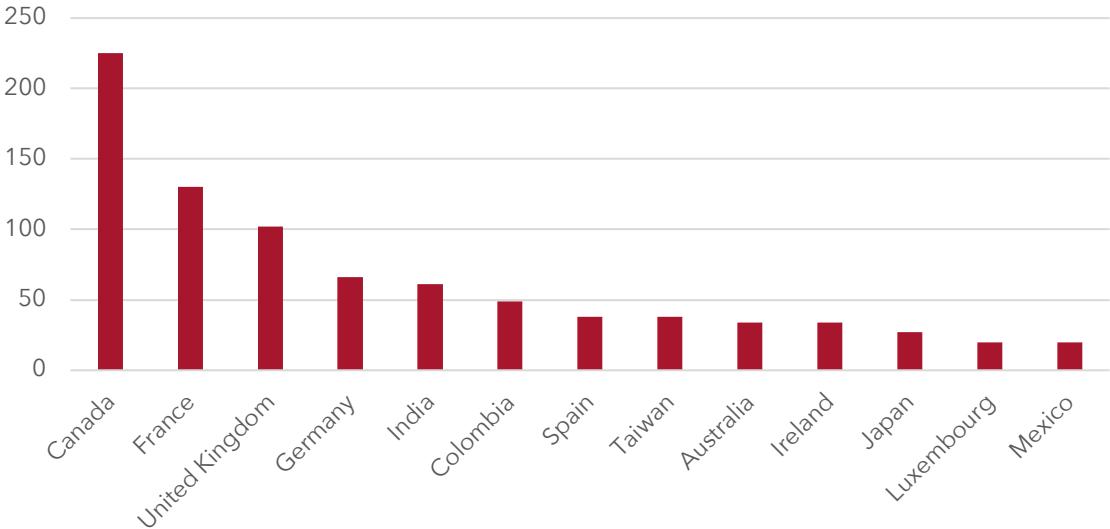
Percentage of Pulsar Downloads by US Region



Interestingly, the South holds the second highest number of downloads (770 total downloads). Internationally, a *Pulsar* podcast has been downloaded at least one time over the last year in 76 countries.

The top country is the United States, with 10,652 downloads, which represents 90.12% of total downloads, followed by Canada (225, 1.9%), France (130, 1.1%), and the United Kingdom (102, 0.86%). Interestingly France, a non-English-speaking country, has a few more downloads than the United Kingdom (an English-speaking country).

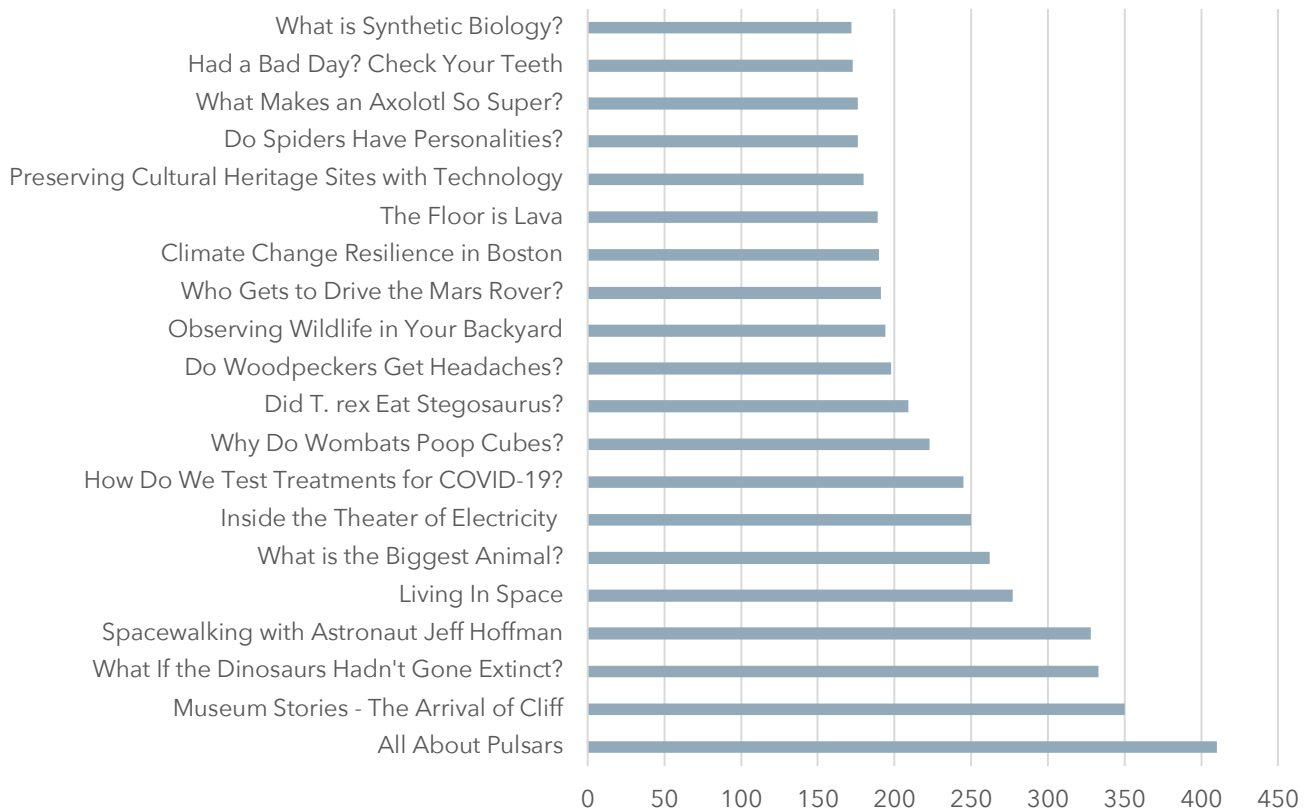
Pulsar Downloads from Countries Ranked 2 to 13



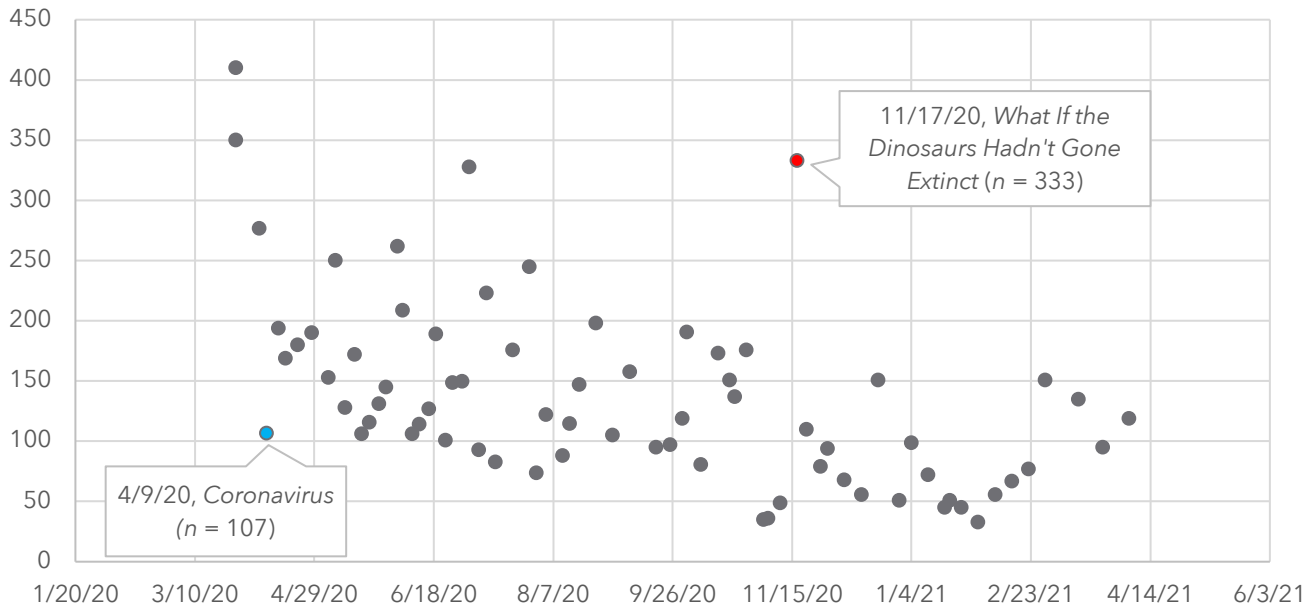
## CONTENT TOPIC DATA

The top two downloaded podcasts, *All About Pulsars* and *Museum Stories - The Arrival of Cliff*, are the two oldest podcasts, published first on 3/27/20. Although this was expected, we were prompted to explore the number of downloads per podcast compared to that podcast's release date. As podcasts remain accessible after publication, it is understandable that the older podcasts have the highest downloads. However, the third most downloaded podcast (the data point in red) was published on 11/17/20. This data point refers to the *What If the Dinosaurs Hadn't Gone Extinct* podcast. In addition, there are less-downloaded outliers, like the Coronavirus episode published on 4/9/20. Although this episode has been available to the public for months, it still tends to trend at the bottom.

Top 20 Most Downloaded Pulsar Podcasts



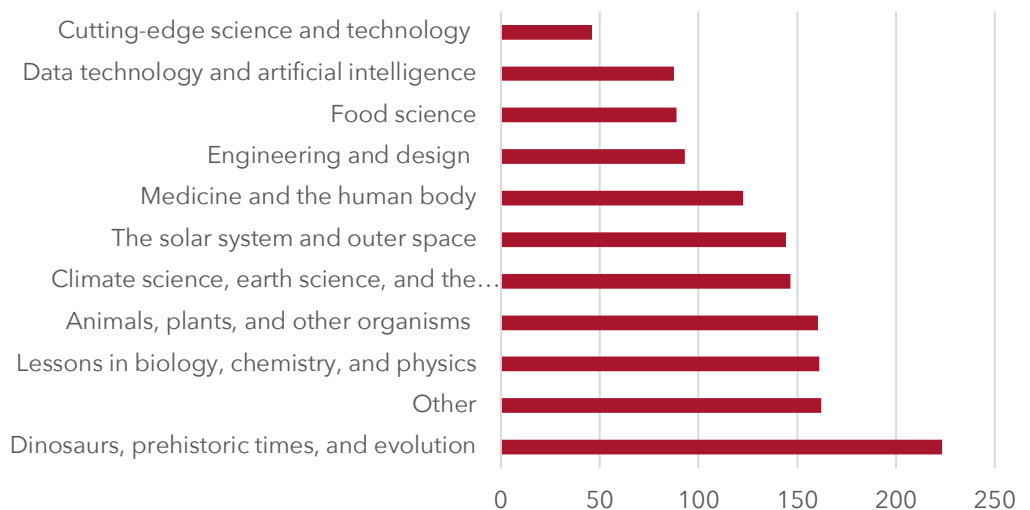
## Podcast Release Date versus Downloads



The available 72 published podcasts were coded into 11 content topics based on the discretion of the evaluation team. An average download was calculated by dividing the number of downloads by the number of podcast episodes in that content topic bucket. This attempts to account for the age of each podcast.

Based on the average podcast download by content topic, the content topic that attracts the most listeners is that of **Dinosaurs, prehistoric times, and evolution**. The **other** category contains four podcasts: *Museum Stories - The Arrival of Cliff*, *Preserving Cultural Heritage Sites with Technology*, *The Future of Accessible Learning*, and *Who Were the Blackwell*

## Average Download by Podcast Topic



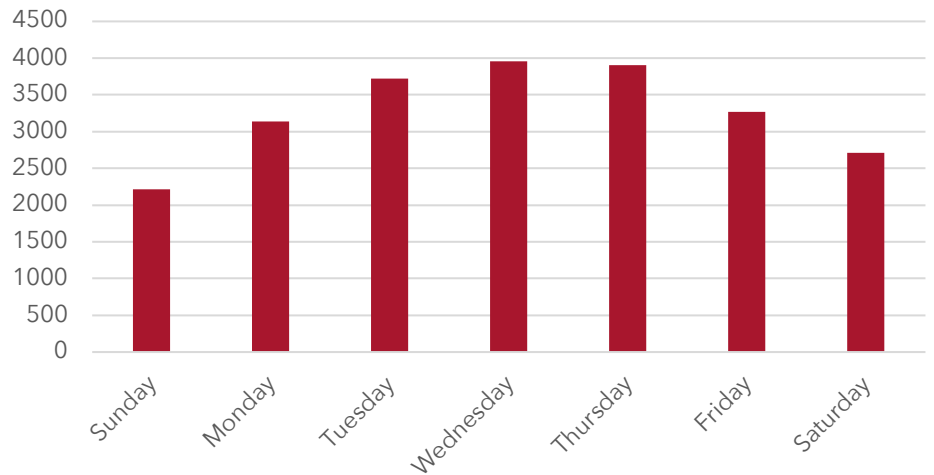
*Sisters*. It is important to note that the *Museum Stories - The Arrival of Cliff* podcast, was one of the first podcast published, which is account for the high average calculated above.

