

# Smithsonian Learning Lab User Search

Digital Analytics Evaluation

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Pratt Institute





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# INTRODUCTIONS

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**Arthi  
Sundararajan**

BS Computer Science  
BA Art History  
MS IXD



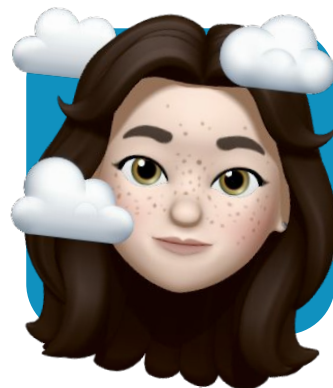
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# AGENDA

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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

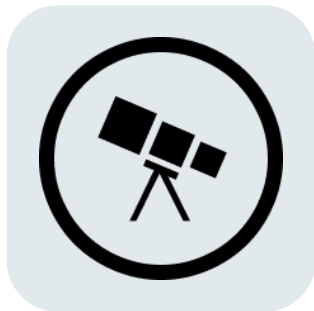
# 01. OBJECTIVES

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



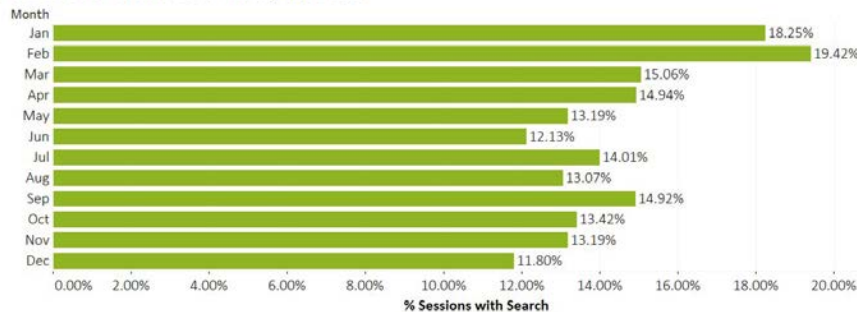
# Search Behavior

# 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.

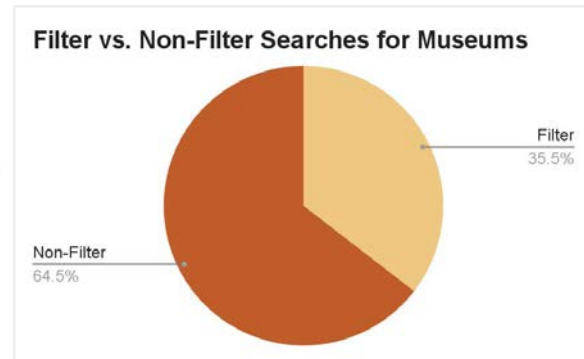
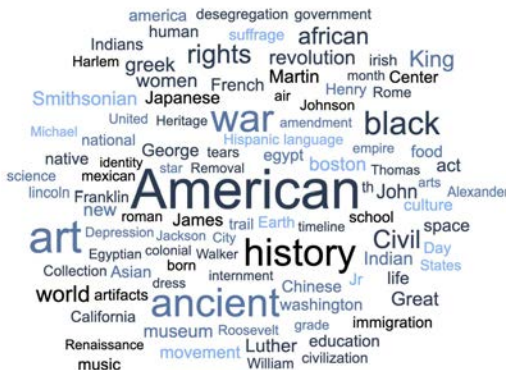
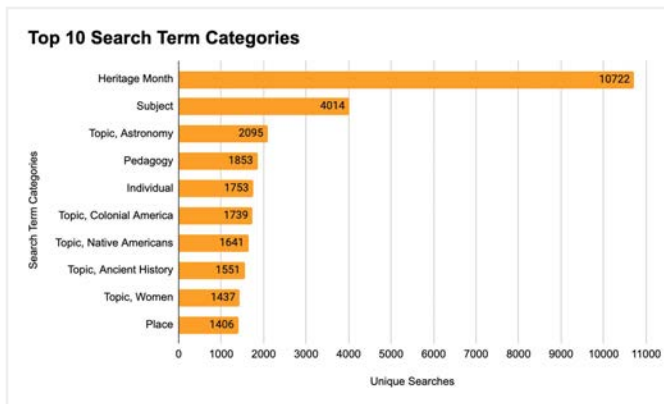


**% Sessions with Search by Month**



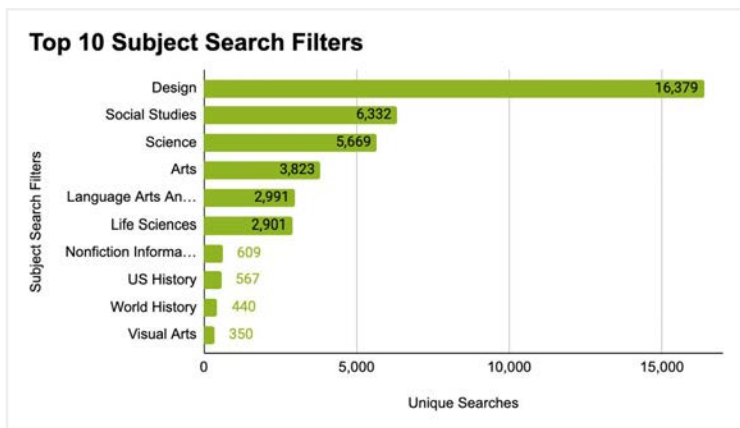
## Finding 2: SEARCH TERMS

- Searches related to **heritage months**, followed closely by **subject areas**, are the most popular
- Words related to **social studies** and **art topics** are the most frequently searched
- More users are **hand-typing museum names** than using the Lab's existing filters

