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# Meeting Users in Their Spaces: Key Findings on Discovery to Delivery

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## **Discovery and Access Project:** How do academic library users navigate the path from discovery through to access?

- What do academic users do when searches don't result in fulfillment?
- What differentiates searches that lead to access from searches that don't?
- What demographic characteristics influence the access of users?
- How does access correlate with success?

# Methodology

- We want to understand aggregate user behavior to inform impact and roadmap prioritization
- However, we also want to understand the ‘why’

How do we get the best of both quantitative and qualitative research methods? **Combine them!**

**Tandem use of log analysis and user interviews.  
Librarian Resource Sharing interviews, too.**

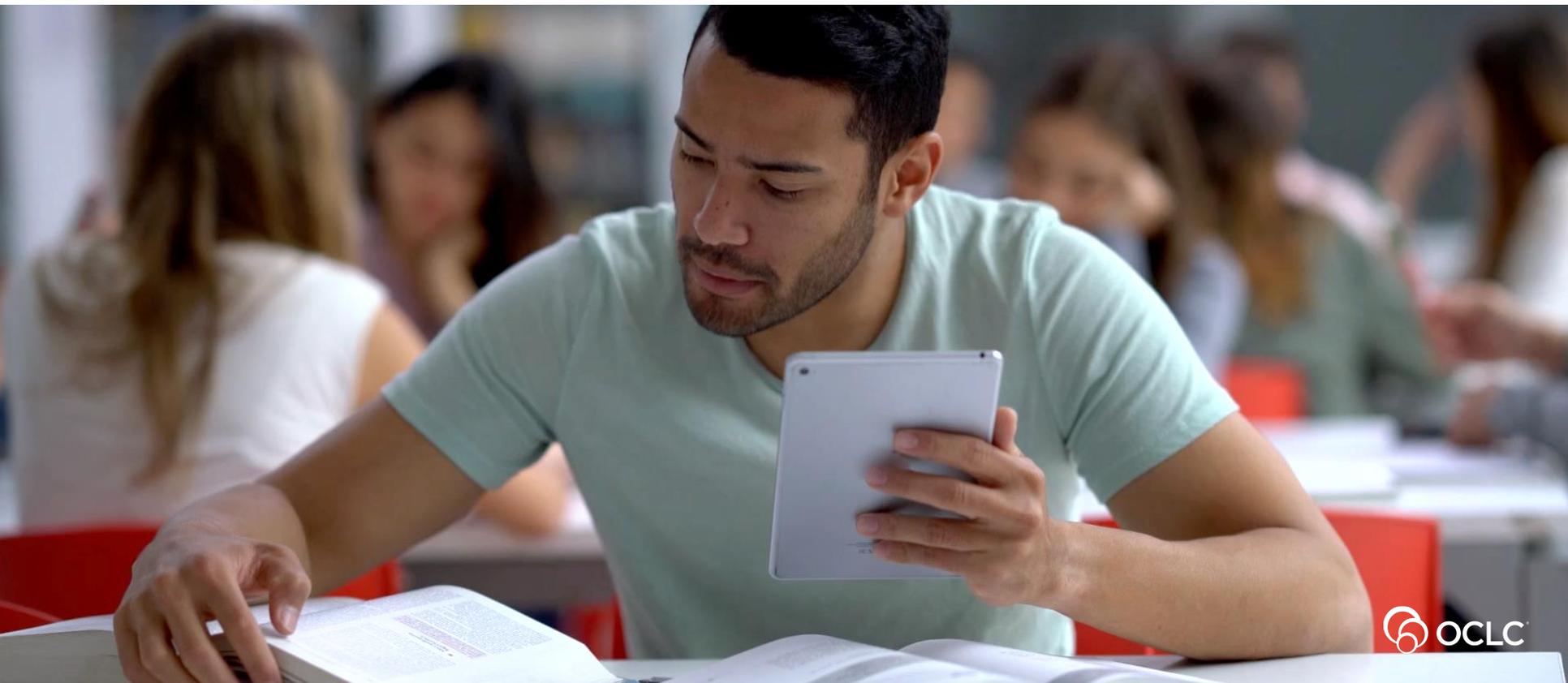
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# HIGH LEVEL DISCOVERY AND ACCESS FINDINGS

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# INTUITIVE

Convenience is king, queen, the whole court



# SMART

Context and situation matter



# PERSONAL

Delight users



# UNIVERSAL

Share and share alike





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Convenience is king,  
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# UNIVERSAL

Share and share alike



Library **on-demand**

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# WORLDCAT DISCOVERY SEARCH LOG ANALYSIS

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*“Log analysis is everything that a lab study is not.”*