## TEMPORAL ENGAGEMENT

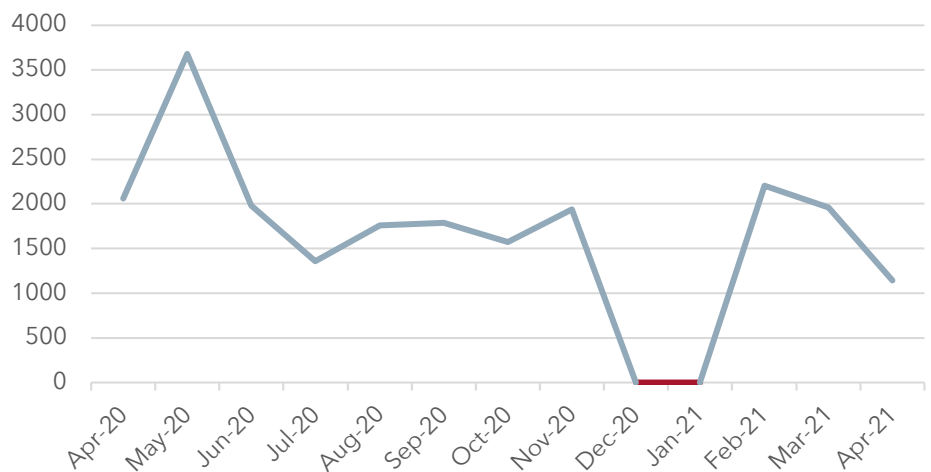
The top 2 podcasts, *All About Pulsars*, and *Museum Stories - The Arrival of Cliff*, are the two oldest podcasts, published on 3/27/20. However, the third most downloaded podcast, *What If the Dinosaurs Hadn't Gone Extinct*, was published on 11/17/20 just under seven months after the first publications. *Pulsar*-specific webpages are most often visited on Wednesdays. This is quite interesting since *Pulsar* podcasts are historically published on Mondays, however this aligns with general podcast findings in that Mondays, Tuesdays, and Wednesdays tend to see more downloads than the remaining days of the week (Podcast Insights).

Analysis of the monthly *Pulsar* page views show May 2020 as the highest month of viewership. May 2020 holds two of the top 20 podcast episodes: *Inside the Theater of Electricity* (published 5/8/20, ranked 7<sup>th</sup>) and *What Is Synthetic Biology* (published 5/16/20, ranked 20<sup>th</sup>). These data suggest that audience members do not typically listen to *Pulsar* podcasts as soon as they are published.

Page Views by Day of the Week



Monthly Pulsar Page Views



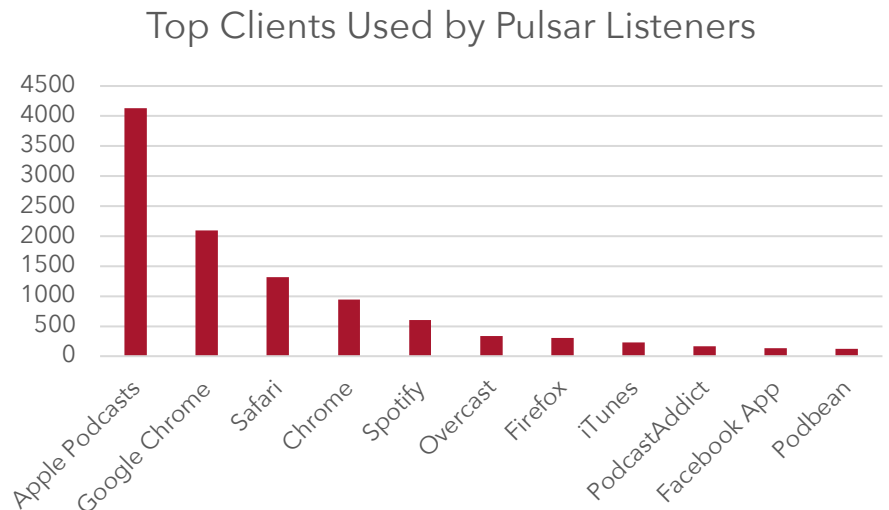
## TITLE FORMAT

Title format of the podcasts were also analyzed. By taking the number of downloads for each title format type (non-question and question) and dividing it by the number of episodes with each title format type, the average download per title format type was calculated. Historically, *Pulsar* podcast titles used to be primarily non-question, yet have recently switched to a question format. This means that these data are confounded by the time they were released. Older episodes, with longer opportunity to have more views, are mostly non-question, and newer ones, with less time to catch up on views, are all in question format. Thus, we expect these question-format episodes to have lower average download numbers based on the release dates: The number of downloads from March 2020 through August 4<sup>th</sup> 2020 (the last time there was a non-question title), the average is about 176. Moving forward, the average number of downloads since from August 11<sup>th</sup> to present is about 106. These newer episodes have received around 60% of the downloads so far compared to the older episodes, **thus we would expect that the question format types, as being newer, might also be hitting around 60% compared to the non-question types.**

The **question formats episodes hit around 66%** of the downloads that non-question-formats are receiving. However, due to the mixture of title format types used at the beginning of this timeline, no clear-cut assumptions can be drawn. Thus, in terms of downloads, this evaluation did not have enough data to suggest whether listeners have a preference in title format.

## DOWNLOAD CLIENTS

The top client used to download *Pulsar* podcasts is Apple Podcasts. Although this provides valuable information, the number of streams (essentially plays) are not captured by any of the data the evaluation team has on hand. Based on Podcast Insights, Spotify is the used app for listening to podcasts in the United States.

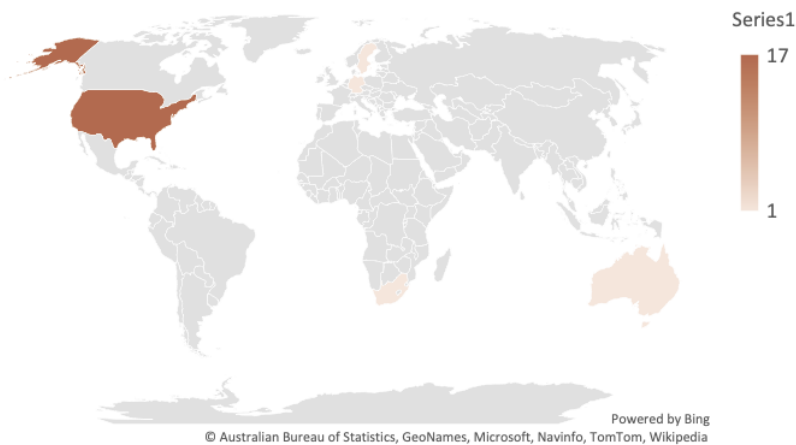


## SURVEY FINDINGS

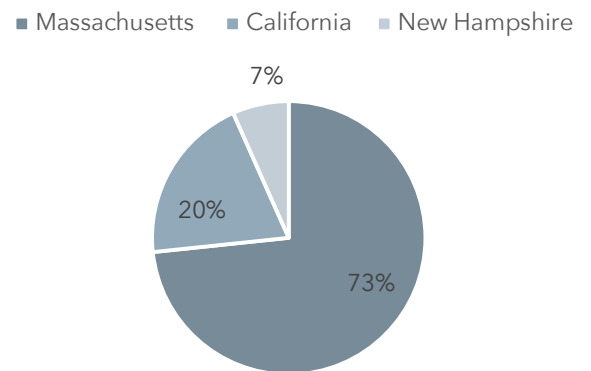
### DEMOGRAPHIC DATA

Analytics data indicates that *Pulsar* reaches a wide audience of viewers from multiple countries – an audience we attempted to replicate in our distribution of the Potential Listeners survey. While the majority of respondents (17) came from the United States, we also reached four individuals who came from Australia, Sweden, Germany, and South Africa. Among U.S. respondents, most were Massachusetts residents, though three California residents and one New Hampshire resident also responded.

Responses By Country



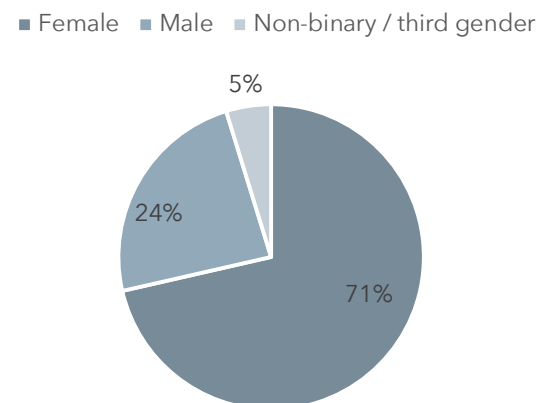
States Where U.S. Respondents Live



While Qualtrics, our survey platform, automatically collected location data from all individuals who clicked on the survey – including those who answered no questions – this data was excluded from our analysis, since those individuals did not consent to this form of data collection.

Among Potential Listeners, the vast majority (15 people) were female. Another five people were male, and one person reported being non-binary or third gender. As only one person, a female provided their gender in the Current Listeners survey, it is unclear how representative this data is of *Pulsar* listeners. More likely, this bias is indicative of our team’s own background in the education field, which is largely female-dominated (Wong, A, 2019). As discussed

Gender of Participants

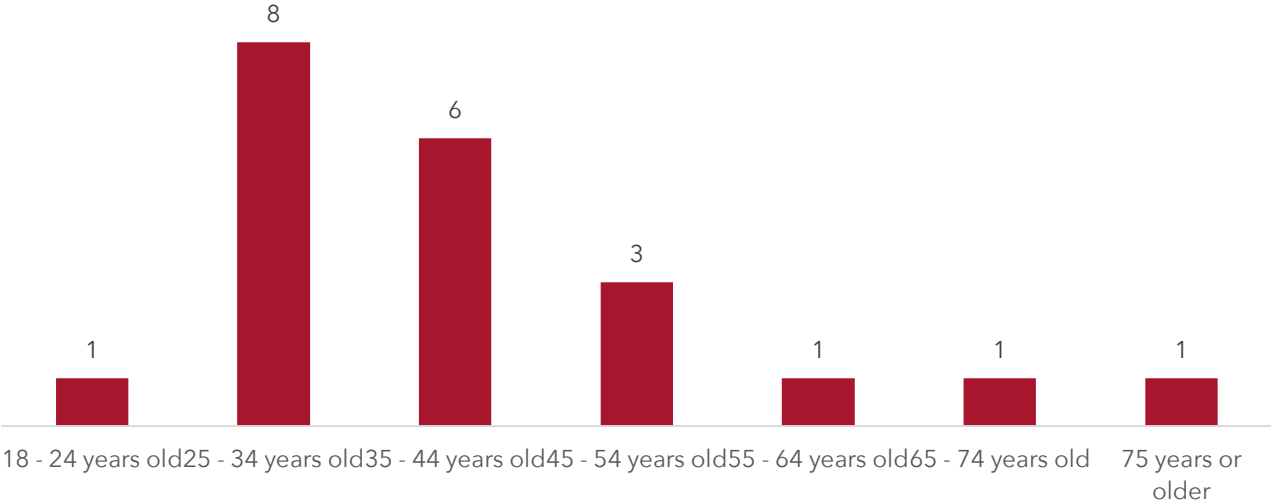


above, our sampling method for the Potential Listeners survey was biased by our own spheres of friends and colleagues.

Our Current Listeners survey provided a small-sample but interesting snapshot of listeners' ages that skewed relatively young. Of the five people who provided data, two were 18 to 24 years old, one was between the ages of 25 to 34 years old, and another was between 35 and 44 years old. Our final respondent was between 55 and 64 years old.

Respondents who participated in the Potential Listeners survey were also relatively young, with the majority (eight people) falling into the 25 to 34 age range.