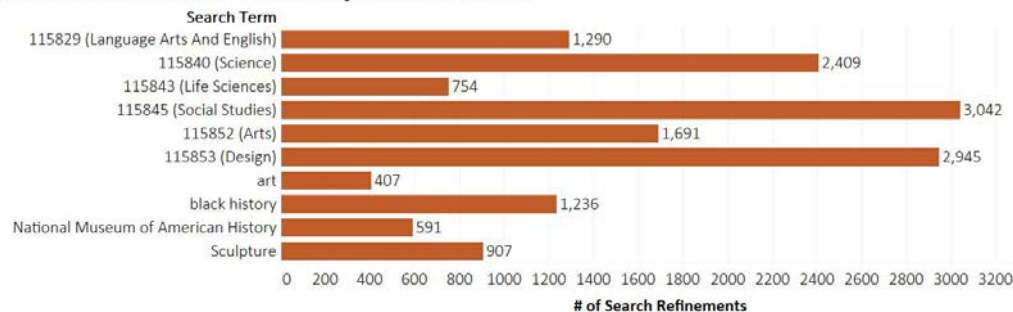


# Finding 3: SEARCH REFINEMENT

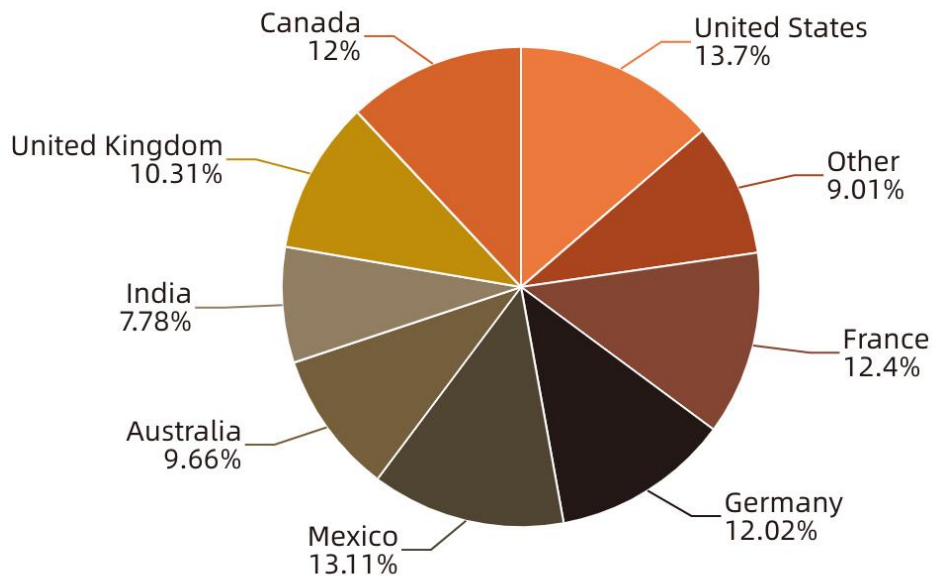
- The most popular subject filter is **Design**, followed by **Social Studies**, **Science**, **Arts**, and **Language Arts and English**.
- The most popular age level filter is **Elementary**, followed by **Primary**.
- **Subject filters** have the highest number of search refinements.



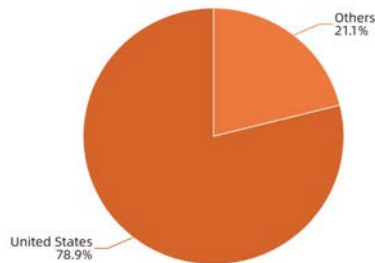
**# of Search Refinements by Search Term**



# Finding 4: ETHNOGRAPHIC ANALYSIS OF SEARCH USERS



*Percent of Sessions With A Search By Country*



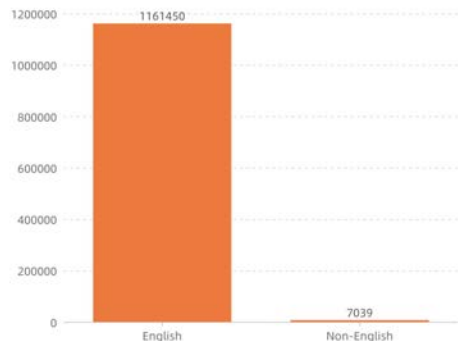
*US Users vs. Other Countries  
US=78.9%*

