Evaluating the Usability of Museum APIs





















Museums are providing API access to their collections. Museum API's are a niche but important entry into museum data. In this project we assessed the usability of 4 museum APIs and their available documentation.

The APIs included in this study were:

- Cooper Hewitt Smithsonian Design Museum <u>https://collection.cooperhewitt.org/api/</u>
- The Met <u>https://metmuseum.github.io/</u>
- Smithsonian Open Access <u>https://edan.si.edu/openaccess/apidocs/</u>
- Cleveland Art Museum https://openaccess-api.clevelandart.org/





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- Understand how people use cultural heritage institutions' APIs and APIs in general.
- Evaluate the usability of the current interfaces and available documentation.
- Assess the interest and satisfaction of the available data.
- Identify use cases of the collection data.
- Learn new ways of distributing and marketing the API information.
- Benchmark the usability of these APIs and develop best practices for the museum sector



The collection of data was done via **unmoderated remote user testing** using the tool SoundingBox.

We recruited **20 participants**. This was a comparative analysis study so each participant conducted the tasks in one specific API (5 participants per API).

Participants were recruited from email lists, linkedin, Twitter, courses in programming for culture heritage, machine learning at Pratt. Participants received a \$20 Gift card.





Today we're going to ask you to complete four activities on this site. As you go about using this API interface, we would like you to think aloud as much as possible: describe what you are looking at and what you are trying to do.

- 1. Get familiar with the available data on this API and describe aloud some ideas on how you would use it.
- 2. Review the documentation and tell us what is useful and if there is any missing information
- 3. Please spend about 5 minutes looking for something you would do on this site if you were using it on your own. What would be interested in creating using this data?
- 4. Review the API and documentation and describe how you would approach the task.

Participants tech skills

All participants were familiar with using APIs although their expertise varied.

Python is the programming language used by most of the participants, followed by Java.

Frequency of APIs usage



Frequency of programming languages used by participants



Programming language

Participants profile: user types

We identified four main user types during our study based on their familiarity with museums, programming skills and purpose to use APIs.

Tech professionals

Users who work as developers separately from museums. These users had familiarity with APIs, programming languages, and general software skills. These users did not necessarily have a familiarity with the content of museums.

Students

These users are museum/library science students who have taken courses which use APIs, they have a solid understanding of museum terminology and practices.

Hobbyists

These users had used APIs to make bots, apps, and other programs using APIs. They are presumably self taught and use APIs for personal projects.

Museums professionals

These users understood general museum terminology and databases, but had relatively medium/advanced experience working directly with APIs.

Participants profile: user types

Museum knowledge



Their expectations, needs and experience varied based on user's familiarity with museums, programming skills and purpose to use APIs.

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Technical skills

API sources

Participants were asked in a pre-questionnaire how they search for APIs to use; what are the participants' main sources or repositories for finding APIs.

Many participants found APIs to use by searching directly on the institution's website or by using Google/search engines.

Recommendation: Optimize the API pages for non-branded searches on search engines (topic, data available...)

How do paticipants search for APIs to use



APIs participants use

This wordcloud shows the APIs participants mentioned that they used in the past



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Overall findings

- Users valued positively the amount of data available and describe a range of usages from games, data visualization to virtual exhibitions. Adding ideas and examples of previous projects would be useful to show the possibilities.
- Users appreciate the understandability of the interface but some found the pages too long to scroll. A navigation bar or index is suggested.
- Examples are well appreciated, how to write queries, examples for different languages, how to combine the endpoints and format the queries. Users valued the options to quickly test their queries.
- Users got frustrated when trying to understand the endpoints, combinations of parameters and required fields. Users suggested having more examples, better error messages and consistency with standards.
- Language and terminology of the data was not always clear. Explanations are needed for those unfamiliar with museums.

Overall scores

The average score of the questions about usability, documentation, likelihood to return and comparative with other APIs was **65/100**.



Satisfaction

On average users rated the APIs as **67/100** when asked if they would return to use the APIs.

When asked how these APIs compare to other APIs they had used they gave a score of **62/100**.



Interest in the data and potential usages

Most commonly, participants found the **amount of metadata** and **specific pieces of metadata** included in the dataset particularly interesting. The accession date of a work of art was noted by one participant, who stated that including this kind of information "enables you to track how the museum's collection has changed over time. The contents of a museums collection can reflect the priorities of the curator and the societal times," and added that it is "also interesting that the artist gender field seems to be a recent addition [to the API and dataset], which also reflects the times. What conclusions then can we draw from the objects that do not have that field filled in?"

