

# Smithsonian Learning Lab User Search

**Digital Analytics Evaluation**

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Pratt Institute



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# Welcome to the Smithsonian Learning Lab!

Support deep, meaningful learning with an online universe of authentic resources and tools for making them your own.



 Solar Wall, Cooper Hewitt, Smithsonian Design Museum →

## Distance Learning Resources

Resources, training, and support to assist caregivers, teachers, and students as they face new learning challenges.

Find Resources

Recursos en español



# INTRODUCTIONS

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BS Computer Science  
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# AGENDA

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## 01. OBJECTIVES

Main study goals and motivation

## 02. METHODOLOGY

Data collection, aggregation and analysis process

## 03. FINDINGS

Key takeaways based on website analytics review

## 04. RECOMMENDATIONS

Suggestions to improve site search based on main findings

## 05. SUMMARY

Review & Closing

## 06. WHAT'S NEXT?

Further topics for future investigation

# 01.

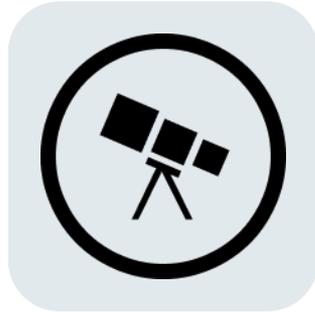
## OBJECTIVES

Main study goals and motivation

# STUDY OBJECTIVES

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1. **Search Behavior:** How are users using the Learning Lab's search?
2. **Search Results:** Are users finding the content they're looking for?



## Exploratory

Users are not sure what they are looking for.



## Results Driven

Users are looking for something specific.

# 02.

## METHODOLOGY

Data collection, aggregation and analysis process.

# DATA SOURCES & TOOLS

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## PERIOD

- January 1, 2020 – April 1, 2022

## DATA SOURCES

- Google Analytics
  - User Segment: Non-Spam Users

## TOOLS

- Google Sheets
- Google Data Studio
- Tableau
- Microsoft Excel



# METRICS

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## GENERAL ACTIVITY

- Users
- Pageviews
- Unique pageviews
- Exit pages
- Session duration
- Landing pages
- Source

## SEARCH BEHAVIOR

- Sessions with search
- Unique searches
- Time after search
- Average search depth
- Search terms
- Search filters
- Search refinements
- Search exits

# 03.

## FINDINGS

Key takeaways based on website analytics review.