Ages of Respondents



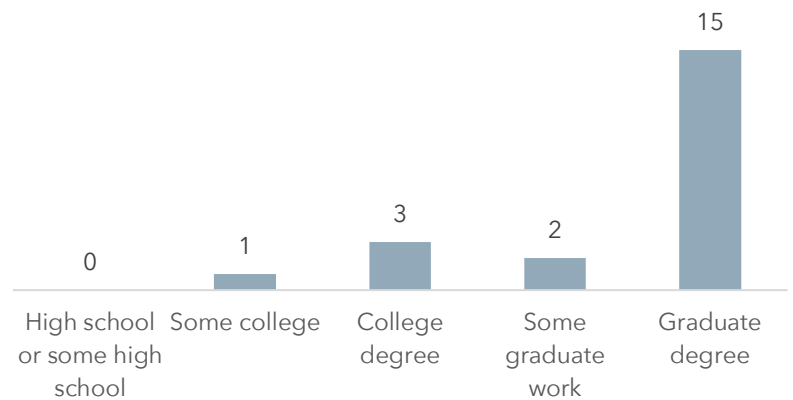
Once again, this pattern among Potential Listeners may be more indicative of our team's circle of friends and acquaintances who tend, like us, to be young professionals.

In observance of IRB requirements, we were careful not to collect data from people under the age of 18, since additional steps would have been required to protect their identities and well-being (HHS.Gov, 2016). Age data was collected at the beginning of the survey, and participants who indicated that they were 17 or younger were immediately taken to the end screen.



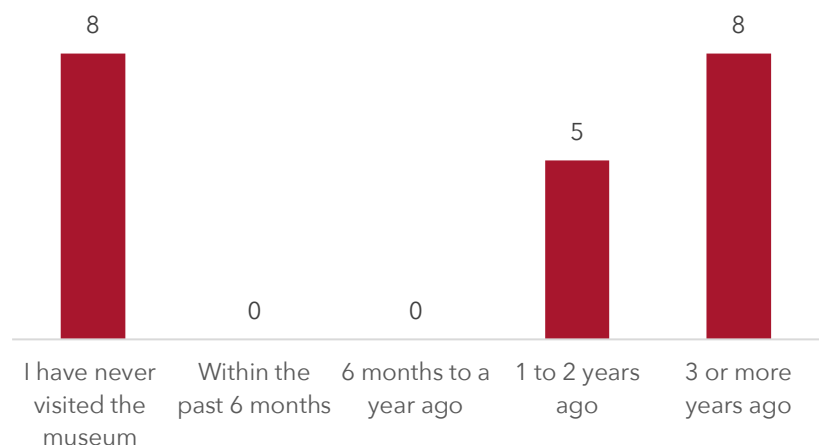
In terms of participants' levels of education, our data was undoubtedly skewed in a way that did not reflect the general U.S. population (U.S. Census Bureau, 2019). The vast majority of respondents reported having graduate-level degrees. Since *Pulsar* caters to a general audience, our analysis related to listeners' interests and opinions related to the podcast's level of accessibility may not be fully representative. That said, since podcast listeners in general tend to hold more degrees than the average U.S. resident, (something we discuss more in our Discussion Section) our findings may reflect actual Pulsar listeners preferences after all.

Participants' Highest Level of Education



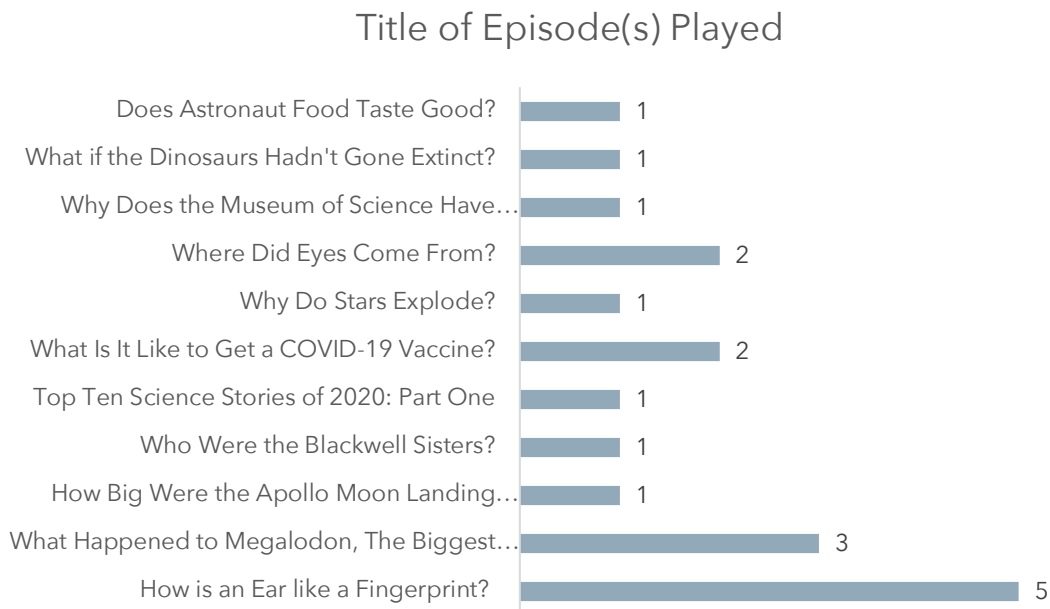
Given the number of respondents from Massachusetts, it may be no surprise that the majority of participants had visited the Museum of Science, Boston at some point. In fact, one hundred percent of Massachusetts residents had visited the museum, although most had not made a trip to the institution in the last two years. The museum's closure from March 2020 to February 2021 during the COVID-19 pandemic likely accounts for the lack of visitors in the last year (MOS, Boston, 2020; MOS, Boston, 2021). An interesting detail worth mentioning is that one Current Listener who completed the full survey last visited the museum within the past six months (not included in the graph to the right, as this only shows *potential* and non-active listeners).

Participants' Past Visits to the Museum

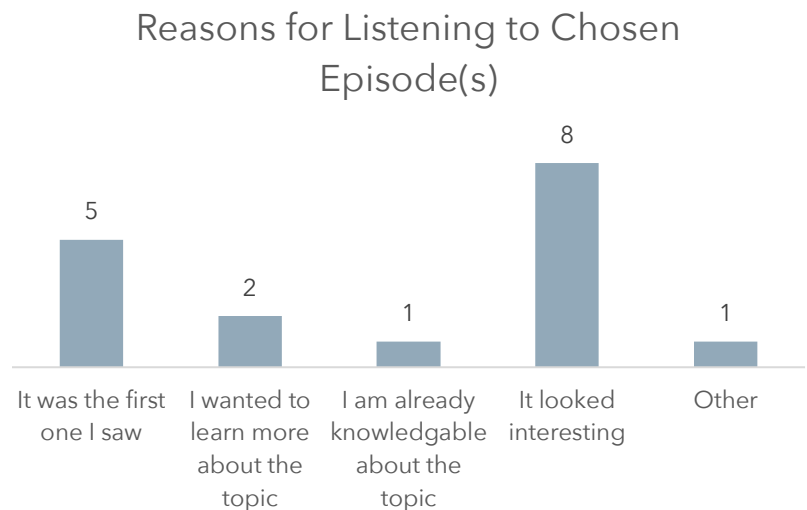


## EPISODE AND TOPIC PREFERENCES

Respondents chose to engage with 11 of the more than 70 episodes in *Pulsar's* catalog. As the chart below – ordered from newest episodes on the left to oldest – indicates, participants tended to pick episodes that were newest and therefore closest to the top. Eight of the 17 individuals who provided data chose to listen to either the latest or second-latest episode on the site. This finding was reinforced by the relatively large number of people (5) who said they selected their episode(s) because it was the first one they saw.



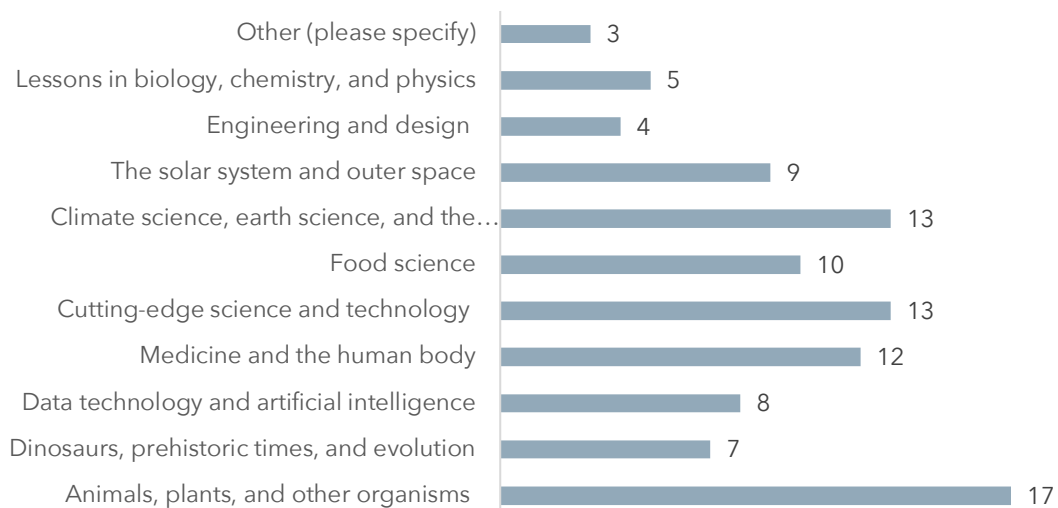
Each of the 17 people who completed the Potential Listener survey engaged with at least one episode, and two people listened to an additional title. Most listeners – eight people – said they selected the episode(s) they did because they “looked interesting.” Notably, there was little overlap among the episodes these people selected. This may suggest that *Pulsar* does a good job of catering to listeners with varying interests.



EPISODES SELECTED BY RESPONDENTS WHO CHOSE BASED ON WHAT "LOOKED INTERESTING"	NUMBER OF TIMES SELECTED
HOW IS AN EAR LIKE A FINGERPRINT?	1
WHAT HAPPENED TO MEGALODON, THE BIGGEST SHARK EVER?	1
HOW BIG WERE THE APOLLO MOON LANDING COMPUTERS	1
WHO WERE THE BLACKWELL SISTERS	1
WHAT IS IT LIKE TO GET A COVID-19 VACCINE?	2
WHY DOES THE MUSEUM HAVE MONKEYS?	1
WHAT IF DINOSAURS HADN'T GONE EXTINCT	1
DOES ASTRONAUT FOOD TASTE GOOD?	1

Indeed, when choosing their top five favorites among a selection of science and technology-related topics, only one category - Animals, plants, and other organisms - came out as a clear frontrunner. Each of the other 10 categories were selected at least three times (including "Other") and four categories were selected at least 10 times.

### Favorite Topics Selected by Participants



The two least appealing choices among these categories, besides “Other,” were “Engineering and design” and “Lessons in biology, chemistry, and physics.” This seems to align with data collected about the episodes respondents chose to watch, since none of those episodes fall squarely into either of those categories.

The few participants who selected “Other” shared topics of their own that they were interested in learning more about through *Pulsar*. These included “DNA,” “Psychology, neuroscience, psychopharmacology,” and “Current events (pandemic / recession).” *Pulsar*, in fact, has addressed some of these topics, particularly current events, with episodes like “Food Insecurity During a Pandemic,” “How Do You Land a Robot on Mars?,” and “Thinking Like an Engineer to Combat COVID-19.”

The “interesting-ness” of the topics discussed in *Pulsar* may be one of the podcast’s biggest strengths. Responses to the question “What aspects of the podcast do you enjoy the most?” brought up the word “interesting” four times among 18 responses.

- *“They cover interesting topics”*
- *“The topic I chose was also very interesting, so that might have helped with why I found it so enjoyable.”*
- *“Very interesting information, range of questions per topic...”*
- *“It was an interesting topic.”*

Further data collection could be useful in determining what exactly respondents meant by “interesting.” Was the content surprising? Useful? Related to things they like?

Just how accessible is *Pulsar* to non-science experts. While this question was not a topic of focus in designing the survey, it was a subject that came up frequently in respondents’ written answers to the questions “What aspects of the podcast do you enjoy the most?” and “What aspects of the podcast do you think could be improved?” When talking about aspects of the podcast they most enjoyed, a third of the 18 participants praised *Pulsar* for being approachable in its content.