Participants found the **parameters** necessary for querying the data interesting as well, with one participant stating that "I wouldn't think to filter down artwork based on some of these parameters, but after I saw them listed, it made sense as to why that would be an option."

Speaking about the Smithsonian Institute's API, one user stated that they "found the CC0 stats endpoint to be the most interesting thing - mainly because it potentially offers a view of the SI collections that you wouldn't really be able to get any other way, and that kind of information about usage of digital collections is not a common feature in museum APIs in general."

Participants also noted that they enjoyed thinking about **creatives ways** to use the various APIs, and noted that they enjoyed that "the documentation did not shy away from giving technical insights, examples, and example responses" which allowed them to think creatively about the **potential uses** of the APIs.

Data

Participants were asked what data they would be interested in accessing when using an API. Participants were allowed to choose a maximum of 5 options from a provided list.

Participants were interested in **creator/artist data, images, dates, exhibition history and links to other datasets**. There was low interest in provenance, and museum departments.

"The most interesting part was that there were diverse keys options such as exhibition history and funfact"

"It's good that accession date is included"

"Artist gender field is recent addition, does this have implications for objects where this field is not filled in?"

"Having a detailed description of Nationality is important because artists are people who move around the world"



Note: not all the data points were available in all the APIs

Use cases

Participants mentioned many different uses they would give to the APIs. Overall the way they would use it depends on the relation with the museum sector (if they know the field or not) and with the type of work people do: some would use for research purposes and some for more "casual" purposes such as entertainment. Some participants mentioned that having examples of what others have created would be a good source of inspiration.

The examples mentioned by participants were splitted in three types mentioned below with some examples:

Creative ideas and games

- A virtual treasure hunt game, multiplayer.
- Application that shows daily picture or random selection of artwork
- Create a bot that posts images of sunrise and sunset at sunrise and sunset each day.

Apps or functionalities for museums

- Create a cross-institution exhibition
- Create a digital museum for those who can't come to the museum
- Create user profiles based on interest

Data visualization and research of museum collections

- Plot trends within dataset
- Seeing fluctuations based on gender representations or location
- Data visualization by geographical data

Documentation: overall satisfaction

The average rate for documentation is **60/100**.

Participants emphasized that the clarity and volume of documentation is useful in their use of APIs. Specific examples and use cases as well as the amount of data available within the API were notable useful features for many of the participants.

Improvements can be made in the navigation, terminology and examples to facilitate the usage of the API for users with different technical backgrounds and familiarity with the museum field.



I felt the API documentation had enough information (Strongly disagree <-> Strongly agree)

Documentation: user preferences

Paginating results for easier analysis and parsing.

Documentation about how to actually **store the data** (next steps and suggestions for the users).

If there is a lot of data to parse through, users noted that they would prefer a **CSV**.

Users generally expected a **key** to be required, but were also pleased in instances where it wasn't required.

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	LICENSE	Update LICENSE	4 years ago
	MetObjects.csv	Open Access csv	2 days ago
	README.md	Update README.md	7 months ago
	≣ README.md		

The Metropolitan Museum of Art Open Access CSV

The Metropolitan Museum of Art presents over 5,000 years of art from around the world for everyone to experience and enjoy. The Museum lives in three iconic sites in New York City—The Met Fifth Avenue, The Met Breuer, and The Met Cloisters. Millions of people also take part in The Met experience online.

Documentation interface

Participants found the interfaces **easy to navigate** and the overall structure of the websites looked familiar and matched what participants were expecting.

Expandable tabs for extra/further documentation is helpful to avoid excessive scrolling:

"if all the information is on the same page, access is more immediate but there is risk of getting lost"

"Give me an index! Or simple navigation pane."

"Perhaps the endless scrolling. Would have loved to see a simple index on the right or left to get an idea of what is in the site... and to navigate it more efficiently when consulting after I arrive at what I am interested in"

Documentation: Comprehensibility and Ease of Use

The average rate for the comprehensibility and ease of use of the documentation is **69/100** and **68/100** respectively.

Users prefer **detailed documentation** that provides examples of how the data could be used, as well as **example code** for queries. Show in the documentation what the API can actually do for them.