# KEY FINDINGS

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## SEARCH BEHAVIOR



Search Activity



Search Terms



Search Refinement



Ethnographics

## SEARCH RESULTS



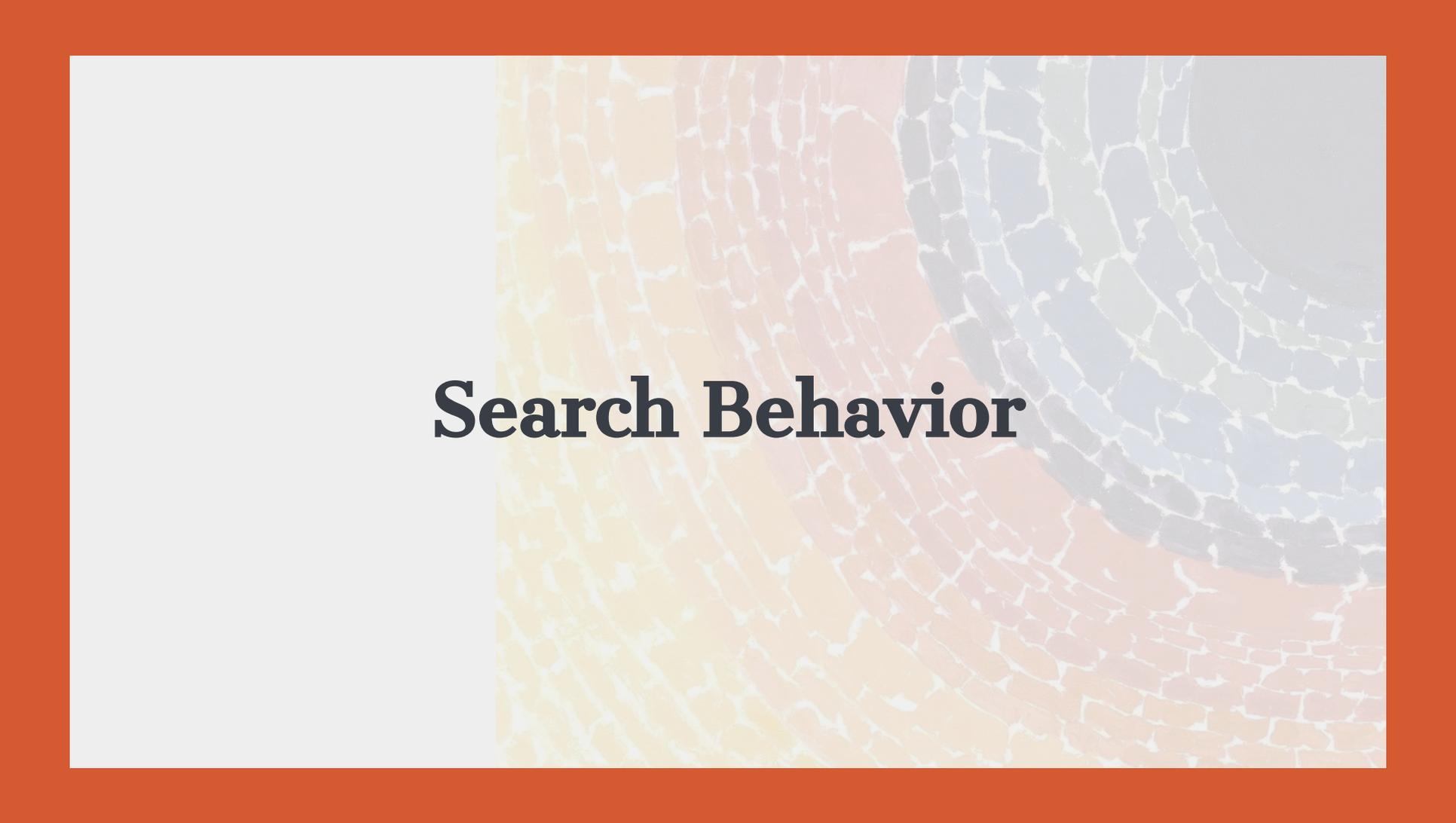
Traffic Sources



Accuracy



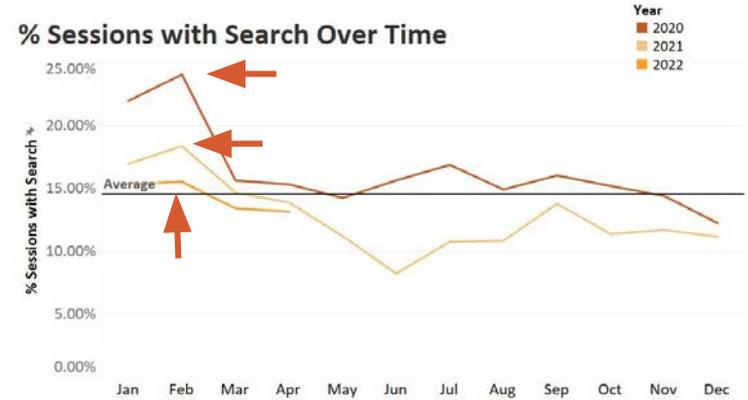
Layout Effectiveness



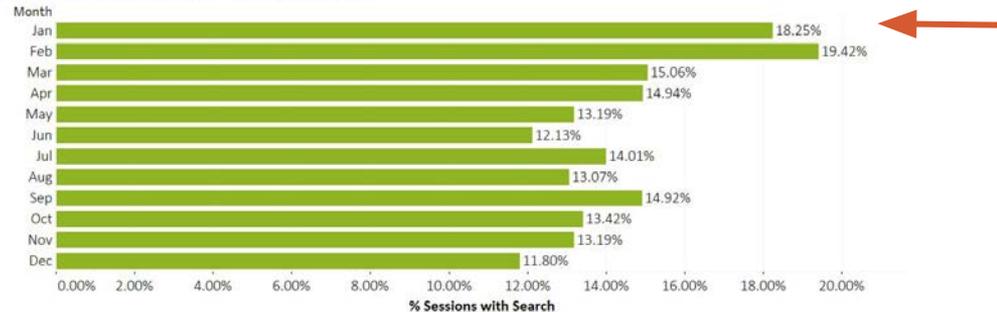
# Search Behavior

# Finding 1: SEARCH ACTIVITY

- Average over entire time period analyzed for percentage of sessions with search is **14.98%**.
- The percentage of sessions with search consistently peaks in **February** of 2020, 2021, and 2022 at **24.04%**, **18.36%**, and **15.53%** respectively.
- **February** has the highest percentage of sessions with search of any one month across the entire period analyzed.
- This is possibly due to fact that February is **Black History Month**.
- Top search term across period analyzed is **“black history”**; this correlation is highly probable.



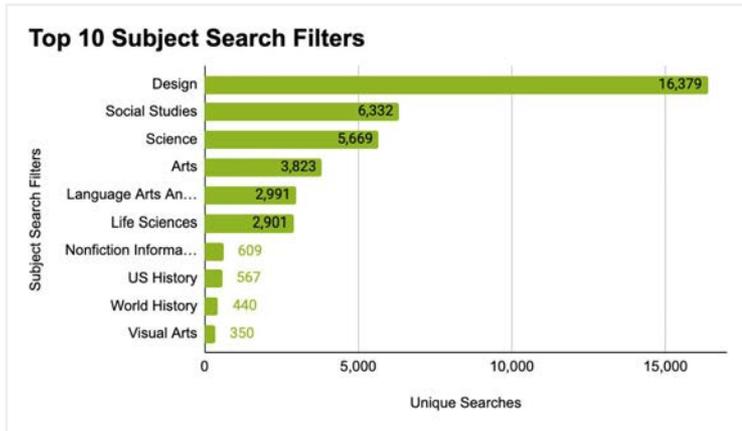
**% Sessions with Search by Month**



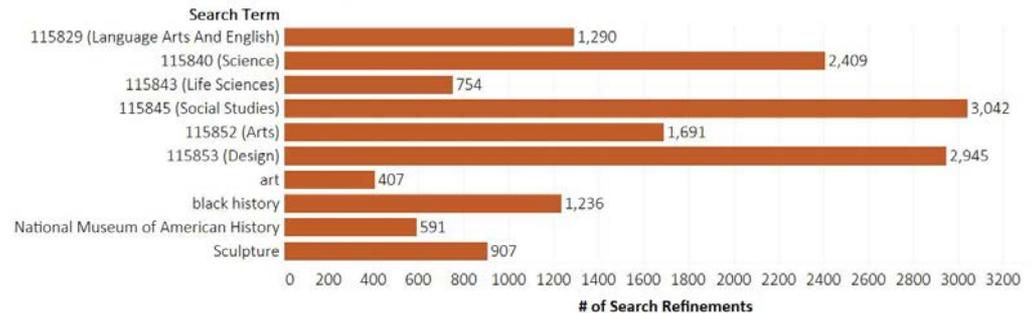


# Finding 3: SEARCH REFINEMENT

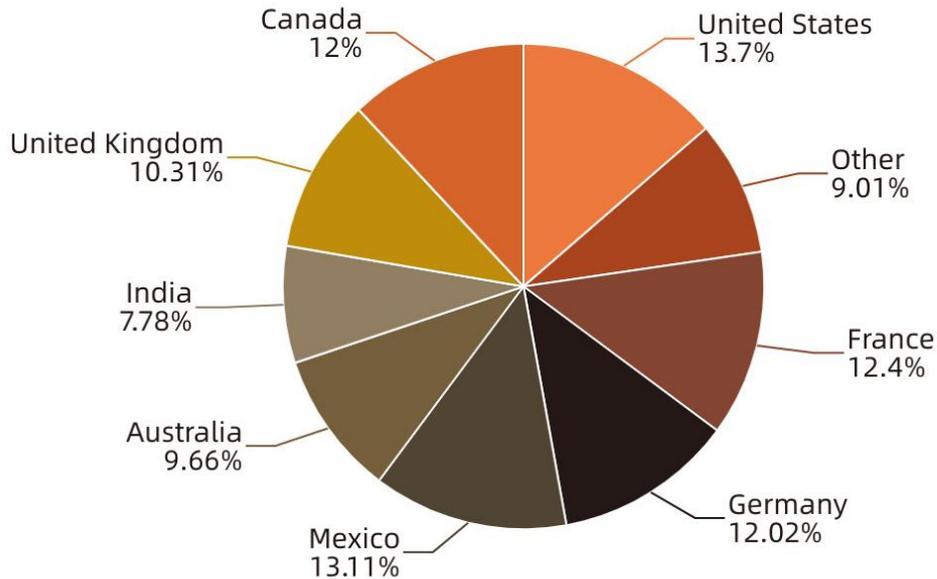
- The most popular subject filter is **Design**, followed by **Social Studies**, **Science**, **Arts**, and **Language Arts and English**.
- The most popular age level filter is **Elementary**, followed by **Primary**.
- **Subject filters** have the highest number of search refinements.



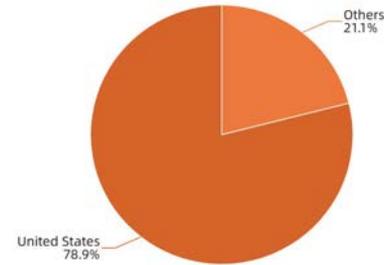
## # of Search Refinements by Search Term



# Finding 4: ETHNOGRAPHIC ANALYSIS OF SEARCH USERS



**Percent of Sessions With A Search By Country**

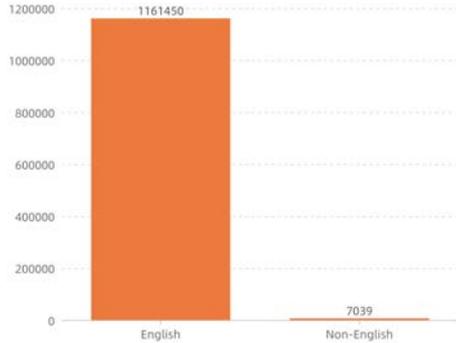


**US Users vs. Other Countries**  
**US=78.9%**

- Global Behavior Compared to US
- OTHER = 9% of search tool use
- Search tool is evenly used even with the great disparity in users between the US and other countries.