- *“The experts were very well spoken and easy to follow.”*
- *“Experts simplifying research for non-experts”*
- *“Although they were talking about complex subjects, they described things for anyone to understand!”*
- *“Accessible to beginners”*
- *“Clear, accessible discussions of the content”*

- *“Also, the podcast does a good job of explaining the topic to a novice without dumbing it down too much.”*

None of the respondents complained that the subject matter was too difficult to understand. However, a couple people seemed frustrated that the podcast was too basic when they talked about aspects of the podcast that could be improved:

- *“Even though the podcasts are intended for non-experts, I’d appreciate more in-depth questions to the experts for the interested listener.”*
- *“Flow, seemed to touch the surface of the subject matter by lightly discussion related influences but left me feeling unfulfilled.”*

An important thing to keep in mind here is that the majority of our respondents, unlike the majority of people in the country or world, hold graduate degrees. This may mean that treatment of content in a way that appears to lack “depth” to them might actually be suitable for most listeners – particularly people younger than 18 who we did not analyze here.

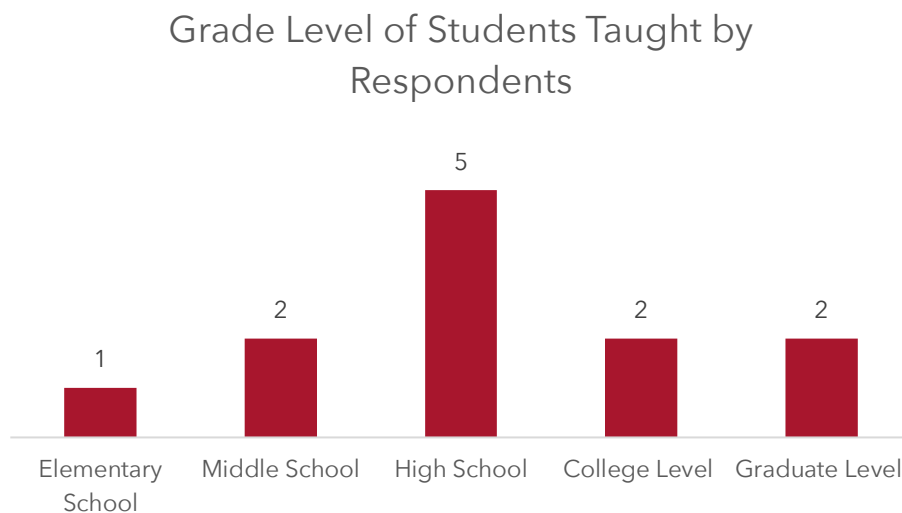
To help *Pulsar* to continue to meet the interests of listeners, we asked listeners to provide topics or questions that they’d like to see explored in an upcoming episode. These responses included:

- Synthetic biology
- Viruses
- Daily simple economic science
- How do quantum computers work?
- Women in Space
- More information about public health

## EDUCATOR ENGAGEMENT

The one person who selected “Other” in response to the question asking respondents why they selected the episode(s) they did was an educator thinking about her students. “I wondered if it would be pertinent to topics I’ve taught in K-5 science,” this individual wrote about her chosen episode.

It’s possible that this person was not alone in thinking about her students. Precisely two-thirds of our 21 Potential Listeners were educators. Among the 10 people who answered whether they would share Pulsar with their students, a clear majority (nine people) answered that they would. These educators tended to be high school teachers, though the spread of responses suggested that some people teaching kids in elementary grades and adults at the graduate level might also use the podcast in the classroom.



A few respondents offered insights about ways that the podcast could be adjusted to better support educators. In talking about aspects of the podcast that could be improved, one person said, “It would also be more useful if the episodes were correlated with standards, or came with lessons, or at least discussion questions.” Another said, “I wish they all included a transcript.” It should be noted, on the topic of transcripts, another respondent said, “Thinking about this in an educational context, I love that there are transcripts.”

## FORMAT AND WAYS OF ACCESSING THE PODCAST

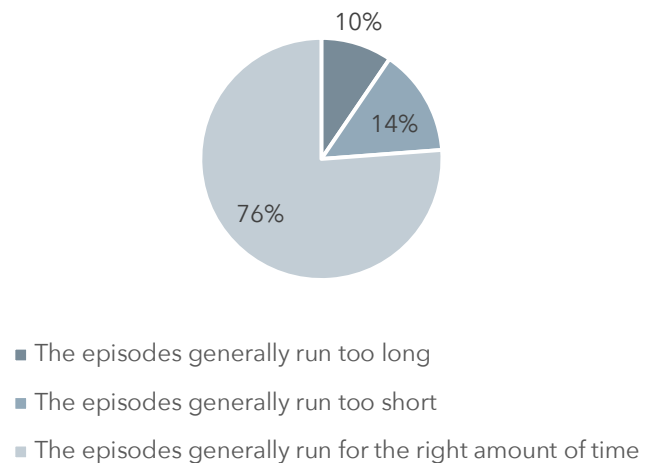
Among Potential Listeners, there was a fairly even distribution of responses over the four categories listed for “How do you typically listen to podcasts?” Nine out of 17 respondents said they listened to the podcast through Spotify or Apple Podcasts - both places where *Pulsar* can be found. Another two people who selected “Other” said they typically listen to podcasts from the creator’s website. The other two participants in the “Other” category said they did not typically listen to podcasts. Our team is unsure about whether *Pulsar* is accessible from popular third-party apps like Overcast and Stitcher. Although, from this data, the podcast is accessible for most listeners given apps and technology that they already possess, it may be worthwhile to make sure listeners can reach *Pulsar* from other popular apps. Perhaps useful to note: The two respondents who provided data in our Current Listeners survey both said they typically listen to *Pulsar* from the podcast’s site.

Potential Listeners data suggested most people were satisfied with *Pulsar*’s ~10 minute runtime. Five respondents were split in believing that the episodes generally ran too long (two people) and too short (three people). For two of these five responses, we are unfortunately missing data for which episode was selected. One of the episodes selected by a respondent in the “too short” category was only about 7 and a half minutes long (“Does Astronaut Food Taste Good?”). The other two respondents who listed episodes (“Why Do Stars Explode” and “Where Do Eyes Come From?”) were split in believing episodes ran too long or too short, even though both selected episodes that are almost precisely 10 minutes long.

### How Do You Typically Listen to Podcasts?



### Preferences about Episode Runtime



Qualitative analysis of the survey's two main questions requiring text response, "What aspects of the podcast do you enjoy the most?" and "What aspects of the podcast do you think could be improved?" revealed that episode runtime was in fact quite important to listeners' experience. Several respondents mentioned runtime among when describing elements of the podcast they enjoyed most:

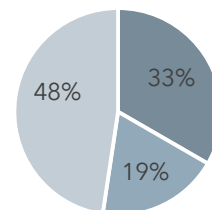
- *"I liked that I could listen for 10 minutes and learn something COOL, useful, and interesting."*
- *"They cover interesting topics and are not too long."*
- *"The run time."*
- *"I love the 10-minute length!"*
- *"A concise yet detailed story line."*
- *"The short length probably works well for incorporating into a lesson..."*

These respondents seemed to enjoy the compact nature of the podcast. On the other hand, several more respondents brought up the runtime when discussing aspects of the podcast they believed should be improved. Like the multiple-choice responses, these comments were split on whether episodes should run longer or shorter, and two of the three called for a longer runtime.

- *"I realize this is geared toward middle school, but it would be more appropriate for elementary schoolers if images accompanied the transcripts and the episodes were shorter."*
- *"I thought the podcast length was good as someone who is usually busy, but since I was on a walk, I definitely could have listened to it for another 10 or 20 minutes!"*
- *"I left wanting a little more. I personally like to listen to longer podcasts (30 minutes and up)."*

In terms of the number of interview guests, most respondents had no preference. Among those left, a slight majority preferred just one expert guest. This preference aligns with the format of most *Pulsar* episodes already published, which by and large feature just one guest.

Opinion on the Number of Expert Guests Featured



- I prefer episodes that feature 1 expert guest
- I prefer episodes that feature 2 or more expert guests
- No preference

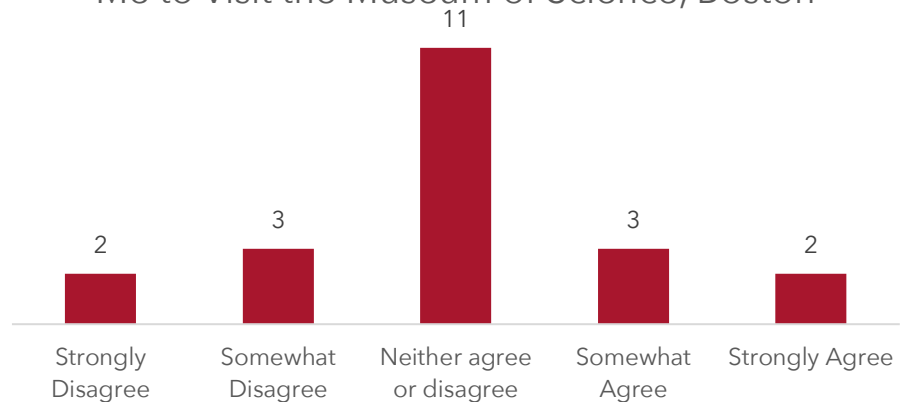


## CONTINUED LEARNING AND VISITING THE MUSEUM

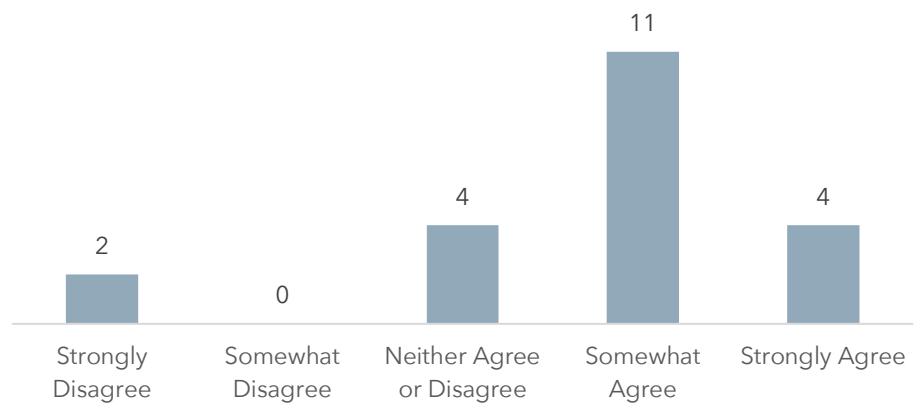
According to our stakeholders, the primary objectives of the podcast are to (1) increase interest in science and (2) to increase the overall visibility of the museum. In terms of the second goal, respondents showed little clear desire to visit the Museum of Science, Boston after listening to the podcast. About half of the 21 participants said they “Neither agree or disagree” with the statement: “Listening to the podcast has encouraged me to visit the Museum of Science, Boston.” Only five answered that they “Strongly agree” or “Somewhat agree.”

On the other hand, our data showed clearer evidence that the podcast was successful in inspiring listeners to be more interested in science. 15 out of 21 participants said they strongly or somewhat agreed that the podcast motivated them to learn more about science. Another 15 out of 21 strongly or somewhat agreed that the podcast broadened their understanding of science and technology.

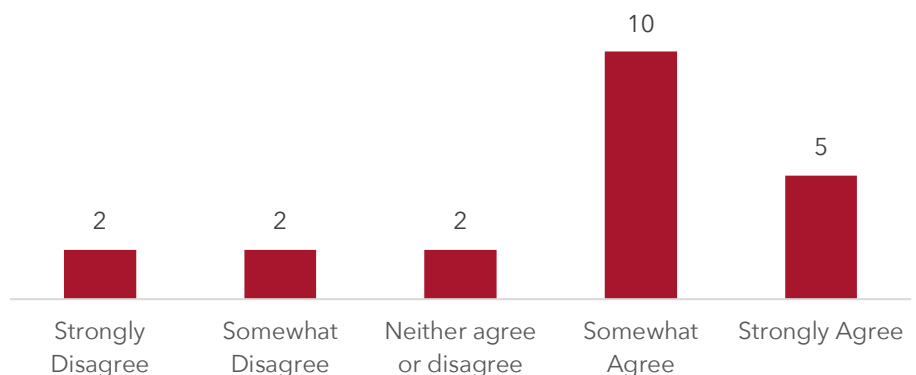
Listening to the Podcast Has Encouraged Me to Visit the Museum of Science, Boston



Listening to the Podcast has Motivated Me to Learn More About Science



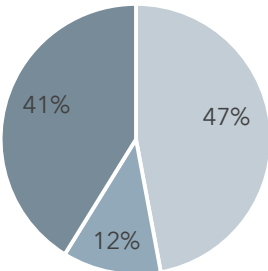
The Podcast Has Broadened My Understanding of Science and Technology



Respondents also seemed interested in listening to more episodes in the future. The majority of participants (15/17) responded “Yes” or “Maybe” to the question, “Are you interested in listening to more Pulsar episodes, now that you’ve listened?” A slight majority of those (eight people) answered “Yes.”