*(Jansen 2017, 349)*

# What do the raw logs tell us?

```
{
  "source_request_id": "470e09dc-d022-4f70-b547-72c82087ef06",
  "caller_file_name": "StatsNotificationBroadcaster.groovy",
  "source_host": "ploughlibrary.on.worldcat.org",
  "institution_type": "pl",
  "level": "callie",
  "self": "ffftSearch=false&useFRBRGrouping=true&startRecord=1&scopeSpec=(wz:9551)&di
stance=0&dbList=10806&dbList=10826&dbList=12716&dbList=1436&dbList=1461&dbLis
t=1540&dbList=1708&dbList=171
2036&dbList=2229&dbList=2237&db
64&dbList=2477&dbList=2482&db
&dbList=2977&dbList=3004&dbLi
List=948&useStemTerms=true&ess
ets=true&format=",
  "type": "application",
  "tags": ["HTTP"],
  "institution_registry": "pl",
  "caller_method_name": "s",
  "original_request_path": "
@timestamp": "2018-04-
"caller_class_name": "
"org.oclc.instrumentation.apa
"tags": "
"insti
"version": "1.0",
"source_application": "
"logger_name": "
"org.oclc.instrumentation.apa
"; {
  "source_request_id": "47
"caller_file_name": "Asy
"source_host": "ploughl
"level": "ERROR",
"session_id": "7ef25e1a-
"caller_line_number": 75
"self_request_id": "8966
"exception_class": "
"org.springframework.http.con
"parent_request_id": "B5
"message": "Caught excep
"type": "application",
"tags": ["EXCEPTION OCCU
"caller_method_name": "s",
"original_request_path": "
@timestamp": "2018-04-
"caller_class_name": "
"org.oclc.discoveryui.control
"thread_name": "Server F
"version": "1.0",
"source_application": "
"stack trace": "
"org.springframework.http.con
Could not read JSON document:
org.oclc.discoveryui.state.no
not one of declared Enum instanc
radio button, text box, link,
java.io.PushbackInputStream#2
reference chain:
org.oclc.discoveryui.stats.mod
>java.util.ArrayList[0]-
>org.oclc.discoveryui.stats.models.ClickEvent["elementType"]; nested
exception is com.fasterxml.jackson.databind.exc.InvalidFormatException:
Can not deserialize value of type
org.oclc.discoveryui.stats.models.ElementType from String \"EM\": value
not one of declared Enum instance names: [button, check_box,
radio_button, text_box, link, image, menu]\n at [Source:
java.io.PushbackInputStream#203076ff; line: 1, column: 68] (through
reference chain:
org.oclc.discoveryui.stats.models.ElementType from String \"EM\": value
not one of declared Enum instance names: [button, check_box,
radio_button, text_box, link, image, menu]\n at [Source:
java.io.PushbackInputStream#203076ff; line: 1, column: 68] (through
reference chain:
org.oclc.discoveryui.stats.models.ClickEvent["elementType"])-
>org.oclc.discoveryui.stats.models.ClickEvent["elementType"]\n at
org.springframework.http.converter.json.AbstractJackson2HttpMessageConve
rter.readJavaType(AbstractJackson2HttpMessageConverter.java:234) ~[spring-
web-4.3.8.RELEASE.jar:4.3.8.RELEASE]\n at
org.springframework.http.converter.json.AbstractJackson2HttpMessageConve
rter.read(AbstractJackson2HttpMessageConverter.java:219) ~[spring-web-
4.3.8.RELEASE.jar:4.3.8.RELEASE]\n at
org.springframework.web.servlet.mvc.method.annotation.AbstractMessageConv
erterMethodArgumentResolver.readWithMessageConverters(AbstractMessageConv
erterMethodArgumentResolver.java:201) ~[spring-webmvc-
4.3.8.RELEASE.jar:4.3.8.RELEASE]\n at
org.springframework.web.servlet.mvc.method.annotation.RequestMappingMethodProce
sor.java:150) ~[spring-webmvc-4.3.8.RELEASE.jar:4.3.8.RELEASE]\n at
org.springframework.web.servlet.mvc.method.annotation.RequestMappingMethodProce
sor.java:150) ~[spring-webmvc-4.3.8.RELEASE.jar:4.3.8.RELEASE]\n at
org.springframework.web.servlet.mvc.method.annotation.RequestMappingMethodProce
sor.java:150) ~[spring-webmvc-4.3.8.RELEASE.jar:4.3.8.RELEASE]\n at
org.springframework.web.servlet.mvc.support.HandlerMethodArgumentResolverCompo
site.resolveArgument(HandlerMethodArgumentResolverComposite.java:121)
~[spring-web-4.3.8.RELEASE.jar:4.3.8.RELEASE]\n at
org.springframework.web.servlet.mvc.support.InvocableHandlerMethod.getMethodAr
gumentValues(InvocableHandlerMethod.java:158) ~[spring-web-
4.3.8.RELEASE.jar:4.3.8.RELEASE]\n at
org.springframework.web.servlet.support.InvocableHandlerMethod.invokeForRe
quest(InvocableHandlerMethod.java:128) ~[spring-web-
4.3.8.RELEASE.jar:4.3.8.RELEASE]\n at
org.springframework.web.servlet.mvc.method.annotation.ServletInvocableHan
dlerMethod.invokeAndHandle(ServletInvocableHandlerMethod.java:97)
~[spring-webmvc-4.3.8.RELEASE.jar:4.3.8.RELEASE]\n at
org.springframework.web.servlet.mvc.method.annotation.RequestMappingHandl
erAdapter.invokeHandlerMethod(RequestMappingHandlerAdapter.java:827)
~[spring-webmvc-4.3.8.RELEASE.jar:4.3.8.RELEASE]\n at
org.springframework.web.servlet.mvc.method.annotation.RequestMappingHandl
erAdapter.handleInternal(RequestMappingHandlerAdapter.java:738) ~[spring-
webmvc-4.3.8.RELEASE.jar:4.3.8.RELEASE]\n at
org.springframework.web.servlet.mvc.method.annotation.AbstractHandlerMethodAdap
ter.handleInternal(RequestMappingHandlerAdapter.java:85) ~[spring-webmvc-
4.3.8.RELEASE.jar:4.3.8.RELEASE]\n at
org.springframework.web.servlet.DispatcherServlet.doDispatch(DispatcherSe
rvlet.java:963) ~[spring-webmvc-4.3.8.RELEASE.jar:4.3.8.RELEASE]\n at
org.springframework.web.servlet.DispatcherServlet.doService(DispatcherSer
vlet.java:897) ~[spring-webmvc-4.3.8.RELEASE.jar:4.3.8.RELEASE]\n at
org.springframework.web.servlet.FrameworkServlet.processRequest(Framework
```