# ETHNOGRAPHIC ANALYSIS OF SEARCH USERS CONT.

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LANGUAGE	USERS	TIME AFTER SEARCH	RESULTS PAGEVIEWS AFTER SEARCH
RUSSIAN	4,069	07:30	25
FRENCH	2,596	20:00	44
DUTCH	594	07:06	7
INDONESIAN	579	08:10	1
POLISH	552	16:48	4
GERMAN	175	06:32	3
ARABIC	18	12:43	17

- Only a small portion of users currently have their browsers set in a language other than English (7,039)
- Languages with *Most* time after search were re-ordered into those with the most users, translation priority

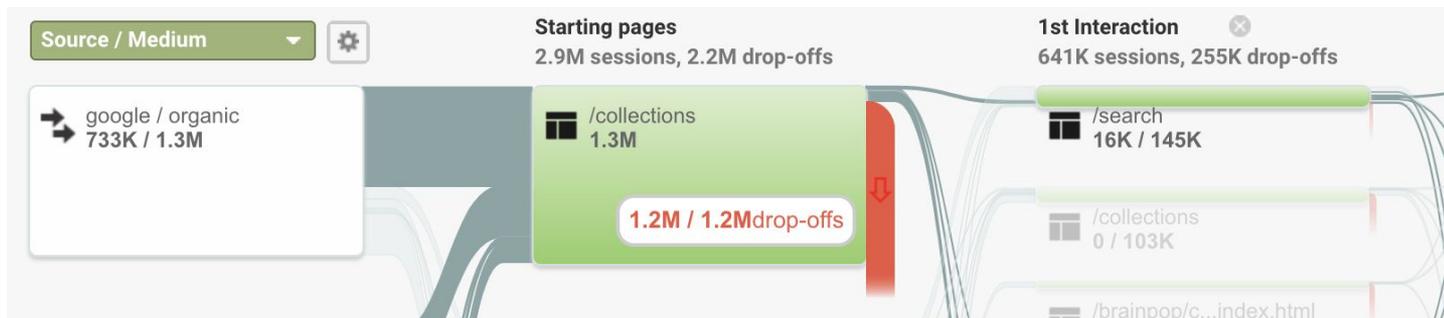


# Search Results

# Finding 5: TRAFFIC SOURCES

- Almost **87%** of traffic is **indirect** and it can be assumed that this traffic is mainly **results-driven**
- Results **pageviews per search** is **>3**
- Users are viewing at least 3 resources or collections before finding what they are looking for or abandoning search

MEDIUM	SESSSIONS	%SESSIONS WITH SEARCH
(NONE)	719,395	13.05%
REFERRAL	646,942	19.27%
ORGANIC	629,986	13.14%
EMAIL	24,496	8.67%



# Finding 6: SEARCH RESULTS ACCURACY

- **'Black History'** and **'Hispanic Heritage'** are the most searched terms, with 6198 and 3080 respectively.
- The number of unique searches of other terms are all below 1000.
- Users usually stay for **3 minute and 52 seconds** after the search.

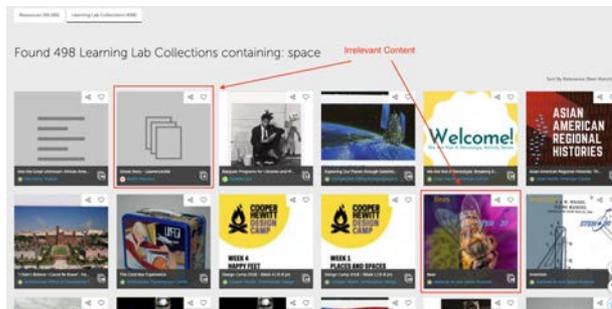
Top 10 Search Terms

Search Term	Total Unique Searches	Time after Search
black history	6,198	00:03:43
hispanic heritage	3,080	00:02:16
art	849	00:04:13
space	768	00:03:40
womens history	611	00:01:08
slavery	610	00:08:04
black history month	599	00:03:07
National Museum of American History	599	00:05:26
trail of tears	595	00:03:12
civil war	577	00:03:58

# SEARCH RESULTS ACCURACY CONT.

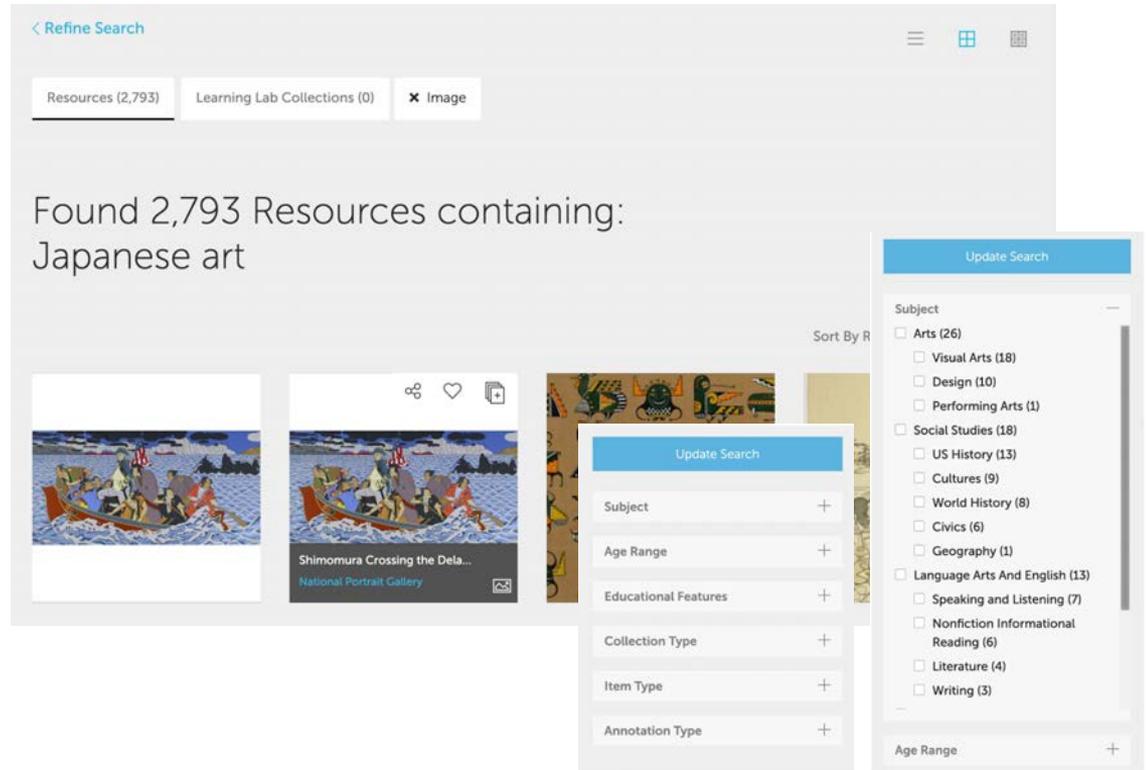
- The top 10 search terms all successfully recalled contents. The precision rate is **70%**, and avg.% Relevant on 1st page is **92%**.
- Compared with search terms with a large number of collections, **search terms with a small number of collections** perform better in accuracy.
- An interesting fact is that the average time after search with terms that have low relevance result page is **319 s**, while that of other terms is **195 s**.