### Are You More Interested in Listening to More Pulsar Episodes?

■ Yes ■ No ■ Maybe

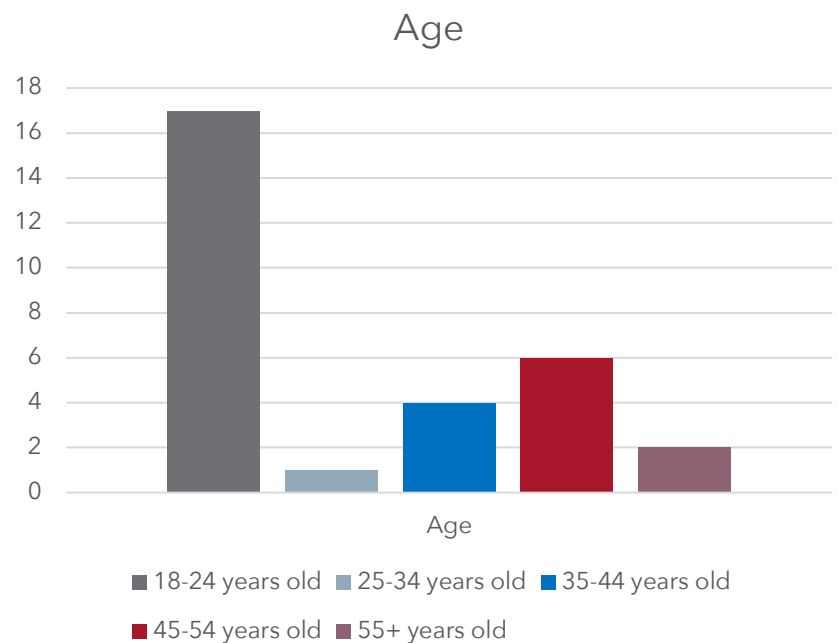
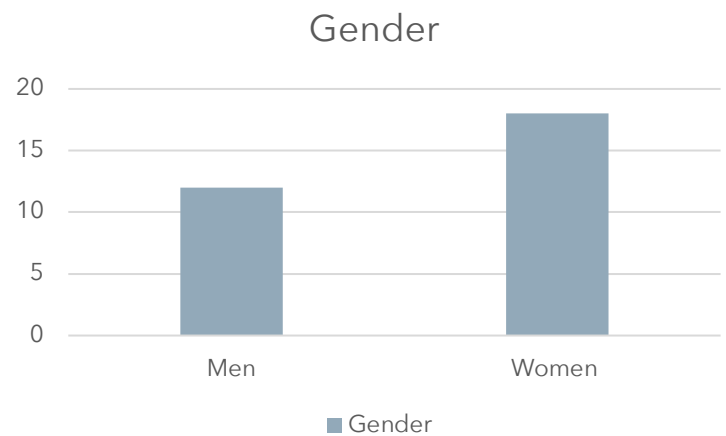


## INTERVIEW FINDINGS

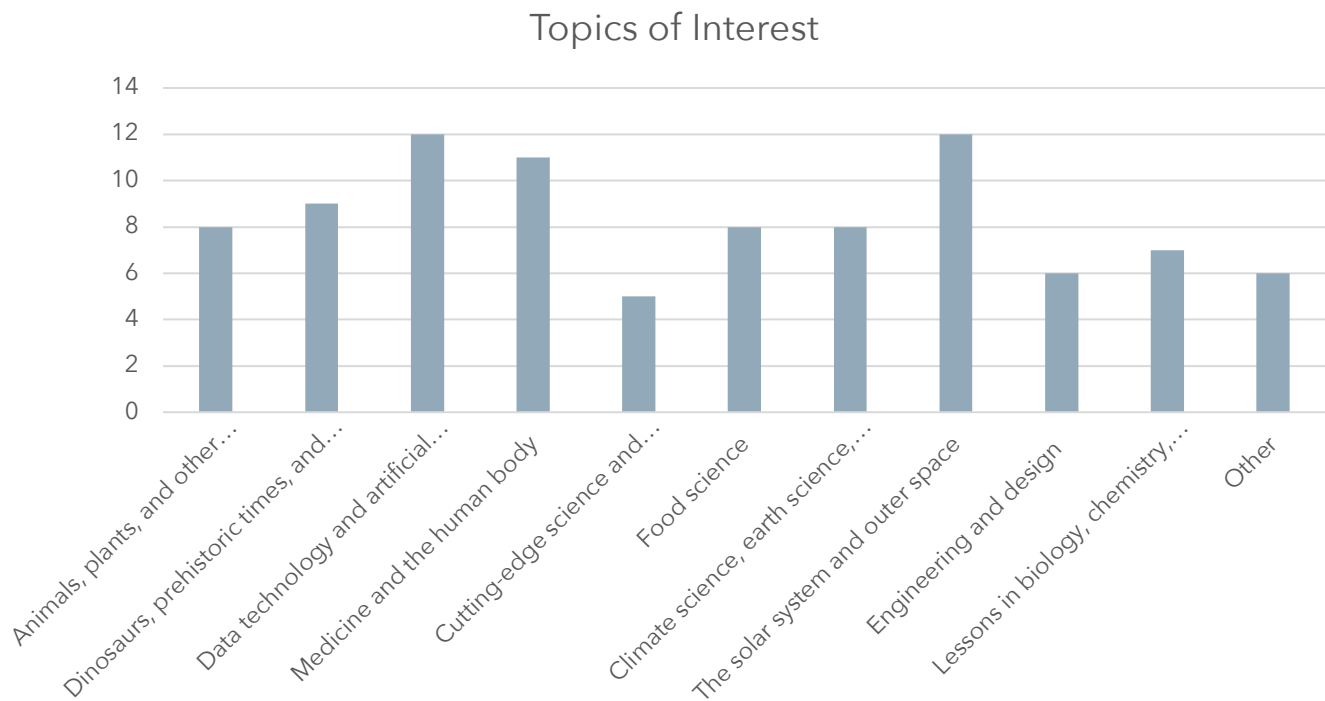
After gathering interviewee's responses, the metrics were sorted into quantitative and qualitative data sets. For the qualitative information, we analyzed the responses to identify common themes or patterns amongst the answers. There was naturally more variability here, but common patterns emerged for some, whereas others had no patterns of consistency. We coded and grouped similar responses to look at the overarching theme for that particular question type.

Based on the revised plan of action, our interview questions were adapted to discuss the hypothetical situation of *if* the interviewee were to listen to a science podcast like *Pulsar*, what would they prefer to see. As such, all of our interview data has the limitation that it does *not* pertain to the actual audience of *Pulsar*, but rather to those who happened to be at the Museum of Science, Boston midday on a Saturday, and should be looked at through that lens. As such, here is a summary of our findings.

We interviewed a total of 30 participants, 18 of whom identified as women and 12 identified as men, ranging from 18 - 73 years old. 17 were in the 18 - 24-year-old age range and 10 were aged 35 - 54. Of our sample, 14 did not (or rarely) listen to podcasts in general, whereas 16 listened to podcasts regularly. Of those who listened to podcasts, only 7 listened to science-related podcasts, none of whom ever listened to *Pulsar: A Science Podcast* itself.



When shown a list of topics generally seen in *Pulsar*, over one third of the respondents selected each of the following topics: data technology and artificial intelligence, medicine and the human body, and the solar system and outer space. The least interested topics were cutting edge-science and technology and engineering and design, but that could be because they were related to other topics seen on the list that they found more appealing.



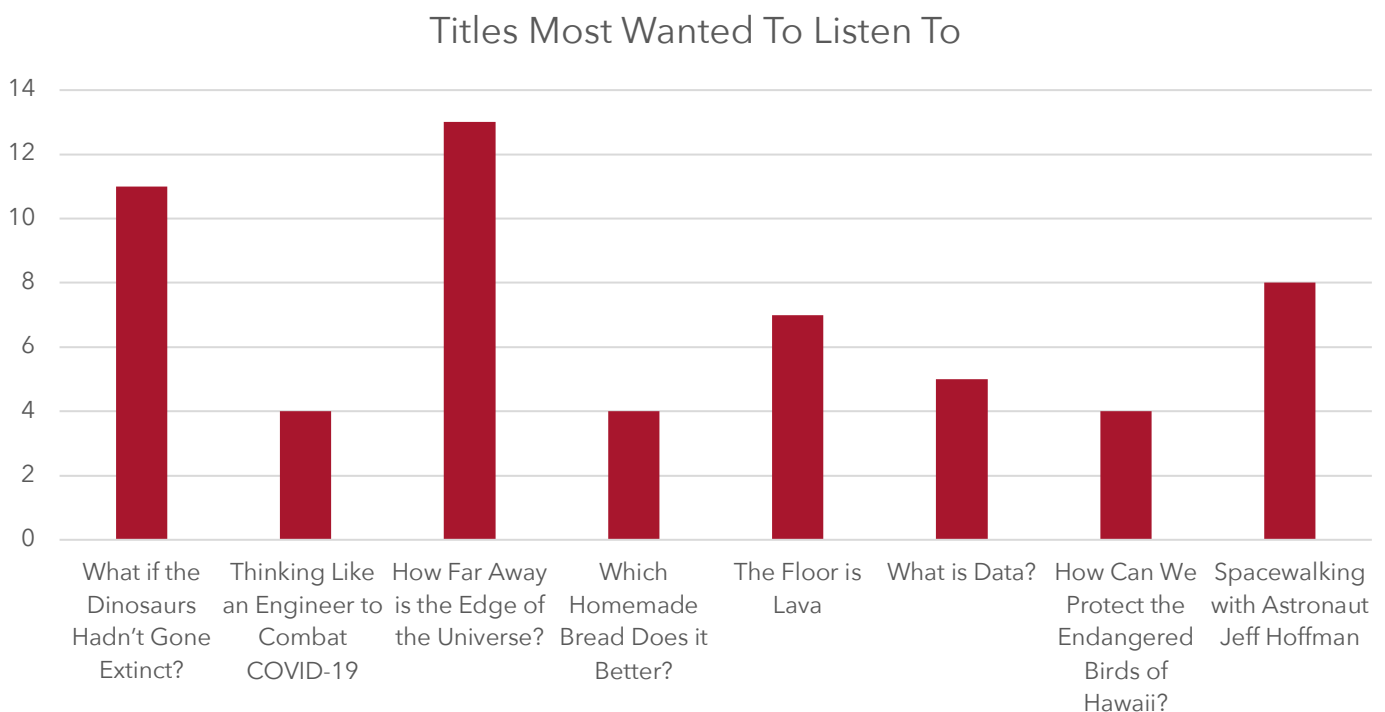
In choosing titles of podcasts that they'd like to listen to, participants chose titles they subjectively found most interesting. The two most interesting titles were "How Far Away is the Edge of the Universe?" and "What if the Dinosaurs Hadn't Gone Extinct?" All participants cited curiosity or interest as the main reason they chose their topic. Three participants stated:

- *"These are all things I study or interested in, besides the food science; that's something different!"*
- *"Dinosaurs are interesting and it's an interesting question. Why?"*
- *"Sounds like interesting topics"*

Additionally, one participant specifically cited the title format as one of the reasons they chose that title.