"When the documentation provides detailed info on what is available, strings to call things, and offers examples, that is incredibly helpful."

"Clear documentation with example usage, searchability, and tutorials."

"[The] ability to directly access information without too much effort; being sure that all items relevant to my search are included; ability to export data and view it in multiple forms"



Comprehensibility: I could use the API without having to learn anything new. (Strongly disagree <-> Strongly agree)

Ease of use: I found this site easy to use (Strongly disagree <-> Strongly agree)

Documentation: examples and test points

Participants liked the **amount of technical cues and examples**.

Speaking about the Cleveland Museum of Art one participant stated:

"I really enjoyed that the documentation did not shy away from giving technical insights, examples, and example responses. When we talk about an API we are already inferring a small community of folks (researchers-data scientists) that would be comfortable enough to a. use one and b. create something from the information. So lean into that audience."

Documentation: type of searches

In general participants appreciate a type of **documentation that explains the parameters** and the type of data. One participant stated

"I find that documentation is often lacking in other APIs. This seems designed to be accessible. The fact that the documentation contained a complete key of museum departments, along with the search required to generate that key, is a refreshing change from some documentation"

Other participants talked positively about the **vastitude of search items** and the facility to explore without having expertise

"The API has an extensive amount of search items. This is interesting to me because you can write a very broad or narrow query to obtain a lot of information. It also offers the flexibility to explore what is in the collection without having to know a lot about a particular subject, medium, artist, etc."

Documentation: Usability improvements

Some of the improvements mentioned by participants regarding documentation were related to example response.

"Add example responses to every endpoint and use standardized schema"

"I was frustrated by the lack of example responses and response schemas (e.g., types for each field)."

"The inconsistent use of example responses was a little frustrating, mainly because it obscured some potentially interesting features of the API."

Documentation: Usability improvements

Another potential improvement regarding the documentation is related to what **fields** are **required** and which ones are **optional**. Below what participants shared about it:

"Documentation is lacking. It's unclear what fields are optional and what are required. Unclear at times what definitions are. Hard to use without an art background - documentation felt like "oh you should know what this term is.""

"Not sure what fields are required vs optional. Not sure what return fields are required or optional. Weird that unicode is being returned mixed with text without any documentation around it. Only 3 api endpoints. Wish I could get by exhibition id."

Documentation: Usability improvements

An additional improvement mentioned by participants is related to having a **glossary of terms** or what the parameters are, how to find them on the page, and more intuitive navigation (include an index or side navigation).

Items that are **specific** to the institution should be thoroughly explained and contextualized.

Examples of terms that created confusion are:

- Objects
- Department
- Accession number
- People
- Type
- Year start
- HyperStack Tags
- Tombstone
- Unit ID / Exhibition ID / Object ID





Empower users to get started easily

It's important for users to test and try out ideas quickly to get a feel for the possibilities an API offers.

- If an API key is required, consider providing a test key.
- Interactive examples where you can try out queries from the documentation itself are very helpful.
- Provide a navigation or index. This gives users an idea of the overarching structure of the API and allows for quick navigation to relevant sections.

Provide comprehensive examples

Having detailed examples of queries and responses along with explanations greatly helps in learning and cuts down on trial-and-error.

- Include example queries and responses along with helper text.
- For queries, clearly indicate what part of the sample query needs to be replaced by the input, input data type, and if/how inputs can be combined.
- For responses, indicate the data type of the returned values and cases where values may not be returned.
- For more customizable endpoints such as search, walk through examples on how to build different combinations of queries.

Glossaries / clear terminology

Terms specific to museums, the institution, or the API are often opaque to the user and should be clarified with examples or additional explanation.

- When such terms are used, provide explanation either alongside the term or in an accessible section within the API (eg: tombstone, accession number, unit ID etc.)
- When a query has a large number of potential inputs (eg, medium, search terms, departments, tags, etc), the API should surface the possible range of the inputs to the user.
- For data or inputs that are obtained from outside the API the documentation should make it clear where these can be found. (eg: object ID, exhibition ID)

Highlight example projects

Most users were curious to see examples of projects and felt that these should be showcased as an integral part of the documentation.

- Examples are useful for giving potential users an overview of the technical possibilities of the API.
- They can also serve as creative inspiration
- Showcasing user-made projects could foster a sense of community

Documentation for different user types

Even with a small sample, there were differences amongst users in terms of programming skill and knowledge of museums. The API interface should accommodate this range of users.