SEARCH TERM	SHOWN RESULTS	RELEVANCE	% RELEVANT ON 1ST PG
BLACK HISTORY	1(145)	YES	100%
HISPANIC HERITAGE	1(26)	YES	100%
ART	1(4341)	NO	75%
SPACE	1(495)	NO	66.7%
WOMENS HISTORY	1(2)	YES	100%
SLAVERY	1(144)	NO	87.5%
BLACK HISTORY MONTH	1(25)	YES	100%
NATIONAL MUSEUM OF AMERICAN HISTORY	1(335)	YES	100%
TRAIL OF TEARS	1(10)	YES	100%
CIVIL WAR	1(226)	YES	100%



# Finding 7: SEARCH RESULTS LAYOUT EFFECTIVENESS

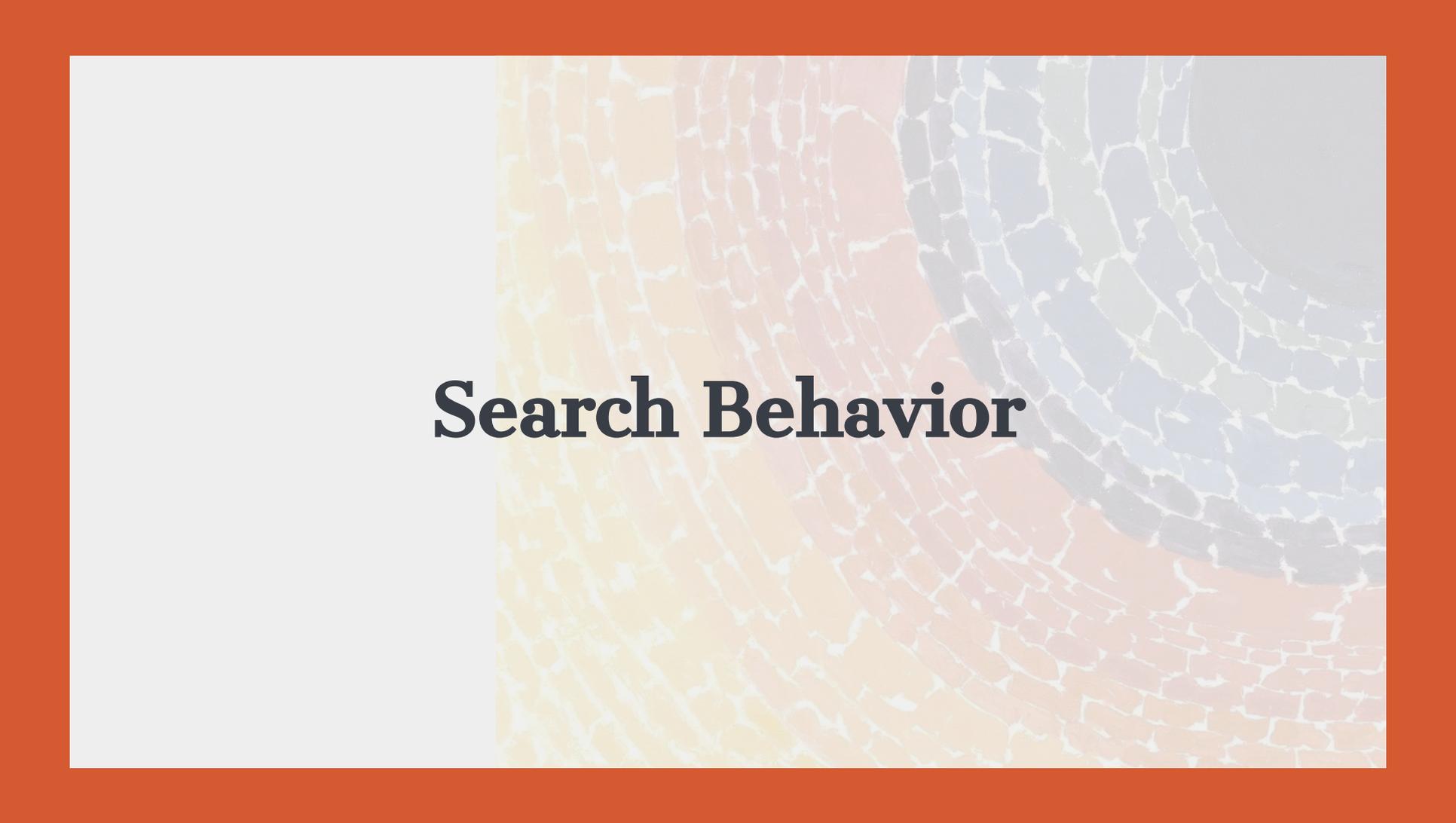
- Less than 50% of users are utilizing **search refinement filters**
- Less than 1% of users are **sorting** search results
- Lack of visibility in resources/collection **metadata**
- Search filters are hidden by default, and the first category is expanded, hiding the following filter options
- No visual distinction between tabs and tags



# 04.

## RECOMMENDATIONS

Suggestions to improve site search based on main findings.



# Search Behavior

# Recommendation 1: SIMPLIFYING THE SEARCH PROCESS



Prioritizing **search** on the home page

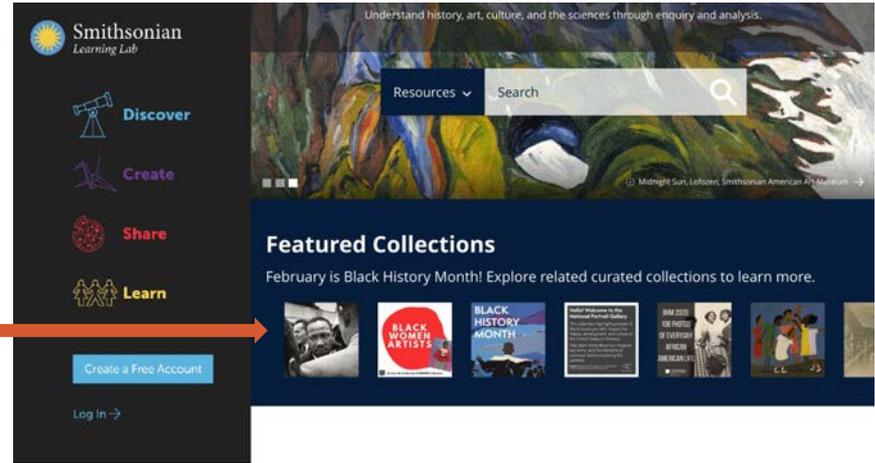
Consolidating to **1 search bar** with a drop-down filter to search for resources or collection