*"I like that it's not a question. And the topics interest me"*

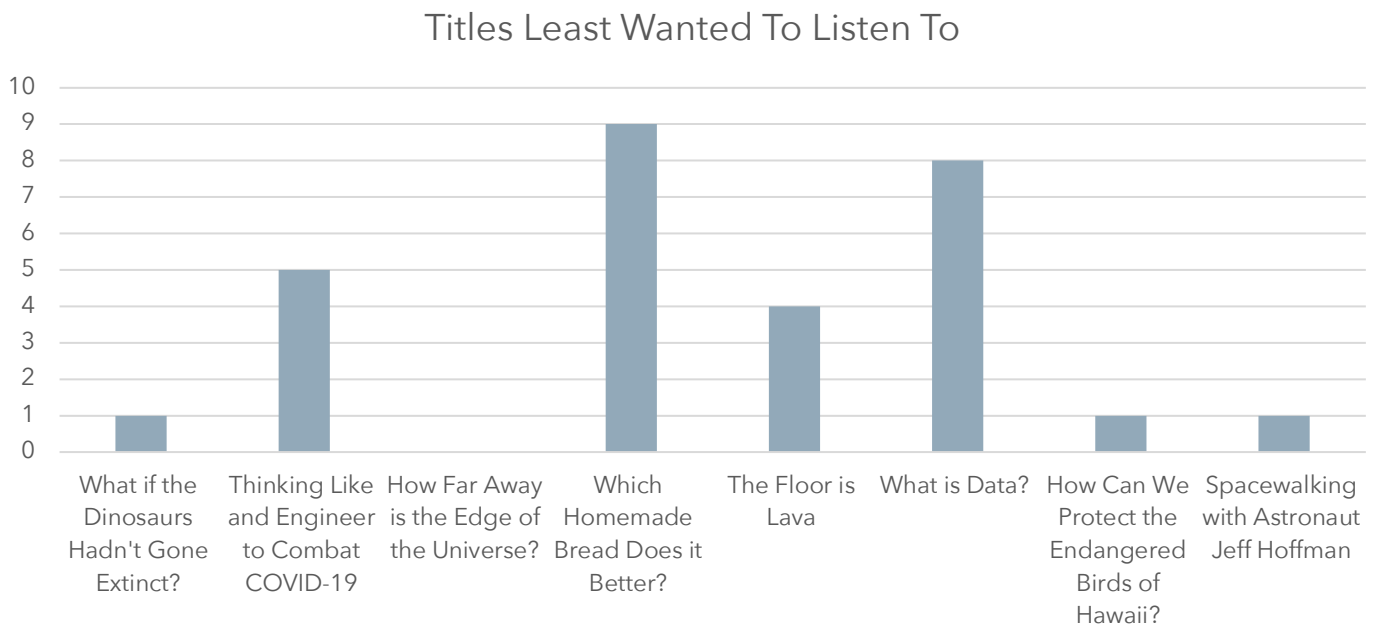
From our sample pool, it did not appear that the title of the podcast had much bearing on the level of select-ability when it came to audience members choosing which podcast to listen to.



The evaluators were also interested to see which titles participants found the least appealing. The two least favorite titles were "Which Homemade Bread Does it Better?" and "What is Data?" Similarly, there was no format structure that influenced their decision, but the topics themselves and the lack of interest they personally had in the subject. These were some responses:

- *"Just sounds boring."*
- *"Doesn't sound interesting at all."*
- *"I listen to podcasts to get away."*
- *"Doesn't sound interesting unless there's mold on the bread."*
- *"Not that interesting. Maybe if it were more descriptive."*

Some other responses were that they “could look it up” in reference to the topic or that the title was “too broad” or “too specific” for their interest.



Interestingly, when looking at topic and title data in collaboration, some participants chose titles directly related to the topics they previously indicated interest. However, others did not seem to show a correlation between their preferred topics, preferred titles, and least preferred titles, sometimes choosing a preferred title in their least preferred topic area and vice versa.

When asked about format, 13 preferred 1 or 2 guests, 7 wanted a panel of experts, 7 were drawn to the idea of storytelling, and 2 were interested in a single person speaking during the podcast. As to their preferred format, participants cited ease of listening and entertainment value as important factors when choosing their preferred format. 3 participants stated:

- *“Easier for me to follow along.”*
- *“I get distracted easily so it just needs to be engaging.”*
- *“I like having a little bit of conversation. You get more interesting and different opinions and it's more entertaining.”*

As a wrap up question, we asked if there was anything else participants wanted to let us know about podcasts. A couple of them referenced length, with 2 suggesting that they'd prefer 30-minute podcasts and 1 suggesting the 60-minute length. An additional participant

stated that “It’s good to have them long,” because “you can do something in the meantime,” but didn’t specify a specific amount of time.

People also referenced the entertainment value as being important to them, highlighting emotion, personality, humor, and applicability to real life as factors that matter to them when choosing a podcast title. Lastly, for the topic, 3 mentioned they like topics to be broader with open-ended questions that can apply to both children and middle-aged people so they can “listen to podcasts together. Some examples are as follows:

- *“Tone of voice is really important. Not monotone, like reading a book.”*
- *“I like humor, so it's not dull or boring.”*
- *“I like that podcasts can balance what kids want and what middle-aged people want.”*
- *“You can listen to podcasts together.”*
- *“I like things that are applicable in real life.”*

## FINDINGS SUMMARY

This evaluation finds its foundation in two primary objectives: (1) describing the podcast's current audience and (2) understanding factors that impact listeners' engagement with the podcast. Our evaluation utilized three main instruments – surveys, interviews, and analysis of podcast analytics – to achieve these goals. The data analytics provided the evaluation team with a historical snapshot of *Pulsar's* audience and listenership. These data are mostly quantitative, allowing the evaluation team to identify themes in demographics, content topic preferences, and temporal engagement of *Pulsar*. The survey provided the evaluation team with data specific to respondents who have listened to *Pulsar*, as well as useful demographic information including gender and level of education. The interview provided the evaluation team with holistic data about content topics and temporal engagement with non-*Pulsar* listeners. With the triangulation of all three instruments, the evaluation team was able to address the goals of describing the *Pulsar's* current audience and understanding the factors that impact engagement. Across all instruments, the evaluation team found that *Pulsar: A Science Podcast* is successful in reaching listeners near and far and caters to a variety of listeners' interest.



# DISCUSSION

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## HOW DOES PULSAR COMPARE TO OTHER PODCASTS?

In interpreting our findings, our team looked to on general podcast audience trends to see how our results compared. We drew most of our data from three recent reports released by Nielsen Holdings and Edison Research – both trackers of digital media trends. Below are some general trends we used to contextualize our findings:

- **Age: Podcast users tend to be young.** Nearly half of podcast users – 48 percent – surveyed by Edison Research were between the ages of 12 and 34, though this age group makes up only 37 percent of the U.S. population (*The Infinite Dial 2020*, 2020). The smallest listener group was 55 years or older – about 20 percent of listeners (compared to 23 percent of the population. Our survey and interview participants, too, tended to be young. Among those surveyed, 39 percent of Potential Listeners and 3 out of 5 Current Listeners indicated they were 18 to 34 years old. 60 percent of interview participants fell in the same 18 to 34 age range.
- **Gender: Men have a slight majority among podcast listeners.** About 51 percent of podcast listeners are male, according to the Edison Research report. Nielsen found a somewhat larger majority, with men making up 55 percent of listeners overall (*Podcasting Today: Insights for Podcast Advertisers*, 2021). The same report found that men composed 64 percent of science podcast listeners, while women made up the majority of education podcast audiences at 54 percent. Our own survey and interview participants tended to be female. 60 percent of interview participants identified as female, as did 71 percent of Potential Listeners. One Potential Listener identified as non-binary or third gender, and the single person who completed the Current Listeners survey was a woman.
- **Education: Podcast listeners tend to hold higher-ed degrees.** A 2017 report by Edison Research (not the 2020 report) found that podcast consumers tended to hold more degrees than the average U.S. resident over 18 years old (*The Podcast Consumer 2017*, 2017). 57 percent of podcast listeners held a four-year college degree, attended some grad school, or hold an advanced degree. By comparison, only 41 percent of U.S. residents fell into these categories. About 30 percent of listeners had some grad school or an advanced degree under their belt. By comparison, 71 percent of Potential Listeners said they held a graduate degree.

- **Listenership: Podcast download numbers vary widely.** While we had trouble finding good data on the average number of downloads per podcast episode, most sources seem to agree that there is no hard and fast number of downloads needed to consider a podcast “successful.” Though the giants of the podcast world have tens of millions of downloads (think *Serial*), more niche podcasts may only get a few dozen per episode. That being said, data provided by Buzzsprout, one of the larger podcast host sites, gave us good insight into the number of downloads the “average” podcast episode might be expected to receive in its first seven days after posting (Gray, 2019):
  - Top 1% of Podcasts > 3188
  - Top 5% of Podcasts > 584
  - Top 10% of Podcasts > 244
  - Top 25% of Podcasts > 74
  - Top 50% of Podcasts > 27

Though we do not know how many downloads *Pulsar* episodes typically receive in the first seven days, we do know that episodes receive an average of 138.43 downloads total. Assuming that episodes see the largest number of downloads shortly after they are posted, we can guess that *Pulsar* falls in the top 25 percent of podcasts in terms of listenership.

## WHAT PULSAR DOES WELL

In sifting through our findings, we found that *Pulsar* succeeded in a number of key areas. Below is a summary of the strengths we found across our various instruments:

### Reaching Listeners Near and Far

It’s clear from our analytics data that *Pulsar* appeals to more than just a few local MOS patrons. While the majority of listeners do reside in Massachusetts, *Pulsar* reaches users from nearly all 50 states and several countries all over the world. These figures are particularly impressive, considering the *Pulsar* team ramped up production only about a year ago. Though O’Dea and his colleagues hope to expand *Pulsar*’s audience, we hope they feel proud knowing that the podcast likely falls in the top 25 percent of podcasts in terms of average downloads within the first seven days.

## Catering to Varying Interests

One thing we learned in our evaluation process is that people don't always know what they want until it's been presented to them. Thankfully, *Pulsar* manages to satisfy a broad spectrum of interests and passions. Survey and interview participants demonstrated few clear preferences when it came to podcast topics. Even those topics which bored some interviewees sparked curiosity for others. Our findings suggest that the diverse palette of expertise makes for one of *Pulsar's* greatest strengths. As O'Dea said in our findings presentation, *Pulsar* aims to pose "a question you can't scroll by without knowing the answer, and spend 8 minutes to find out." The intrigue we saw among interview participants as they read through episode titles demonstrated that the podcast does just that.

## Making Science Education Interesting and Approachable

Survey data shows that listening to *Pulsar* increased participants' interest in science and motivated them to learn more. Both interview and survey participants pointed to the interestingness of the topics covered in *Pulsar* episodes when discussing aspects of the podcast they enjoyed most, making statements like "It's just mind boggling," "Very interesting information," and "It's such a great question." Moreover, six out of 18 participants spontaneously praised *Pulsar* for providing information from experts in a way that was clear and accessible to novices. Given these findings, it is no surprise that 15 out of 17 survey participants answered "Yes" or "Maybe" when asked if they were interested in listening to future *Pulsar* episodes. These findings demonstrate that *Pulsar* has succeeded in achieving one of its main product objectives; namely, to spark interest in and curiosity about science and technology.

## What Pulsar Can Improve

Below is a short summary of the places where we felt *Pulsar* did not meet its stated goals, and areas where we felt the podcast creators could make changes to better suit listeners' preferences:

### Increasing the Museum's Visibility

One of the product objectives mentioned by *Pulsar's* creators was increasing the MOS's visibility among listeners. We as evaluators approached this goal by asking survey participants whether the podcast made them more interested in visiting the museum. About half of the participants said they "Neither agree or disagree" with the statement, "Listening to the podcast has encouraged me to visit the Museum of Science, Boston" and only five

answered that they “Strongly” or “Somewhat” agreed. There are many ways to interpret these results. Because only two out of eight participants who had not previously visited the museum “Strongly” or “Somewhat” agreed that they were more interested in visiting, it may be the case that the podcast does not do a good job of advertising all that the museum has to offer. Alternatively, it may simply be the case that many people are uncomfortable visiting museums during a pandemic. Because all the participants who had not visited the museum live in California or other countries, the journey may simply be too far. Results were similar among those who have visited the museum in the past – 8 participants neither agreed or disagreed, 3 “Strongly” or “Somewhat” disagreed, and three “Strongly” or “Somewhat” agreed. Though none of these participants had visited recently, it may be the case that participants felt that they had already experienced all the museum has to offer. For this reason, we encourage the *Pulsar* creators to focus on advertising recent exhibits and initiatives available at the museum.