1. Did a keyword search but mistyped it  
- Had 0 results
2. Redid keyword search with correct spelling  
- Had 759,902 results
3. Began typing in additional keyword
4. Selected one of the autosuggested keyword phrases  
- Had 1,761 results

# Ways of evolving a search

**Corrected search**

**Shows greater than 90% similarity with the previous search string**

**Refined search**

**Shows 80–90% similarity with the previous search string, with the first string contained in the second, or an index change**

**New search**

**Shows less than 80% similarity with the previous search string**

# Summary of results

- Average of **5 minutes** per session
- Average of **2.2 searches** per session
- Average of **5.1 words** per search
- **12%** of sessions had search refinements
- **33%** of sessions had multiple searches

n=282,307 sessions

# Types of Requests

## Search results

The user **made a request for search results**. This could include a new search, refinement of an existing search, or the addition of limiters.

## Physical access options

Some users left the system after looking at a holding, where they were able to identify the physical item call number and/or location. These users were categorized as **having the option to physically access the item**.

## Online access attempt

The user clicked an item or made a request to **digitally access the full text** of the item.

## Attempt to save

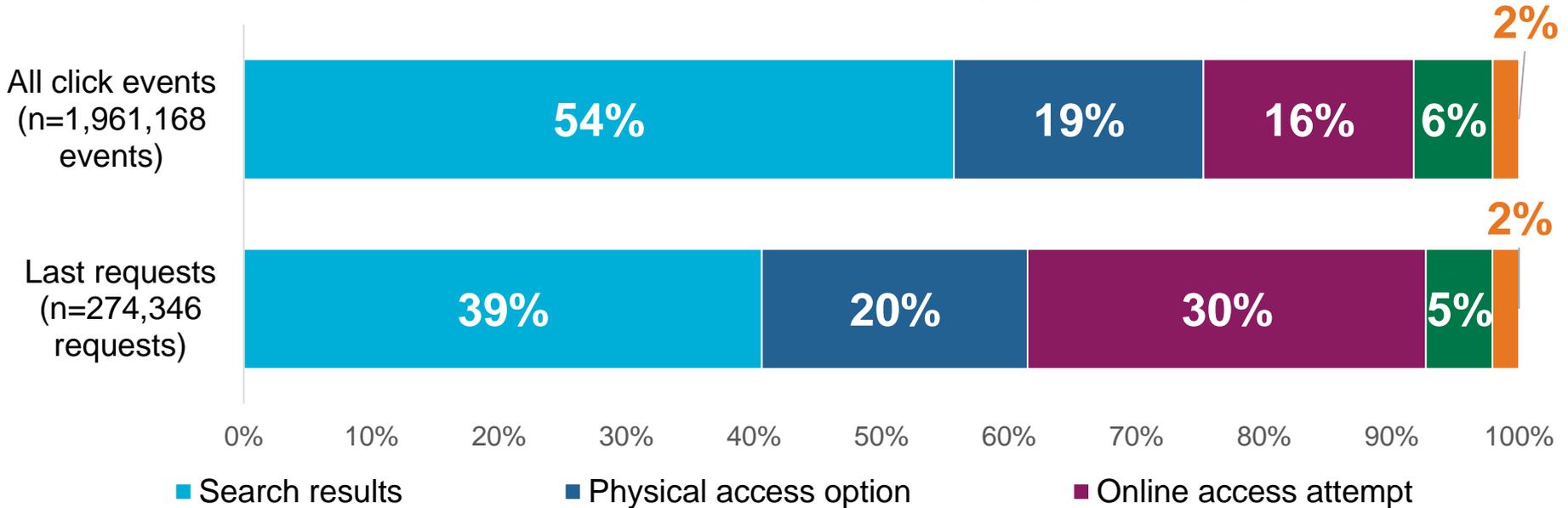
The user attempted to **export or otherwise save the citation**.

## Physical access attempt

The user clicked an item or made a request to **place a hold** on a physical copy of the item.

**While search results account for over half (54%) of all click events, they account for just over a third (39%) of last requests**

### All click events vs. Last requests by type of request



# Probability of fulfillment

Number of searches	2
Number of search refinements	0
Words per search	2
Results per search	1000
Keyword limiter (1 if yes, 0 if no)	1
Author limiter (1 if yes, 0 if no)	0
Title limiter (1 if yes, 0 if no)	0
Chance of Fulfillment	69.09%

Number of searches	2
Number of search refinements	0
Words per search	2
Results per search	1000
Keyword limiter (1 if yes, 0 if no)	1
<b>Author limiter (1 if yes, 0 if no)</b>	<b>1</b>
Title limiter (1 if yes, 0 if no)	0
Chance of Fulfillment	84.76%

Number of searches	2
Number of search refinements	0
<b>Words per search</b>	<b>7</b>
Results per search	1000
Keyword limiter (1 if yes, 0 if no)	1
Author limiter (1 if yes, 0 if no)	0
Title limiter (1 if yes, 0 if no)	0
Chance of Fulfillment	70.32%