# Recommendation 2:

## FEATURING POPULAR COLLECTIONS

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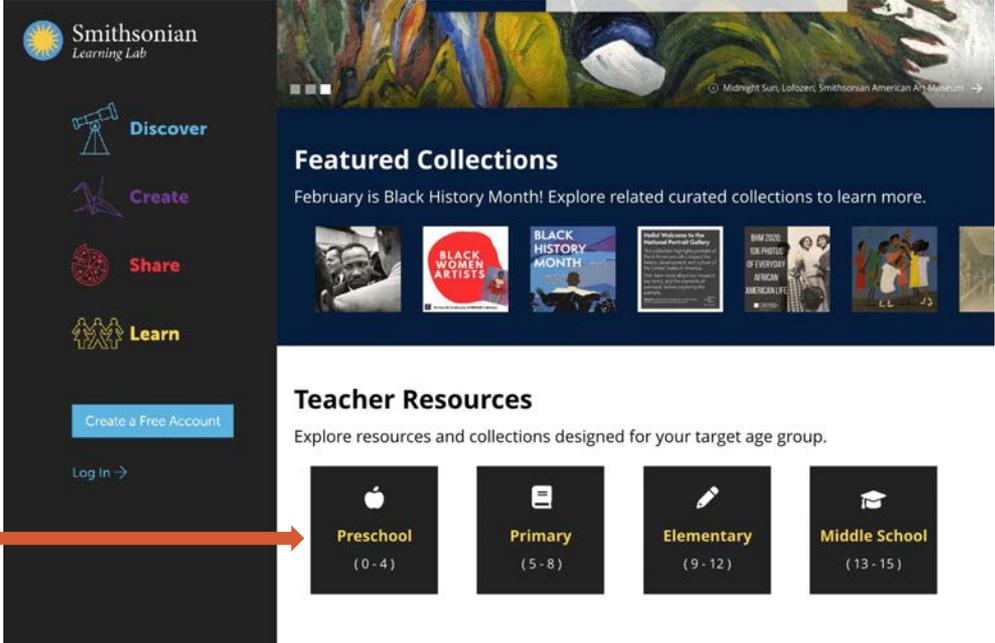
- Our findings have shown that users of the Lab often turn to the search function to find materials related to **cultural heritage months**.
- Proposed **Featured Collections** module on Smithsonian Learning Lab website showcases featured collections for users, especially related to heritage months.
- Benefits **exploratory** users who may have a topic in mind but would enjoy browsing different suggested collections.
- Can be updated depending on whichever update schedule is most feasible for Lab staff.
- Ideas for themes include: Black History Month, Hispanic Heritage Month, Women's History Month, Asian American and Pacific Islander Heritage Month, Native American Heritage Month, LGBTQ Pride Month.



# Recommendation 3:

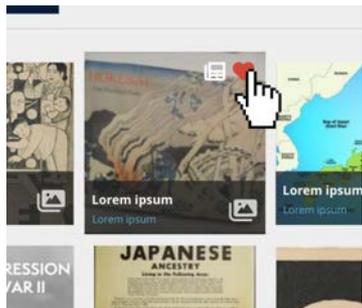
## FEATURING RESOURCES FOR TEACHERS

- 10,080 unique pageviews during the time period analyzed involved usage of the Lab's age group refinement filters.
- Proposed **Teacher Resources** module would allow immediate access to collections filtered by appropriate age group.
- Benefits **results-driven** users, particularly educators, who need to refine their searches quickly and efficiently in order to access age-appropriate content for their students.

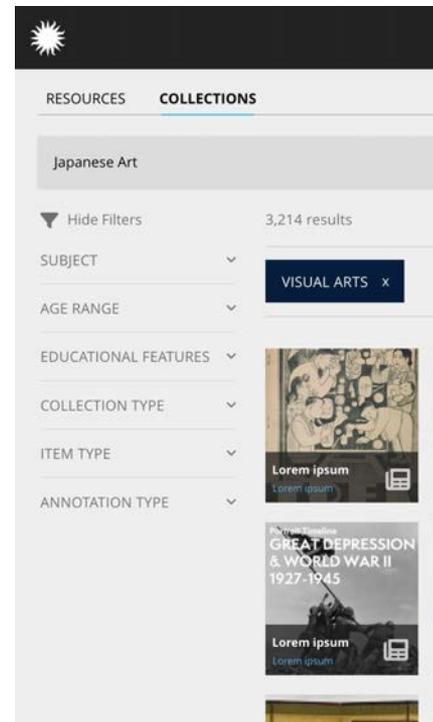
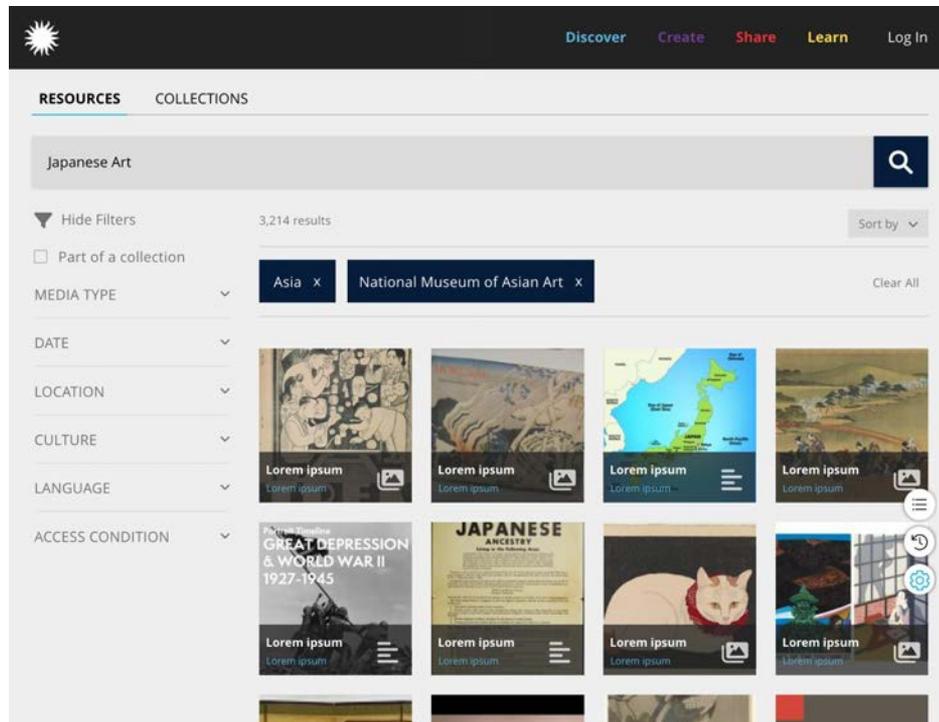


The screenshot displays the Smithsonian Learning Lab interface. On the left is a dark sidebar with the Smithsonian Learning Lab logo at the top. Below the logo are four navigation icons: a telescope for 'Discover', a purple bird for 'Create', a red globe for 'Share', and three figures for 'Learn'. At the bottom of the sidebar are buttons for 'Create a Free Account' and 'Log In'. The main content area features a large artwork at the top with the text 'Midnight Sun, Lofoten, Smithsonian American Art Museum'. Below this is a 'Featured Collections' section with the text 'February is Black History Month! Explore related curated collections to learn more.' and a row of five collection thumbnails. The 'Teacher Resources' section is titled 'Teacher Resources' and includes the text 'Explore resources and collections designed for your target age group.' Below this are four dark buttons with icons and text: 'Preschool (0-4)', 'Primary (5-8)', 'Elementary (9-12)', and 'Middle School (13-15)'. An orange arrow points from the 'Teacher Resources' section in the sidebar towards the 'Preschool' button in the main content area.