- Some users were relatively newer to APIs and required more guidance in the documentation, others were familiar with APIs in general, and some were experts in using them across a variety of contexts.
- Users also differed in their familiarity with museums and cultural institutions. Those with a greater degree of familiarity had a greater knowledge of the terminology, and often already had ideas on how they could use the API data.
- Institutions can potentially explore the most common programming languages and processes employed by users and supplement their documentation accordingly.





Here is an extensive list of the use cases mentioned by participants during the user testings.

Creative ideas and games

- A virtual treasure hunt game, multiplayer.
- Create a bot that posts images of sunrise and sunset at sunrise and sunset each day. Maybe this could be done by searching titles and including a sun or moon in the scope.
- Get random images for personal fun purposes (background for computer) Playful way: people can interact with the objects (3D). eg. minecraft. Users can create their own world
- Application that shows daily picture or random selection of artwork
- Change the objects in a way that you can't do in a museum (play, research...)

Apps or functionalities for museums

- Create a cross-institution exhibition (multi institution API)
- Build custom exhibits
- Get live updates about what is currently on display
- Create a widget of gallery and exhibition dates
- Create an AR experience with images and videos
- Get a better view of the organization of a collection
- Create applications for educational purposes
- Create an application to get random artwork
- Create a digital museum for those who can't come to the museum (accessibility)
- Create a timeline for each artist to see how their work changed
- Create a GUI for the museum API
- Link creator with people that own art
- Create user profiles based on interest
- Connect data with local museums for the user profile preferences

Use Cases (II)

Data visualization and research of museum collections

- Plot trends within dataset
- Seeing fluctuations based on gender representations or location
- General stats around the collection
- Change of the collection over time using acquisition date
- Sort by creator to see how different creators were collected through time
- Get collection of images by artists
- Look for art by location of creation
- Data visualization by geographical data
- Get frequency of artists and painting data
- Analysis of artists by gender, nationality, and other biographical data, compared with other museums.
- Mapping of artwork journey
- Filter museum artifacts, try to find patterns within the records and make visualizations of the patterns. This could be done for different museums and figure what is the domain or specificity of each museum.
- Create visualizations by media, by time period, by dimensions
- Build profile of various types of art and aggregate API's from other museums

User test script (I)

Pre-test questionnaire

How do you search for APIs to use? What are your main sources or repositories?

Of the APIs you have used, what makes them useful?

Have you used APIs from museums and other cultural heritage organizations?

- If "yes", which ones and add a description of what they've made.
- If "no", what kind of things do you imagine you would be able to make with a museum API?

Tasks

Today we're going to ask you to complete four activities on this site. As you go about using this API interface, we would like you to think aloud as much as possible: describe what you are looking at and what you are trying to do.

- 1. Get familiar with the available data on this API and describe aloud some ideas on how you would use it.
- 2. Review the documentation and tell us what is useful and if there is any missing information
- 3. Please spend about 5 minutes looking for something you would do on this site if you were using it on your own. What would be interested in creating using this data?
- 4. Review the API and documentation and describe how you would approach the task. Does it look like it can be made using the API? Are the steps and documentation clear?

User test script (I)

Post-test questionnaire

What was the most interesting or appealing thing, if anything?

In general, which museum data would you be interested in using? Choose a maximum of five. Images , Creator, Object type, Creation date, Dimensions, Exhibition history, Artist gender, Provenance, Museum department, Links to other datasets, Acquisition date, Wikidata IDs, Object place, Culture, Life form, Accession number,

What frustrated you most about this API?

Scale ratings - Select a number is a scale of 1 - 5

I could use the API without having to learn anything new. (1- Strongly disagree -2 -3 -4 -5 - Strongly agree)

I found this site easy to use (1- Strongly disagree -2 -3 -4 -5 - Strongly agree)

Would you return to the site? (1 - Definitely Would Not - 2 - 3 - 4 - 5 - Definitely Would)

How does this API compare to other APIs you have used? (1 - Worse - 2 - 3 - 4 - 5 - Better)

Please explain your rating. Compare this API to other APIs you have used

If you had a magic wand, how would you improve this site?

Data analysis: Miro board



https://miro.com/app/board/o9J_lcnjkfl=/

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