- 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

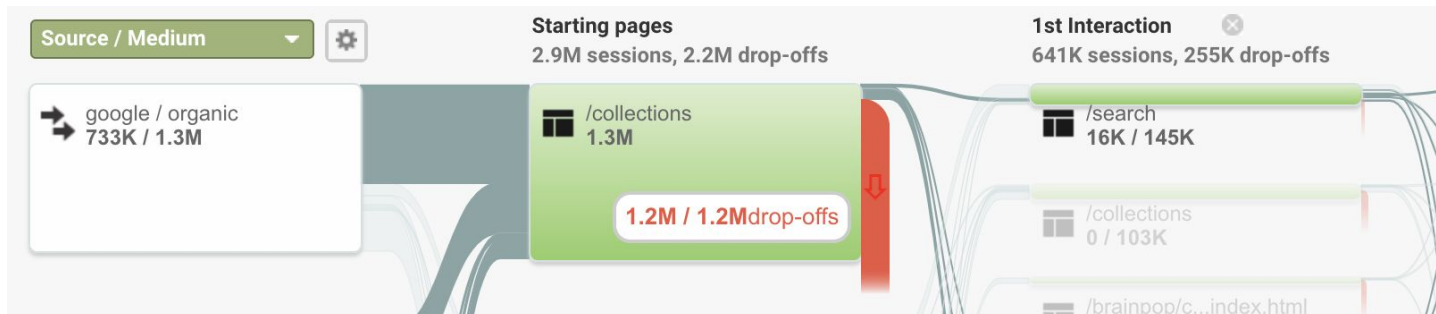


# Search Results

# 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.

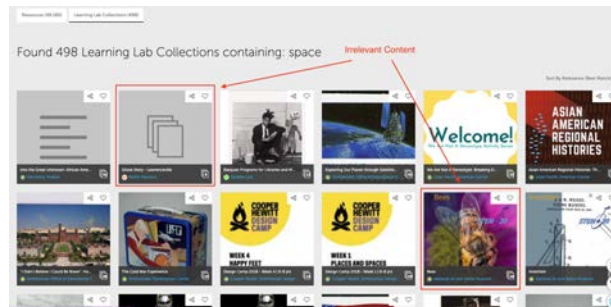
Top 10 Search Terms

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.

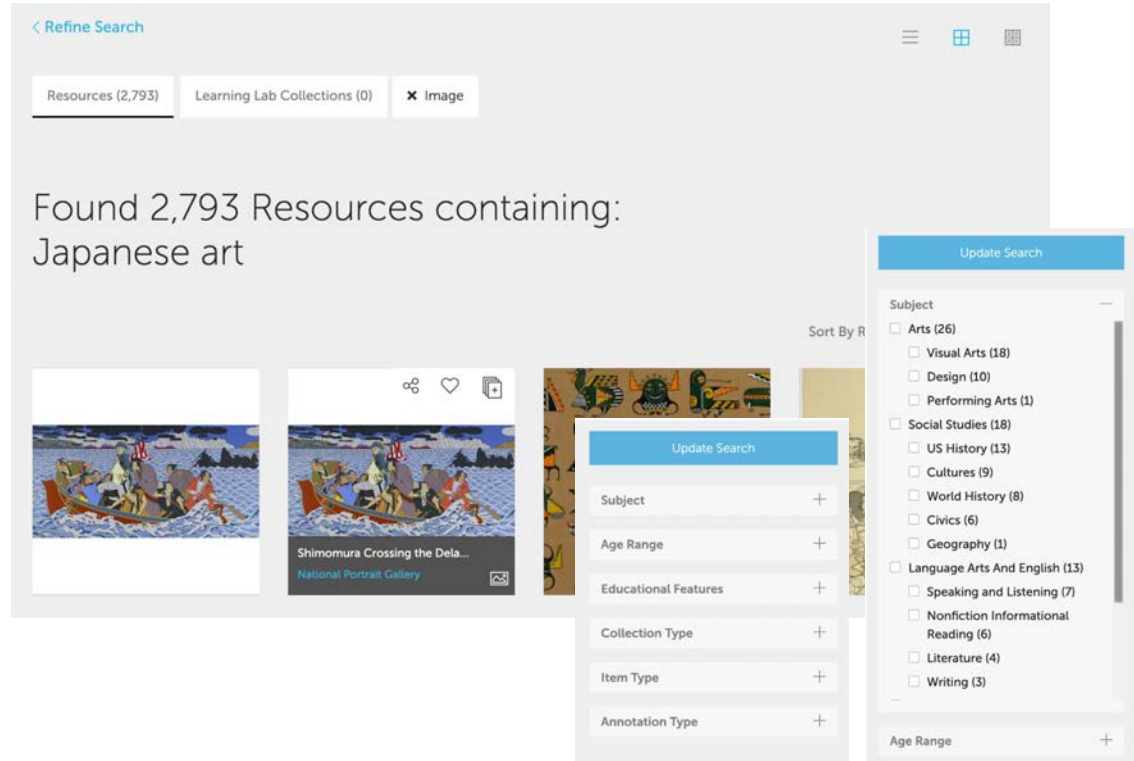
- The top 10 search terms all successfully recalled contents. The precision rate is **70%**, and avg.% Relevant on 1st page is **92%**.
- Compared with search terms with a large number of collections, **search terms with a small number of collections** perform better in accuracy.
- An interesting fact 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.