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# USER INTERVIEWS

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*“User interviews can help capture search and discovery behavior as the user understands it, rather than as a computer system understands it.”*

*(Connaway, Cyr, Brannon, Gallagher, and Hood 2019)*

# Example questions

- “Please tell us what you were looking for and why you decided to do an online search.”
- “Did the item you were searching for come up in your search results? In other words, did you find it?”
- “I’d like to understand how you felt about your search experience overall. Would you say you were delighted with your search experience?”

# What do the interviews tell us?

## What 'just the logs' told us:

- Began keyword search but mistyped it
  - Had 0 results
- Redid keyword search with correct spelling
  - Had 759,902 results
- Began typing in additional keyword
- Selected one of the autosuggested phrases
  - Had 1,761 results

## What logs and interviews told us:

- Just starting work on a paper on a broad topic; didn't yet have a direction for the paper
- Was overwhelmed with number of search results
- Abandoned "library search" to do "Google searching" to better determine a direction for the paper
- Later came back to the library search and found it useful
- Also received help from student workers in the library
- Felt "prepared" to use the library search due to 1<sup>st</sup>-year library instruction

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# METHODOLOGY CHALLENGES AND BENEFITS

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*“The methodology used for this study also could be extended beyond discovery systems. Other computerized activities that leave digital traces could be studied using interview protocols based on log analysis.”*

*(Connaway, Cyr, Brannon, Gallagher, and Hood 2019)*

# Challenges of methodology

(Tandem use of log data and user interviews)

- **Resource intensive**
  - Time consuming
  - Multiple team members
  - Multiple IRBs
- **High level of expertise required**

# Benefits of methodology

(Tandem use of log data and user interviews)

- Provide context for quantitative data
- Clarify qualitative data
- Most effective when digital traces are present

# Impact of Study

- Collaborate internally in new ways
- Identify why and what users did during the search and when acquiring resources
- Develop a new methodology for studying user behaviors
- Influence product and system development

# Thank you!

Jay Holloway

**Because  
what is  
known must  
be shared.<sup>SM</sup>**