### **Adjusting the Podcast for Those Who Prefer Longer Runtimes**

Runtime turned out to be surprisingly important to interview and survey participants. While the majority of people seemed to like *Pulsar’s* 10-ish minute runtime, a small but vocal minority were split on whether the podcast should run longer or shorter. It’s hard to cater to those people who like shorter runtimes, but some relatively simple changes could make *Pulsar* more attractive to those who like to put podcasts on in the background and let them run for an hour. An automatic “play next” function added to the website might make it easier for listeners to enjoy multiple episodes and help increase *Pulsar’s* listenership.

### **Building Listenership in Other Regions/Countries with Local Experts**

While *Pulsar* is already reaching a fairly wide audience, we believe the podcast team could do more to reach listeners in other states and countries by contacting local experts in those places. O’Dea informed us during our findings presentation that an increase in listeners in France may have resulted from the fact that he interviewed a French archaeologist for one of the episodes. This unexpected bump in listeners could lay the basis for a general strategy. The *Pulsar* team may find success seeking listeners in countries where podcast listenership is already large, such as South Korea, Spain, Sweden, and Australia (Winn, 2019). They may also seek listeners in places where audiences are rapidly growing, such as Chile, Argentine, Peru, Mexico, and China (Gray, 2019). If they hope to draw visitors, they may also consider interviewing experts from nearby states, such as Connecticut, Rhode Island, Vermont, and New York.

## Why Do These Findings Matter?

This evaluation is meant to analyze the podcasts' design and implementation as a means of determining how well it meets the creators goals and vision. As stated above, our focus for this document was to describe the podcast's audience and understand the factors that influence user engagement. By doing so, we believe that we can help the *Pulsar* team take a great product and make it even better by tailoring it to audiences' desires and preferences. We as evaluators applaud the *Pulsar* team's work in providing an effective and approachable resource to the public free of charge. Our hope is that this report may serve as a guide for continued growth and development.

# RECOMMENDATIONS

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Moving forward, the following are recommendations that *Pulsar: A Science Podcast* can consider when creating content for their audience.

Pulsar's listenership is on trend with general podcast trends like having a younger audience that has pursued higher education in some form. If Pulsar wants to create content to increase this demographic, it might be worthwhile to consider how other podcasts have built a similar following of science, or non-science-related, podcasts and mirror their tactics.

Massachusetts is the highest region in the US for listeners. If they wanted to increase regional or national diversity, they could consider targeted ads through social media to try and increase engagement. Another option to increase regional or national diversity is to invite guest speakers from other areas to speak on topics. As seen through the analytics data, France saw an uptick in national representation, possibly due to the interview with a French archaeologist. If *Pulsar* has guests from other regions, it could possibly increase the listeners from that region for that podcast, and grasp them as regular listeners from that point onward.

In regards to topics, it is clear from the interview metric that people do not necessarily know what they want until they see it. This is important to consider when choosing titles as that is the bigger indicator for people to select a topic. As such, if *Pulsar* wants to capture and captivate listeners, they should consider keeping similarly engaging titles. As the analytics data indicated, the trend is towards question-formatted titles. However, others indicated that they prefer non-question formats. Regardless, the topic within the title seems to be the bigger indicator of select-ability.

Next, *Pulsar: A Science Podcast* might reconsider how they market themselves to general audience members as they continue to scale. The least downloaded podcast topic was "Cutting Edge Science and Technology," which was the topic they originally set out to pursue in content generation. As such, with their growing following and the changing trends within the general podcast generation, they might reconsider how they market themselves on social media platforms and other areas to capture audience members who might be interested in some of their podcasts, but not actively look for "Science Podcasts" on Apple Podcasts, Spotify, or online.

Additionally, *Pulsar* could potentially remarket older podcasts when an upcoming event has similar relevance. For example, if there is a spacewalk scheduled for January of the following year, they might reuse “Spacewalking with Astronaut Jeff Hoffman” to gain more marketability for the hot topic event coming up.

If Pulsar wants to capture listeners who prefer longer podcasts, they could consider an automatic “play next” function on their website or group similar podcast topics on Apple Podcast or Spotify.

If Pulsar wanted to attract more listeners to the Museum of Science Boston, they could advertise more attractions at the museum, highlight recent changes, and spotlight in-house experts. Conversely, if there is an interest in building listenership among MOS visitors, perhaps *Pulsar* could use their in-person platforms to advertise the podcast to people already at the museum.

# CONCLUSION

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*Pulsar: A Science Podcast* is a short form science podcast that uses a guest speaker interview format. Over the year that they have been operating, they have amassed a diverse audience that not only reaches nearly all of the United States, but many countries around the globe.

Their content might be grounded in science, but the variety of their podcast titles is just as diverse as their audience. *Pulsar: A Podcast* does a remarkable job appealing to the masses in their content generation, dissemination of podcasts on multiple platforms, and recruiting experts to discuss interesting topics in their realm of scientific expertise.

This formative evaluation aimed to identify who comprises *Pulsar's* current audience and to understand the factors that impact their audience's engagement. As such, this is a summary of our major findings.

Goal: To describe the podcast's current audience	Goal: To understand the factors that impact engagement
US region with highest total downloads is the Northeast (81%), followed by the <b>South (8%)</b> , the West (6%), and the Midwest (5%)	Regardless of publication date, episodes relating to <b>dinosaurs</b> have higher than average listenership
Data suggest that audience members <b>do not</b> typically listen to <i>Pulsar</i> podcasts as soon as they are published	A survey of potential listeners showed that participants were interested in a <b>variety of topics</b>
Most survey participants, especially those from Massachusetts, <b>have visited the MOS</b>	People preferred a <b>1 or 2 guest format</b> , with <b>ease of listening and entertainment value</b> being of high importance when listening to podcasts



Based on these, it is clear that *Pulsar* has already succeeded in their mission to generate interest in science and disseminate interesting and engaging material to a diverse audience from all over the world. In analyzing our recommendations, it is clear that *Pulsar: A Podcast* has options they could pursue in content, format, title structure, length, and marketing efforts that could mirror their long-term strategic plan to scale and grow moving forward.

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# APPENDIX

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## APPENDIX A: TITLE LIST FOR INTERVIEWS

### TITLES

1. What if the Dinosaurs Hadn't Gone Extinct?
2. Thinking Like an Engineer to Combat COVID-19
3. How Far Away is the Edge of the Universe?
4. Which Homemade Bread Does it Better?
5. The Floor is Lava
6. What is Data?
7. How Can We Protect the Endangered Birds of Hawaii?
8. Spacewalking with Astronaut Jeff Hoffman

## APPENDIX B: TOPIC LIST FOR INTERVIEWS

### TOPICS

1. Animals, plants, and other organisms
2. Dinosaurs, prehistoric times, and evolution
3. Data technology and artificial intelligence
4. Medicine and the human body
5. Cutting-edge science and technology
6. Food science
7. Climate science, earth science, and the environment
8. The solar system and outer space
9. Engineering and design
10. Lessons in biology, chemistry, and physics
11. Other (please specify)

## APPENDIX C: RECRUITMENT SCRIPTS

### **The following script was included in the podcast to recruit participants:**

*We want your feedback. Visit [MOS.org/pulsar](https://mos.org/pulsar) to fill out a five-minute survey and help us improve the podcast.*

### **The following script was used to recruit participants from the Pulsar site and from social media and newsletter posts:**

*Help us improve Pulsar by participating in a short survey! (link embedded)*

### **The following script appeared at the beginning of the survey:**

*Thank you for taking part in this survey. Any feedback you provide here will be used to improve the quality of the Pulsar podcast. The following questions were developed by student researchers at Harvard University in collaboration with the Museum of Science, Boston.*

*Please know that this survey is voluntary and that you can stop at any time. All results will be reported in aggregate form and identifying information will not be disseminated. You must be 18 or older to participate.*

*This survey takes less than 5 minutes to complete. If you have any questions or concerns, please contact Abby Feldman at [abigail.feldman@gse.harvard.edu](mailto:abigail.feldman@gse.harvard.edu).*

### **The following script appeared at the end of the survey to recruit participants for the interview:**

*Thank you for interest in helping us improve Pulsar! We are hoping to conduct short interviews with Pulsar listeners to gather more feedback. If you are interested in participating, please provide your name and email address in the survey below. We will respond to you within 48 hours to set up a time to meet virtually or over the phone. You must be 18 or older to participate.*

*Please note that your participation in an interview is voluntary and you may change your mind at any time. Interviews will last no more than 15 minutes and will be conducted in English. If you have any questions or concerns, please contact Abigail Feldman at [abigail.feldman@gse.harvard.edu](mailto:abigail.feldman@gse.harvard.edu).*

## APPENNDIX D: PODCAST EPISODE TOPIC ASSIGNMENTS

Topic	Episode
Animals, plants, and other organisms	Observing Wildlife in Your Backyard
Animals, plants, and other organisms	The Future of Insects
Animals, plants, and other organisms	Our Fine Feathered Friends
Animals, plants, and other organisms	What is the Biggest Animal?
Animals, plants, and other organisms	Why Do Dogs Smell Each Others' Butts?
Animals, plants, and other organisms	Why Do Wombats Poop Cubes?
Animals, plants, and other organisms	What Makes an Axolotl So Super?
Animals, plants, and other organisms	How Can We Protect the Endangered Birds of Hawai'i?
Animals, plants, and other organisms	Do Woodpeckers Get Headaches?
Animals, plants, and other organisms	How Do You Explore An Underwater Forest?
Animals, plants, and other organisms	Do Spiders Have Personalities?
Animals, plants, and other organisms	Why Does the Museum of Science Have Monkeys?
Animals, plants, and other organisms	What Do a Honeybee and a Chicken Have in Common?
Animals, plants, and other organisms	A Shark The Size of a School Bus...What Did It Eat?
Animals, plants, and other organisms	What Happened to Megalodon, The Biggest Shark Ever?
Climate science, earth science, and the environment	Measuring Urban Heat Islands
Climate science, earth science, and the environment	Climate Change Resilience in Boston
Climate science, earth science, and the environment	Glaciers: Tortoise or Hare?
Climate science, earth science, and the environment	WCVB's Harvey Leonard on Predicting the Weather
Climate science, earth science, and the environment	Staying Safe in a Lightning Storm
Climate science, earth science, and the environment	The Floor is Lava
Climate science, earth science, and the environment	How Do You Sculpt a Bronze Heron?
Climate science, earth science, and the environment	How Do Scientists Predict Tornadoes?
Cutting-edge science and technology	What Were the Top Ten Science Stories of 2020? Part One
Cutting-edge science and technology	What Were the Top Ten Science Stories of 2020? Part Two
Cutting-edge science and technology	What Were the Top Ten Science Stories of 2020? Part Three
Cutting-edge science and technology	What Were the Top Ten Science Stories of 2020? Part Four
Data technology and artificial intelligence	How Can Artificial Intelligence Help Create Maps?
Data technology and artificial intelligence	What is Data?
Dinosaurs, prehistoric times, and evolution	Digging Up Dinosaurs
Dinosaurs, prehistoric times, and evolution	Did T. rex Eat Stegosaurus?
Dinosaurs, prehistoric times, and evolution	What If the Dinosaurs Hadn't Gone Extinct?
Engineering and design	Thinking Like an Engineer to Combat COVID-19
Engineering and design	What is a Heart on a Chip?
Engineering and design	How Small Can You Make a Refrigerator?