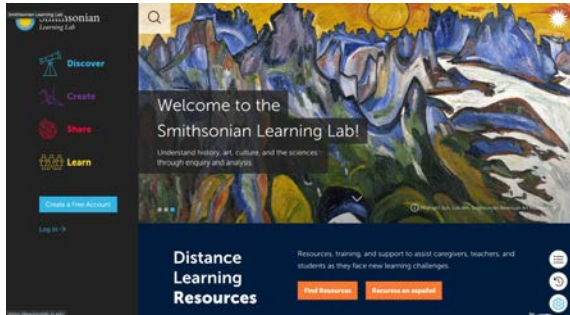
# Search Behavior



# Recommendation 1:

## SIMPLIFYING THE SEARCH PROCESS

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Prioritizing **search** on the home page

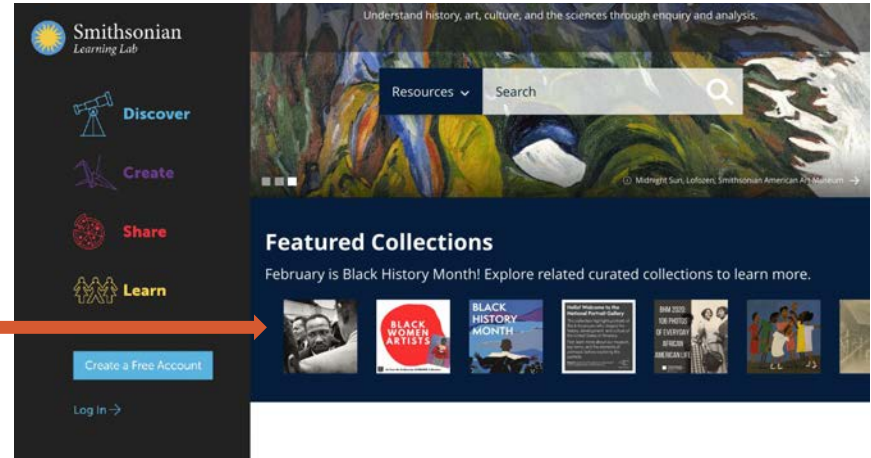
Consolidating to **1 search bar** with a drop-down filter to search for resources or collection

## Recommendation 2:

# FEATURING POPULAR COLLECTIONS

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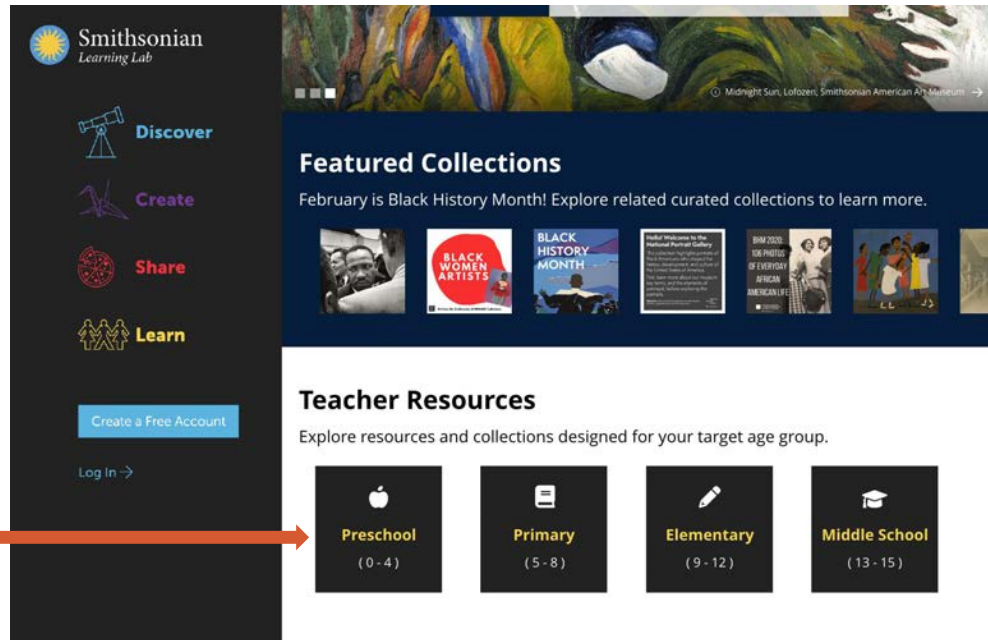
- Our findings have shown that users of the Lab often turn to the search function to find materials related to **cultural heritage months**.
- Proposed **Featured Collections** module on Smithsonian Learning Lab website showcases featured collections for users, especially related to heritage months.
- 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:

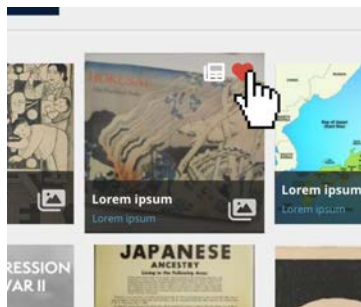
## FEATURING RESOURCES FOR TEACHERS

- 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.