# Recommendation 4: MAKING SEARCH REFINEMENT EASIER



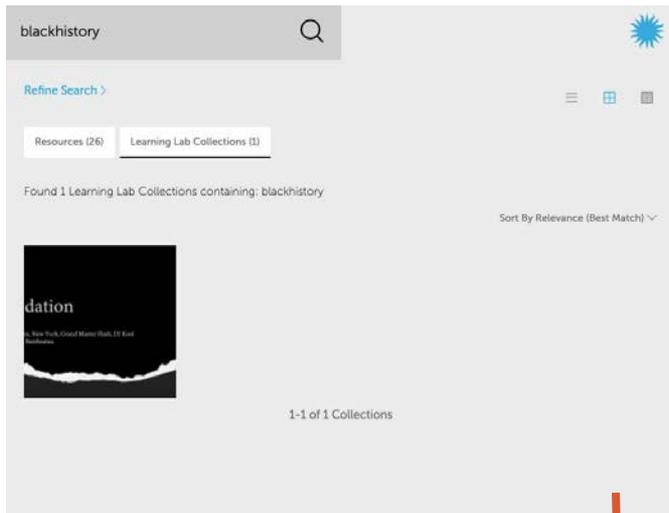
Architecture and visual design changes to improve **usability** of the search results page



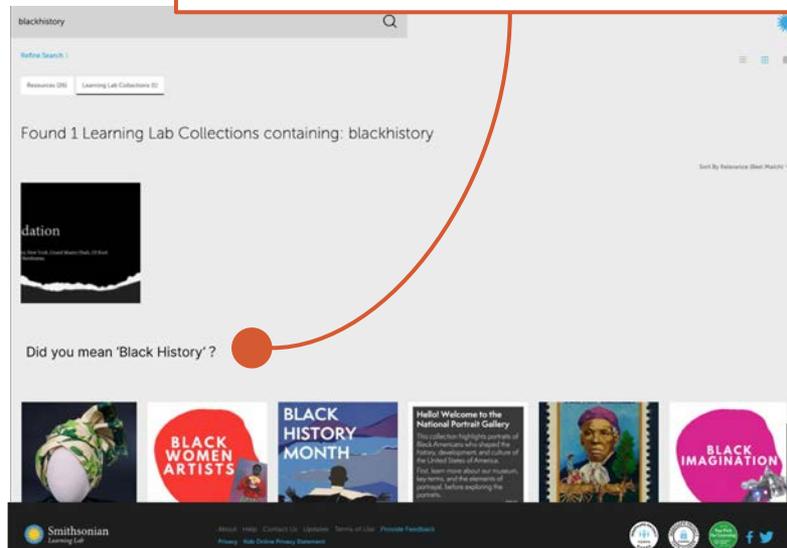


# Search Results

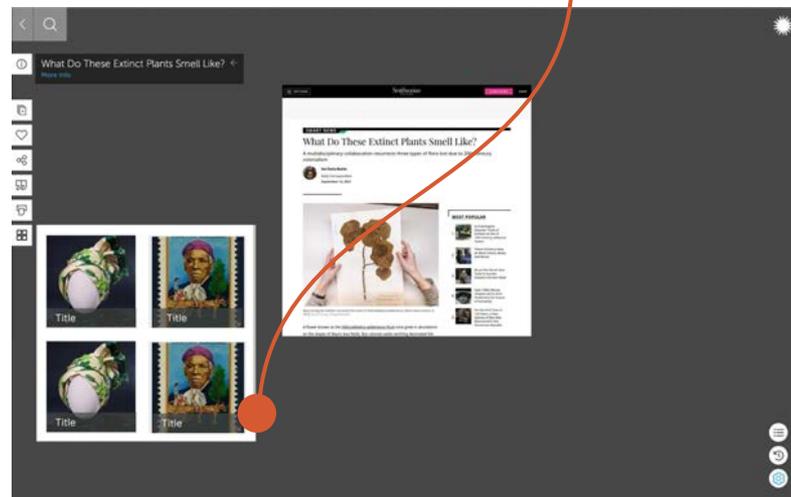
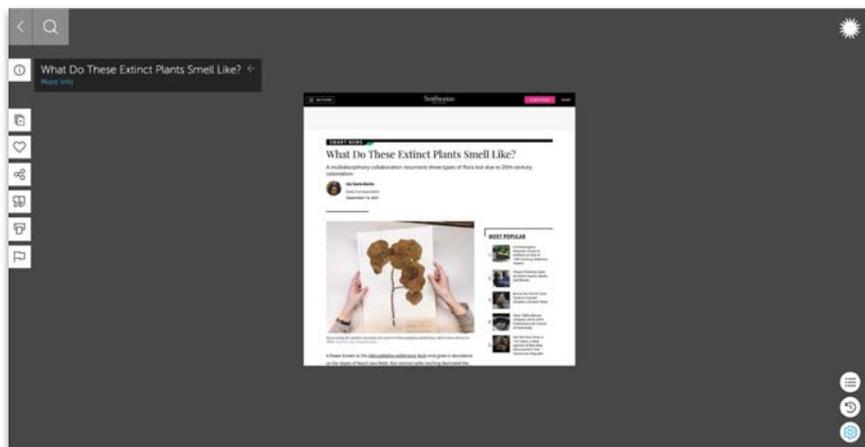
# Recommendation 5: OPTIMIZING RECALL STRATEGY AND RESULTS LAYOUT



Setting "*Did you mean [corrected search term]*" on the result page and including relevant content



# OPTIMIZING RECALL STRATEGY AND RESULTS CONT.



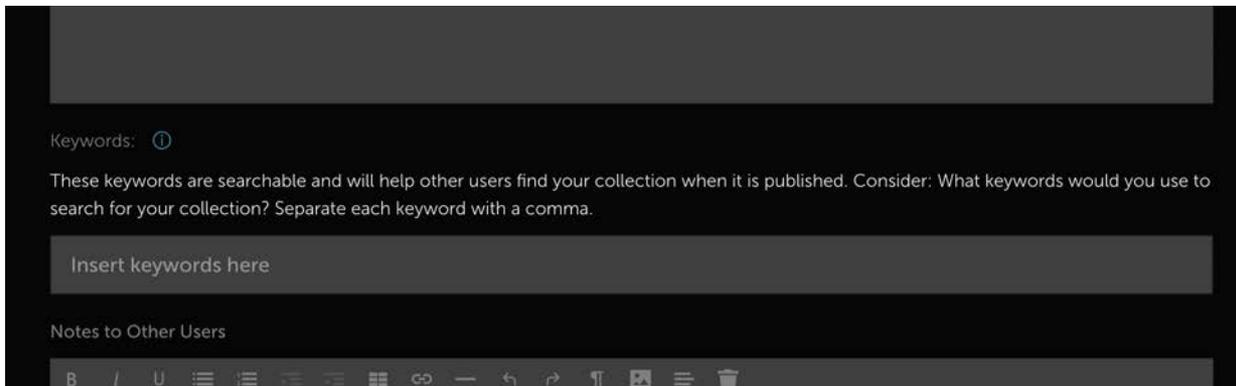
## Recommendation 6:

# CONNECTING COLLECTION KEYWORDS

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Build a controlled vocabulary into the Keywords tool based on most common terms searched.