Food science	Which Homemade Bread Does It Better?
Food science	Food Insecurity During a Pandemic
Food science	What Water Makes the Best Beer?
Food science	How Can Half a Degree Ruin My Eggs?
Lessons in biology, chemistry, and physics	Inside the Theater of Electricity
Lessons in biology, chemistry, and physics	What is Synthetic Biology?
Lessons in biology, chemistry, and physics	How Many Colors Are in the Rainbow, Really?
Lessons in biology, chemistry, and physics	How Can I Explore Chemistry at Home?
Lessons in biology, chemistry, and physics	What's Your Favorite Molecule?
Medicine and the human body	Coronavirus
Medicine and the human body	Using Biotechnology to Track COVID-19
Medicine and the human body	Meet a Polio Pioneer
Medicine and the human body	How Do We Test Treatments for COVID-19?
Medicine and the human body	Had a Bad Day? Check Your Teeth
Medicine and the human body	Can We Restore Mobility to Spinal Injury Patients?
Medicine and the human body	Where Did Eyes Come From?
Medicine and the human body	What is it Like to Get a COVID-19 Vaccine?
Medicine and the human body	How Is An Ear Like a Fingerprint?
Other	Museum Stories - The Arrival of Cliff
Other	Preserving Cultural Heritage Sites with Technology
Other	The Future of Accessible Learning
Other	Who Were the Blackwell Sisters?
The solar system and outer space	All About Pulsars
The solar system and outer space	Living In Space
The solar system and outer space	How Do You Catch a Meteor Shower?
The solar system and outer space	Spacewalking with Astronaut Jeff Hoffman
The solar system and outer space	How Bumpy is My Exoplanet?
The solar system and outer space	Does Astronaut Food Taste Good?
The solar system and outer space	How Do Astronomers Search for Exoplanets?
The solar system and outer space	How Do You Land a Robot on Mars?
The solar system and outer space	Mars Helicopter? Really?
The solar system and outer space	Who Gets to Drive the Mars Rover?
The solar system and outer space	Does the Moon Rotate?
The solar system and outer space	How Far Away is the Edge of the Universe?
The solar system and outer space	Why Do Stars Explode?
The solar system and outer space	What Does Microgravity Feel Like?
The solar system and outer space	How Big Were the Apollo Moon Landing Computers?

## APPENNDIX E: IN-PERSON INTERVIEW WORKSHEET

*Hello, I hope you're enjoying your visit to the museum today - I have a quick question for you. My name is \_\_\_\_\_ and I'm a student at Harvard. We're doing a formative evaluation about the Museum of Science Boston's science podcast called Pulsar: A Podcast. Would it be alright if I ask you a couple of questions? The interview should only take a few minutes, it will be completely anonymous, and you can stop at any time.*

Can I first ask for the age and gender of everyone in the group?


Do you listen to podcasts? \_\_\_\_\_

Have you ever listened to a science podcast? If so, which ones and why?

Have you listened to the Museum of Science podcast, called Pulsar? **[If yes, go to page 2]**

Which of these topics would interest you the most for a science podcast? **[Show topics list]**

Podcasts can come in different formats: **solo commentary, one-on-one interviews, conversations with a panel of experts, or storytelling formats.** If you were to listen to a science-related podcast, what formats would you find most appealing? Why?

Based on the titles on the back of the clipboard, which podcast would you **most** want to listen to? Why? **[Show titles list]**

Based on the titles on the back of the clipboard, which podcast would you **least** want to listen to? Why? **[Show titles list]**

What else would you like to tell us about the content, format, or anything else relating to science podcasts and *Pulsar*?

\_\_\_\_\_

1

Questions for subjects who have listened to Pulsar

How did you come to know the Pulsar podcast?

What are you typically doing while listening to the podcast?

What aspects of the Pulsar podcast(s) do you enjoy the most?

What types of topics do you find most appealing?

What is your preferred format? **Solo commentary, one-on-one interview, a conversation with a panel of experts, and story-telling.**

How can the podcast be improved?

What else would you like to tell us about the content, format, or anything else relating to *Pulsar: A Podcast*?

2



## APPENDIX F: QUALTRICS SURVEY 1

Qualtrics Survey Software

3/11/21, 10:19 PM

### Pulsar: A Podcast

Thank you for taking part in this survey. Any feedback you provide here will be used to improve the quality of the Pulsar podcast. The following questions were developed by student researchers at Harvard University in collaboration with the Museum of Science, Boston.

Please know that this survey is voluntary and that you can stop at any time. All results will be reported in aggregate form and identifying information will not be disseminated. You must be 18 or older to participate.

This survey takes less than 5 minutes to complete. If you have any questions or concerns, please contact Abby Feldman at [abigail.feldman@gse.harvard.edu](mailto:abigail.feldman@gse.harvard.edu).

How old are you?

- 17 years old or younger
- 18 - 24 years old
- 25 - 34 years old
- 35 - 44 years old
- 45 - 54 years old

[https://harvard.az1.qualtrics.com/Q/EditSection/Blocks/Ajax/GetSurv...textSurveyID=SV\\_1Y2JQKXUTIT13Z4&ContextLibraryID=UR\\_bHnHs16Rsvz2Ar1](https://harvard.az1.qualtrics.com/Q/EditSection/Blocks/Ajax/GetSurv...textSurveyID=SV_1Y2JQKXUTIT13Z4&ContextLibraryID=UR_bHnHs16Rsvz2Ar1)

Page 1 of 9

Qualtrics Survey Software

3/11/21, 10:19 PM

- 55 - 64 years old
- 65 - 74 years old
- 75 years old or older

Have you listened to Pulsar: A Podcast?

- Yes
- No

How many episodes of the podcast have you listened to?

- 1 episode
- 2 - 4 episodes
- 5 - 10 episodes
- 11 or more episodes

Which of the following best describes your reasons for listening to the podcast? (Choose your top two reasons)

- I want to learn more about science and technology
- I want to teach others about science and technology
- I want to learn about a specific topic
- I find the podcast entertaining and enjoyable

[https://harvard.az1.qualtrics.com/Q/EditSection/Blocks/Ajax/GetSurv...textSurveyID=SV\\_1Y2JQKXUTIT13Z4&ContextLibraryID=UR\\_bHnHs16Rsvz2Ar1](https://harvard.az1.qualtrics.com/Q/EditSection/Blocks/Ajax/GetSurv...textSurveyID=SV_1Y2JQKXUTIT13Z4&ContextLibraryID=UR_bHnHs16Rsvz2Ar1)

Page 2 of 9

- I can listen to the podcast with family / children
- Other (please specify)

How do you typically listen to Pulsar: A Podcast?

- Directly from the Pulsar page on the Museum of Science website
- Apple Podcasts
- Spotify
- Third-party app
- Other (describe)

Do you typically listen to Pulsar with other people? (Select all that apply)

- Yes, I typically listen to the podcast with friends
- Yes, I typically listen to the podcast with family
- Yes, I typically listen to the podcast with colleagues and coworkers
- No, I typically listen to the podcast alone

Are you an educator?

- Yes

- No

Have you used or shared Pulsar with learners in your educational setting or classroom?

- Yes
- No

Which of the following best describes the learners in your educational setting or classroom?

- Elementary school
- Middle school
- High school
- College level
- Graduate level
- Other (please specify)

Which of the following best describes your opinion of the podcast's runtime?

- The episodes generally run too long

- The episodes generally run too short
- The episodes generally run for the right amount of time

Which of the following best describes your opinion of the number of expert guests featured in each podcast episode?

- I prefer episodes that feature 1 expert guest
- I prefer episodes that feature 2 or more expert guests
- No preference

What aspects of the podcast do you enjoy the most?

What aspects of the podcast do you think could be improved?

Is there a question or topic you'd like Pulsar to explore in an upcoming episode?

Rate the extent to which you agree or disagree with each statement:

	Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree
Listening to the podcasts has encouraged me to visit the Museum of Science, Boston.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Listening to the podcast has motivated me to learn more about science.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The podcast has broadened my understanding of science and technology	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Which podcast topics interest you the most? (Please

select your top 5 choices)

- Dinosaurs, prehistoric times, and evolution
- Climate science, earth science, and the environment
- Lessons in biology, chemistry, and physics
- Food science
- Medicine and the human body
- Engineering and design
- Cutting-edge science and technology
- Other (please specify)
- The solar system and outer space
- Data technology and artificial intelligence
- Animals, plants, and other organisms

Pulsar is a short-form podcast produced by the Museum of Science, Boston that features interviews with museum educators and notable scientists, researchers, and engineers. Based on this description, what interests you most about a podcast like this?

What kind of questions or topics do you think future Pulsar episodes should address?

Do you currently live in the United States?

- Yes
- No

What is your zip code?

When, if at all, was your last visit to the Museum of Science, Boston?

- I have never visited the museum
- Within the past 6 months
- 6 months to 1 year ago
- 1 to 2 years ago
- 3 or more years ago

Which of the following best represents your highest level of education?

- High school or some high school
- Some college
- College degree
- Some graduate work
- Graduate degree
- Prefer not to say

What is your gender?

- Male
- Female
- Non-binary / third gender
- Prefer not to say

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## APPENDIX G: QUALTRICS SURVEY 2

4/5/2021

Qualtrics Survey Software

### Pulsar: A Podcast

Thank you for taking part in this survey. Any feedback you provide here will be used to improve the quality of the Pulsar podcast. The following questions were developed by student researchers at Harvard University in collaboration with the Museum of Science, Boston.

Please know that this survey is voluntary and that you can stop at any time. All results will be reported in aggregate form and identifying information will not be disseminated. You must be 18 or older to participate.

This survey takes less than 5 minutes to complete. If you have any questions or concerns, please contact Abby Feldman at [abigail.feldman@gse.harvard.edu](mailto:abigail.feldman@gse.harvard.edu).

How old are you?

- 17 years old or younger
- 18 - 24 years old
- 25 - 34 years old
- 35 - 44 years old
- 45 - 54 years old
- 55 - 64 years old

[https://harvard.az1.qualtrics.com/Q/EditSection/Blocks/Ajax/GetSurveyPrintPreview?ContextSurveyID=SV\\_8wgw2u50URDLXUO&ContextLibraryID=UR\\_bHnHs...](https://harvard.az1.qualtrics.com/Q/EditSection/Blocks/Ajax/GetSurveyPrintPreview?ContextSurveyID=SV_8wgw2u50URDLXUO&ContextLibraryID=UR_bHnHs...) 1/8

4/5/2021

Qualtrics Survey Software

- 65 - 74 years old
- 75 years old or older

Which episode did you listen to? (Please write the title below)

Which of the following best describes your reasons for listening to the episode you chose? (Choose your top two reasons)

- It looked interesting
- It was the first one I saw
- I wanted to learn more about the topic
- I am already knowledgeable about the topic
- other (please specify)

How do you typically listen to podcasts?

- Apple Podcasts
- Spotify

[https://harvard.az1.qualtrics.com/Q/EditSection/Blocks/Ajax/GetSurveyPrintPreview?ContextSurveyID=SV\\_8wgw2u50URDLXUO&ContextLibraryID=UR\\_bHnHs...](https://harvard.az1.qualtrics.com/Q/EditSection/Blocks/Ajax/GetSurveyPrintPreview?ContextSurveyID=SV_8wgw2u50URDLXUO&ContextLibraryID=UR_bHnHs...) 2/8

4/5/2021

Qualtrics Survey Software

- An app not listed here
- Other (describe)

Are you an educator?

- Yes
- No

Would you use or share Pulsar with learners in your educational setting or classroom?

- Yes
- No

Which of the following best describes the learners in your educational setting or classroom?

- Elementary school
- Middle school
- High school
- College level
- Graduate level

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- Other (please specify)

Are you interested in listening to more Pulsar episodes, now that you've listen to one?

- Yes
- Maybe
- No

Which of the following best describes your opinion of the podcast's runtime, based on the episode you chose?

- The episodes generally run too long
- The episodes generally run too short
- The episodes generally run for the right amount of time

Which of the following best describes your opinion of the number of expert guests featured in each podcast episode, based on the episode you chose?

- I prefer episodes that feature 1 expert guest
- I prefer episodes that feature 2 or more expert guests
- No preference

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What aspects of the podcast do you enjoy the most?

What aspects of the podcast do you think could be improved?

Is there a question or topic you'd like Pulsar to explore in an upcoming episode?

Rate the extent to which you agree or disagree with each statement:

	Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree
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Listening to the podcasts has encouraged me to visit the Museum of Science, Boston.

<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
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Listening to the podcast has motivated me to learn more about science.

<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
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The podcast has broadened my understanding of science and technology

<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
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Which podcast topics interest you the most? (Please select your top 5 choices)

- Engineering and design
- The solar system and outer space
- Lessons in biology, chemistry, and physics
- Data technology and artificial intelligence
- Cutting-edge science and technology
- Climate science, earth science, and the environment
- Dinosaurs, prehistoric times, and evolution
- Animals, plants, and other organisms



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other (please specify)

Medicine and the human body

Food science

Do you currently live in the United States?

Yes

No

What is your zip code?

When, if at all, was your last visit to the Museum of Science, Boston?

I have never visited the museum

Within the past 6 months

6 months to 1 year ago

1 to 2 years ago

3 or more years ago

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Which of the following best represents your highest level of education?

High school or some high school

Some college

College degree

Some graduate work

Graduate degree

Prefer not to say

What is your gender?

Male

Female

Non-binary / third gender

Prefer not to say

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