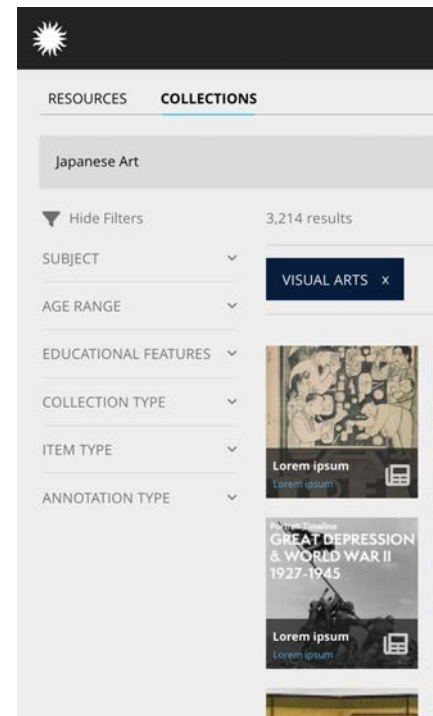
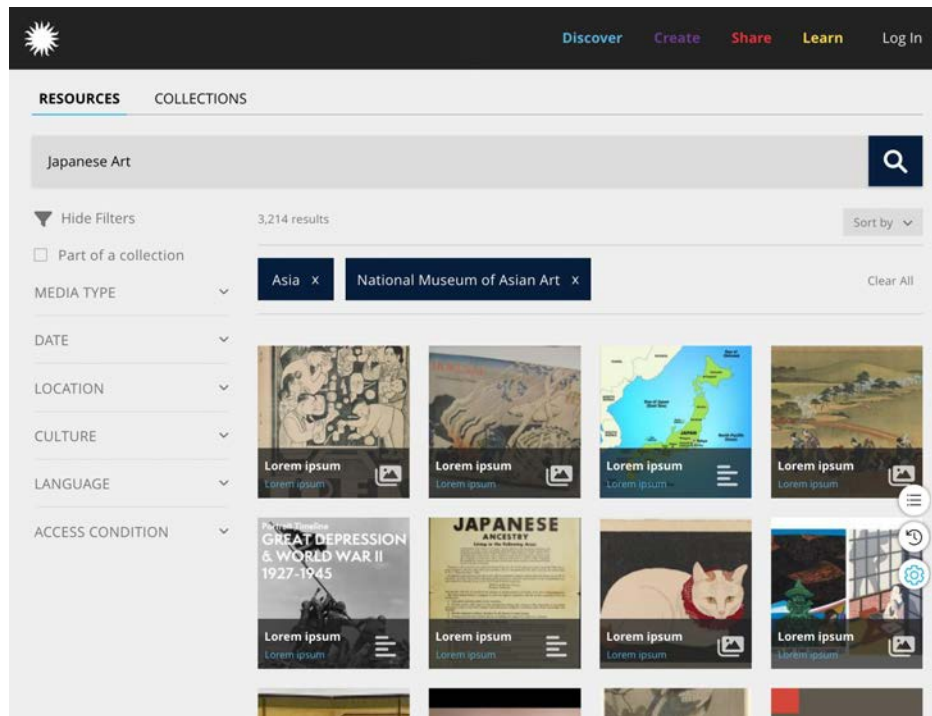