This will increase the **recall** and **precision** rates of collection searches.



# Recommendation 7:

## ENCOURAGING EXPLORATION: COLLECTION TAGGING

### Part of Collection Refinement

New Level of Knowledge Network that would better benefit students and teachers to fit their projects and curriculum.

Click to view assets that have been added to collections already and deemed useful by other users in the past.

The screenshot displays a digital library interface. At the top, there is a navigation bar with a sun icon and links for 'Discover', 'Create', 'Share', 'Learn', and 'Log In'. Below this, the 'COLLECTIONS' tab is active, showing a search for 'Japanese Art' with 3,214 results. A search bar on the right contains the text 'Japanese Art' and a magnifying glass icon. A filter section on the left includes a 'Hide Filters' button and a checkbox labeled 'Part of a collection', which is checked and highlighted by an orange arrow. Below this are several filter categories: 'MEDIA TYPE', 'DATE', 'LOCATION', 'CULTURE', 'LANGUAGE', and 'ACCESS CONDITION', each with a dropdown arrow. To the right of the filters, there are two active filter tags: 'Asia' and 'National Museum of Asian Art'. The main content area displays a grid of asset thumbnails. The first row contains four thumbnails: a traditional Japanese painting, a landscape painting, a map of Japan, and a landscape painting. The second row contains four thumbnails: a historical document titled 'GREAT DEPRESSION & WORLD WAR II 1927-1945', a document titled 'JAPANESE ANCESTRY', a photograph of a white cat, and a photograph of a person in a traditional Japanese setting. Each thumbnail has a 'Lorem ipsum' placeholder and a small icon in the bottom right corner. A 'Sort by' dropdown menu is visible in the top right corner of the results area, and a 'Clear All' button is located below the filter tags.

# COLLECTION TAGGING CONT.

## New Menu Logo in Item View and Collection-Tagging

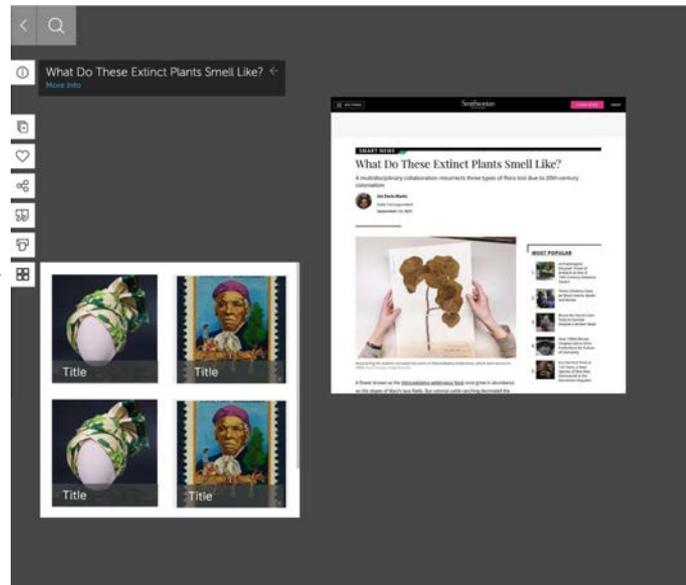
Lead The User To Relevant Material

Allows for the gaps in access from the search tool to be filled by users and educators. This way, they are helping the Lab do the work of **mapping assets in relevancy**

Search engine is able to generate even more relevant searches from the repetitive topics and keywords used in these popularly saved items

Future ability to organize collections on the collections search page by **popularity**, with favorited items and Digital Analysis on clicks to understand third-party use of one's created collection

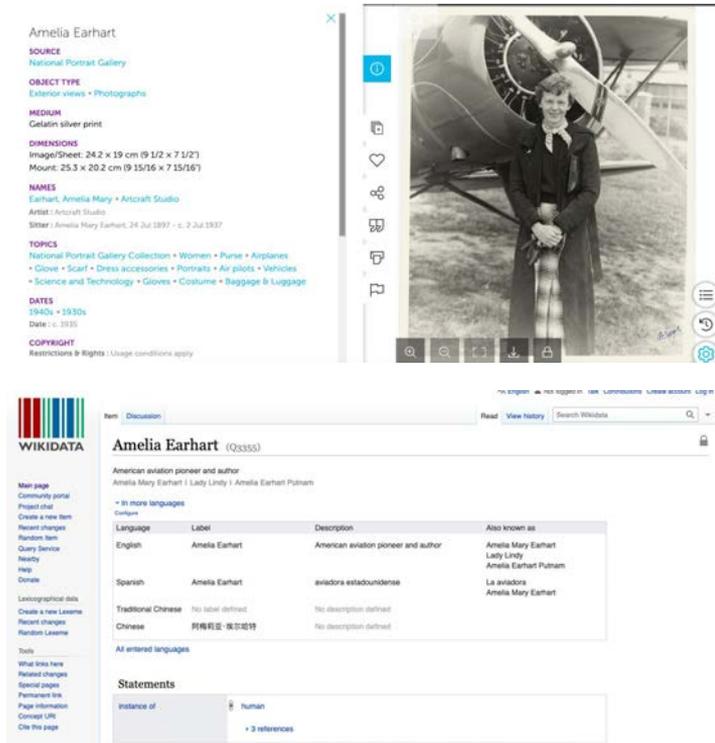
**Generated Predictions** to Enhance Exploration, does not have to share collection or be saved in collection, just have similar topics or keywords



*"You may also like..."*

# Recommendation 7:

## ENCOURAGING EXPLORATION: SEO & LOD



The image shows two overlapping screenshots. The top one is a Smithsonian Digital Library item page for Amelia Earhart, featuring a photograph of her in a dark coat standing in front of an airplane. The bottom screenshot is the Wikidata page for Amelia Earhart (Q3355), displaying her name in multiple languages and a table of labels and descriptions.

**Amelia Earhart**  
SOURCE: National Portrait Gallery  
OBJECT TYPE: Exterior views • Photographs  
MEDIUM: Gelatin silver print  
DIMENSIONS: Image/Sheet: 24.2 x 19 cm (9 1/2 x 7 1/2) Mount: 25.3 x 20.2 cm (9 15/16 x 7 15/16)  
NAMES: Earhart, Amelia Mary • Aircraft Studio  
ARTIST: Aircraft Studio  
Sitter: Amelia Mary Earhart, 24 Jul 1897 - c. 2 Jul 1937  
TOPICS: National Portrait Gallery Collection • Women • Purse • Airplanes • Glove • Scarf • Dress accessories • Portraits • Air pilots • Vehicles • Science and Technology • Gloves • Costume • Baggage & Luggage  
DATES: 1940s • 1930s  
Date: c. 1935  
COPYRIGHT: Restrictions & Rights • Usage conditions apply

**WIKIDATA**  
Main page  
Community portal  
Project chat  
Create a new item  
Recent changes  
Random item  
Query Service  
Nearby  
Help  
Donate  
Lexicographical data  
Create a new Lexeme  
Recent changes  
Random Lexeme  
Tools  
What links here  
Related changes  
Special pages  
Permanent link  
Page information  
Concave URL  
View this page