# Recommendation 4:

## MAKING SEARCH REFINEMENT EASIER



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



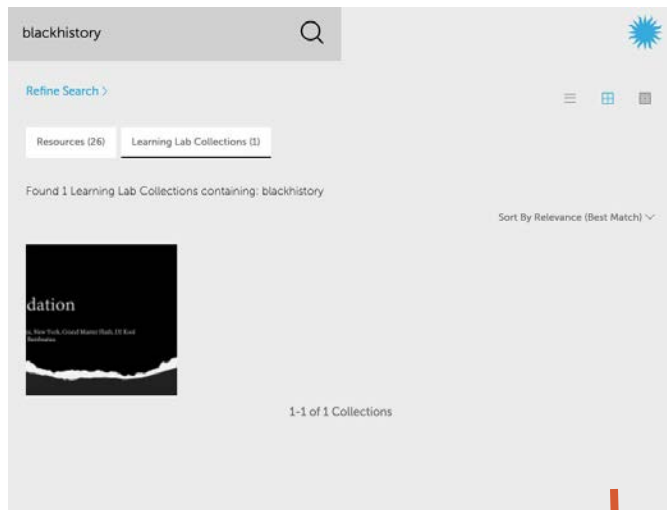


# Search Results

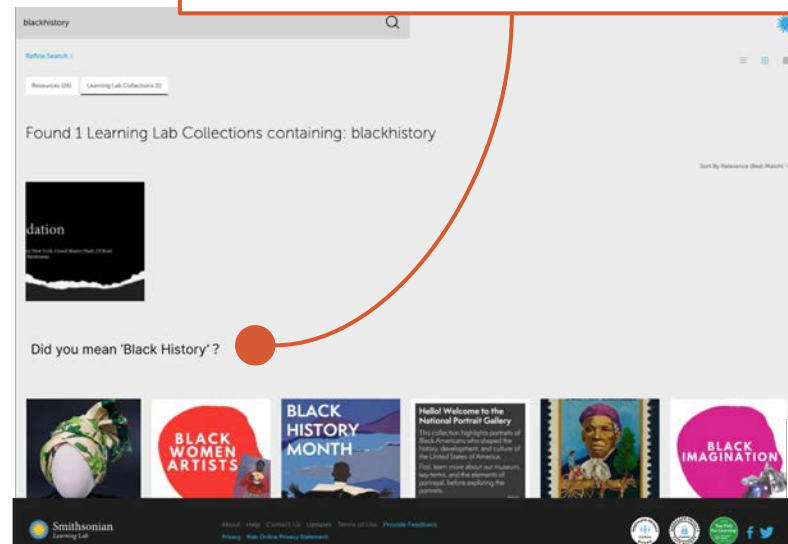


# Recommendation 5:

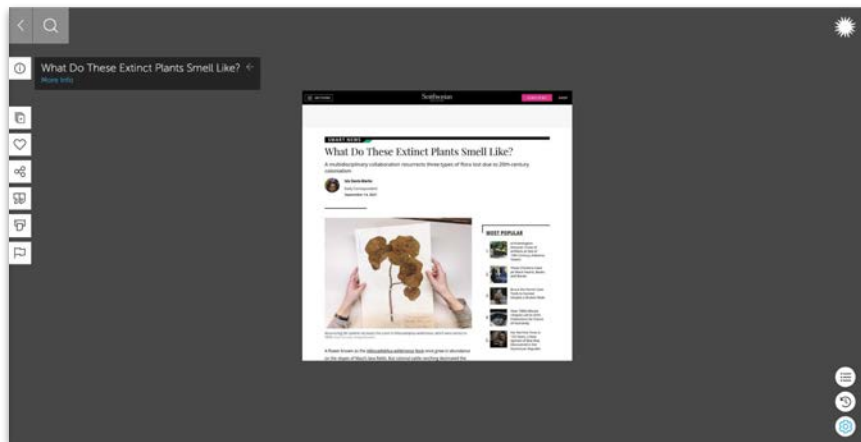
## OPTIMIZING RECALL STRATEGY AND RESULTS LAYOUT



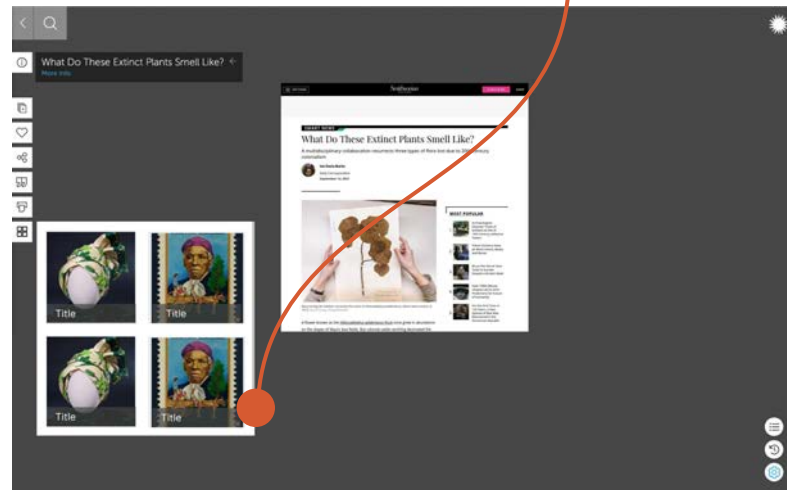
Setting "*Did you mean [corrected search term]*" on the result page and including relevant content



# OPTIMIZING RECALL STRATEGY AND RESULTS CONT.



Add a linked Icon on Left-Hand Side of Item Page to Show Related Collections and Other Linked Data.



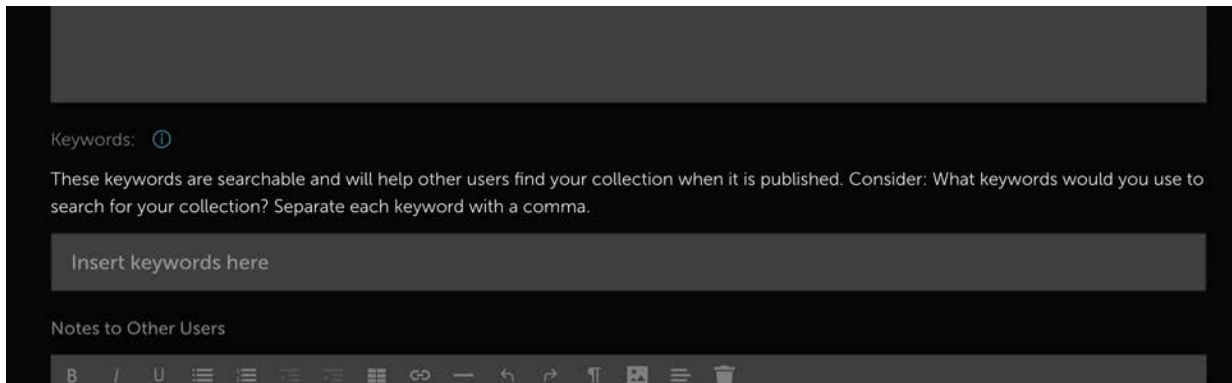
## Recommendation 6:

# 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.



The screenshot shows a dark-themed user interface. At the top is a large, empty rectangular box. Below it, the text "Keywords: ⓘ" is displayed. A paragraph of instructional text follows: "These keywords are searchable and will help other users find your collection when it is published. Consider: What keywords would you use to search for your collection? Separate each keyword with a comma." Below this text is a light gray rectangular input field with the placeholder text "Insert keywords here". Underneath the input field is the section header "Notes to Other Users". At the very bottom of the interface is a horizontal toolbar containing various icons for text formatting (bold, italic, underline, list, link, unlink, undo, redo, indent, outdent, text color, background color) and a trash can icon.



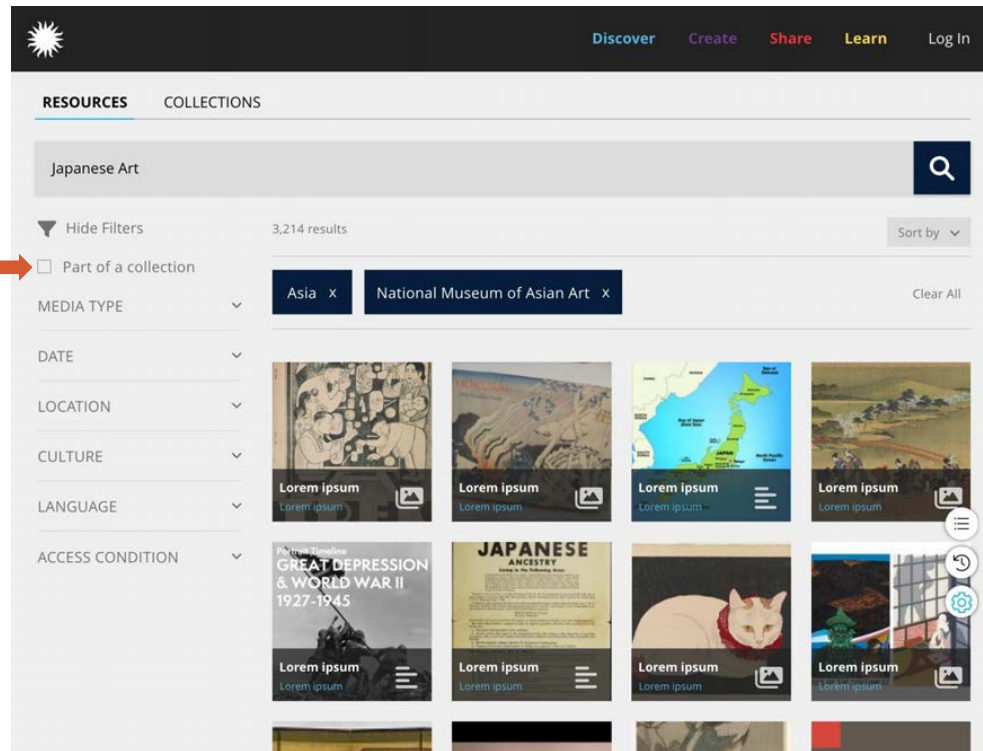
## Recommendation 7:

# 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.



# COLLECTION TAGGING CONT.

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

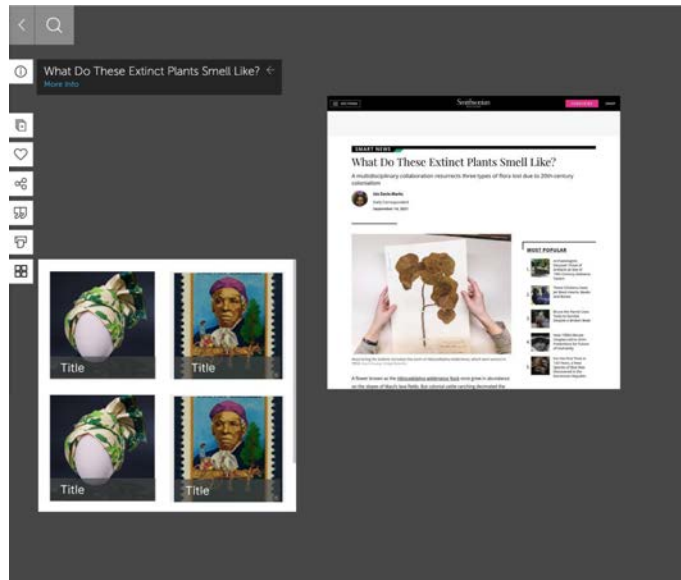
Lead The User To Relevant Material

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

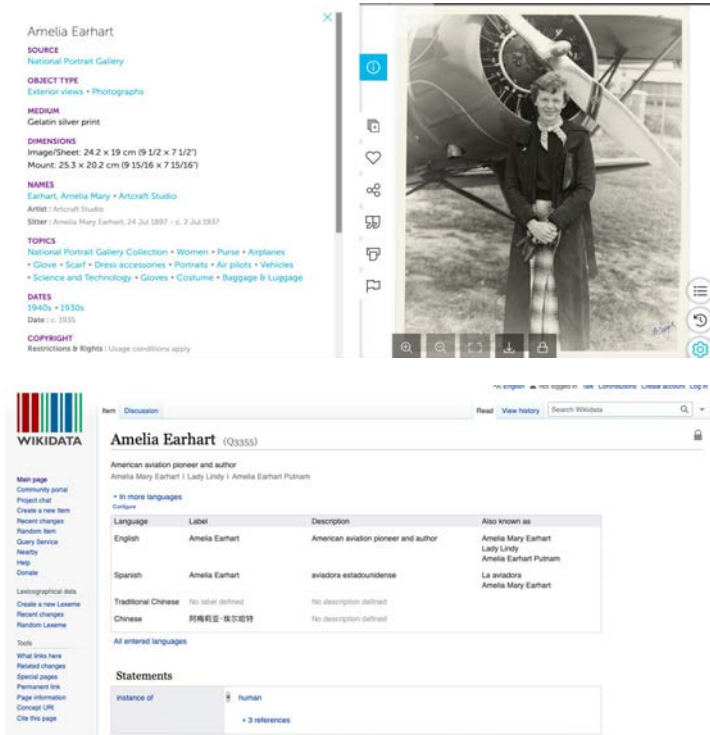
**Generated Predictions** to Enhance Exploration, does not have to share collection or be saved in collection, just have similar topics or keywords