Amelia Earhart (Q3355)  
American aviation pioneer and author  
Amelia Mary Earhart | Lady Lindy | Amelia Earhart Putnam  
- In more languages  
Confuse

Language	Label	Description	Also known as
English	Amelia Earhart	American aviation pioneer and author	Amelia Mary Earhart Lady Lindy Amelia Earhart Putnam
Spanish	Amelia Earhart	aviadora estadounidense	La aviadora Amelia Mary Earhart
Traditional Chinese	No label defined	No description defined	
Chinese	阿梅莉亞·瑪爾德特	No description defined	

All entered languages

Statements

instance of human

+ 3 references

- Working with **Wikidata** to link Lab items will allow for other websites that are relevant to the item to be connected to your website item view and description. This creates **Search Engine Optimization** but also joining deeper connections to discussions of an object on the World Wide Web.
- Directed users will follow Smithsonian to be one **main point of accessing** information regarding their objects.
- Steps towards SEO are directly relevant to meeting users' needs in other **countries and languages by making the item more findable.**

# Recommendation 8:

## CALL FOR SI CREATED COLLECTIONS

To enable the **creation of new educational resources** based on user needs, develop a call for content from Smithsonian educators based on findings on search result accuracy and top search terms, categories, words, and filters

SUBJECT AREAS	AGE LEVELS	HERITAGE MONTHS	TOPICS AND TERMS
<b>ARTS</b> (especially Design, Visual Arts, and Music)	<b>#1: ELEMENTARY</b> (9 to 12 years old)	<b>BLACK HISTORY MONTH</b>	<b>#1: ASTRONOMY</b> (including space, moon, solar system, etc.)
<b>SOCIAL STUDIES</b> (especially US History, World History, and Archaeology)	<b>#2: PRIMARY</b> (5 to 8 years old)	<b>HISPANIC HERITAGE MONTH</b>	<b>#2: INDIVIDUALS</b> (such as Rosa Parks, Martin Luther King Jr., etc.)
<b>SCIENCE</b> (especially Life Sciences, Astronomy, Biology, and Chemistry)	<b>#3: MIDDLE SCHOOL</b> (13 to 15 years old)	<b>ASIAN PACIFIC AMERICAN HERITAGE MONTH</b>	<b>#3: COLONIAL AMERICA</b> (including American Revolution, Jamestown, etc.)
<b>LANGUAGE ARTS AND ENGLISH</b> (especially Nonfiction Informational Reading)	<b>#4: HIGH SCHOOL</b> (16 to 18 years old)	<b>AMERICAN INDIAN HERITAGE MONTH</b>	<b>#4: NATIVE AMERICANS</b> (including Trail of Tears, Removal Act, etc.)
	<b>#5: PRESCHOOL</b> (0 to 4 years old)	<b>WOMEN'S HISTORY MONTH</b>	<b>#5: ANCIENT HISTORY</b> (including Greece, Egypt, Rome etc.)
	<b>#6: POST-SECONDARY</b>		<b>#6: WOMEN</b> (including suffrage, etc.)

# Recommendation 9: SEARCHING FOR MUSEUMS

Make users and groups marked as **white-listed** in the Lab's administrative back-end searchable in the Lab to support users looking for collections by searching for the museum or user's name.

The screenshot displays a search interface for 'cooper hewitt'. At the top, there is a search bar with the text 'cooper hewitt' and a magnifying glass icon. Below the search bar, there are two tabs: 'Resources (6,021)' and 'Learning Lab Collections (69)'. The main content area shows the text 'Found 69 Learning Lab Collections containing: cooper hewitt'. Below this, there is a 'Sort By Relevance (Best Match)' dropdown menu. The results are presented in a grid of 15 items, each with a thumbnail image, a title, and a 'Cooper Hewitt' logo. The items include 'WHAT IS DESIGN T...', 'Cooper Hewitt Desi...', 'Exhibition Spotlight...', 'Design Camp 2018...', 'Design Camp 2018...', 'Estudio de caso de ...', 'NATIONAL HI DESIGN COM...', '2019 National High', 'Design Camp 2018', 'Design Camp 2018', 'Design Camp 2018', 'Design Camp 2018', 'Nike Pro Hijab', and 'Design Camp 2018 ...'. Each item also has a small heart icon in the top right corner.

## Recommendation 10:

# IMPROVING LANGUAGE & ACCESSIBILITY

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- With India, Mexico, Germany, and France as the top countries for their high percentages of sessions with a search, I would recommend translations to **Hindi, Spanish, German, and French** as considerations for beginning translations.
- The languages with the most users and the most pageview time after search are **French and Russian**, priority for inclusion/conversion.
- Other large amount of time spent after search includes small user groups of **Polish, Arabic, Indonesian, and Dutch**.

# LANGUAGE & ACCESSIBILITY CONT.

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- Translations of museum materials and details reach goals of maintaining current audience and reaching the needs for new audiences.
- Translating your website can also be a good tool for **Search Engine Optimization** by improving the User Experience
- If AI such as Google Translate is used, a **disclaimer** on possible mistranslations is necessary to implement. **Google Website Translator** widget is now offered free to institutions since the pandemic beginning 2020.

# LANGUAGE & ACCESSIBILITY CONT.

Example of Search

Mock-Up With

Language Choice

Refinement

The screenshot shows a search interface for 'Japanese Art' with 3,214 results. The interface includes a search bar, a filter sidebar, and a grid of search results. An orange arrow points to the 'LANGUAGE' filter in the sidebar.

**Navigation:** Discover, Create, Share, Learn, Log In

**Search:** Japanese Art

**Filters:** Hide Filters, 3,214 results, Sort by, Part of a collection, MEDIA TYPE, DATE, LOCATION, CULTURE, **LANGUAGE**, ACCESS CONDITION

**Active Filters:** Asia x, National Museum of Asian Art x

**Results:** A grid of search results, including a map of Asia, a book cover titled 'JAPANESE ANCESTRY', and a book cover titled 'The Great Depression & World War II 1927-1945'. Each result has a 'Lorem ipsum' placeholder and a small image icon.

## LANGUAGE & ACCESSIBILITY CONT.

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- **Adding a survey** about user motivations that is linked to the search terms will allow gathering more insight into user behavior in non-English speaking groups
- Recommended further research on investigating the dimension of language with the metrics of time after search, results in pageviews/search, and % of search exits
- This survey and deeper investigation could provide background to determine user behaviors as **exploratory** or **results-driven**

# 05.

## SUMMARY

Review & closing.

# SUMMARY

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- We took a two-pronged approach to defining a successful search (**exploratory** or **results-driven** user motivations) to help all user types achieve successful searches on the Smithsonian Learning Lab website.
- We segmented our analysis further to provide the most in-depth analysis possible by splitting our findings and recommendations into two categories:

**SEARCH BEHAVIOR** and **SEARCH RESULTS**

# 03.

## WHAT'S NEXT?

Further topics for future investigation.

# WHAT'S NEXT?

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## Recommendations for further research:

- Transition to Google Analytics 4.
- Set up strategic event triggers in Google Analytics to track key user behaviors.
- Conduct usability study to further understand user behavior.
- Develop a digital strategy to implement changes.



**Thank You!**