*"You may also like..."*

# Recommendation 7:

## ENCOURAGING EXPLORATION: SEO & LOD



- 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

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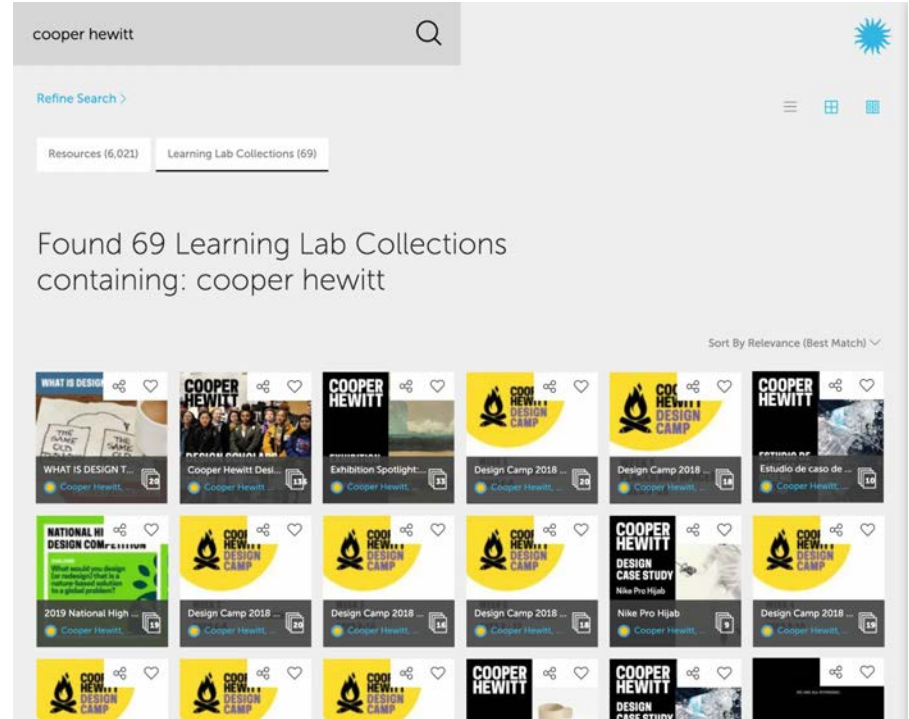
To enable the **creation of new educational resources** based on user needs, develop a call for content from Smithsonian educators based on findings on search result accuracy and top search terms, categories, words, and filters

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.



## 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.

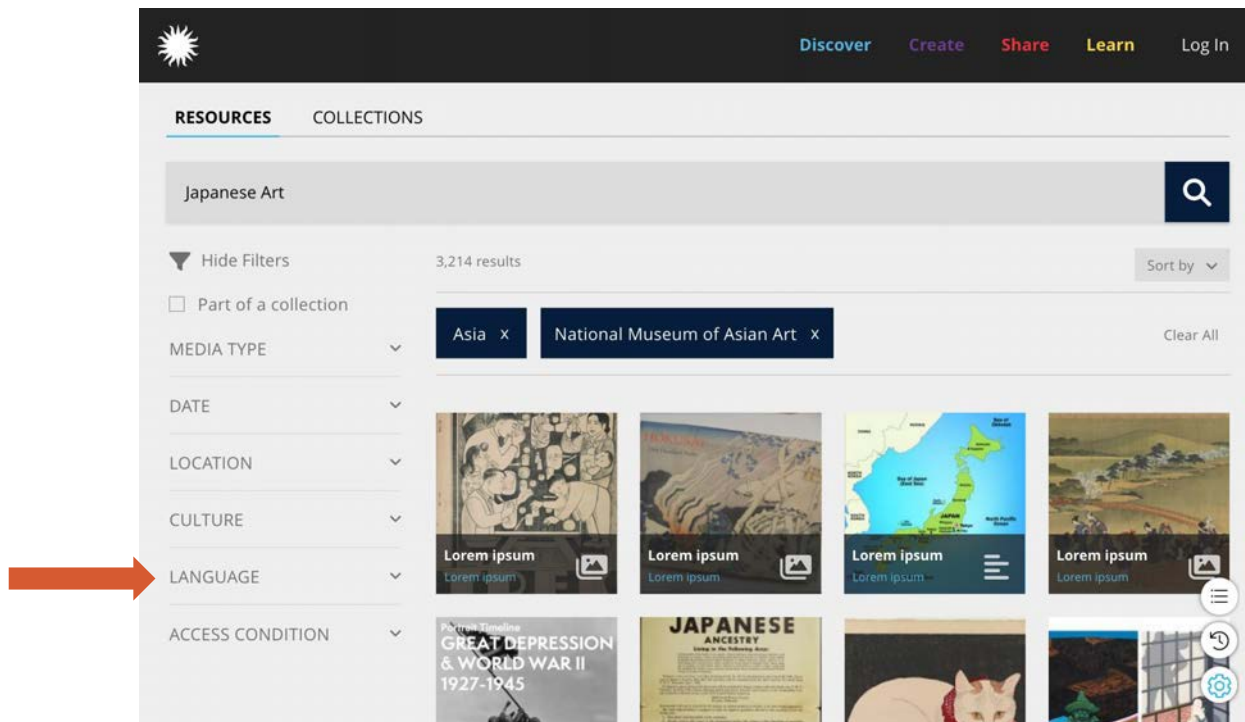
# LANGUAGE & ACCESSIBILITY CONT.

Example of Search

Mock-Up With

Language Choice

Refinement





## 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!**