

**Understanding the Needs of Student Users of Digital  
Smithsonian Resources (vol. 4 of 7)**

# **Student / Learner Usage Data from Smithsonian Learning Lab November 2015 – December 2016**

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**Prepared for  
The Smithsonian Center for Learning and Digital Access**

**Prepared by  
Navigation North Learning Solutions**

**Presented  
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Smithsonian Center for  
Learning and Digital Access



**NAVIGATION NORTH**



## Smithsonian Center for Learning and Digital Access

The Smithsonian Center for Learning and Digital Access (SCLDA) uses all the Smithsonian offers to empower learners to explore their interests and collaborate with others to bring ideas to life. The organization creates models and methods that make the Smithsonian a Learning Laboratory for everyone. Guided by the Smithsonian's mission of the increase and diffusion of knowledge, SCLDA was established to re-imagine and ultimately reinvent the way students, teachers, and lifelong learners interact with and use the Smithsonian's resources in the 21st century. Recognizing most will never visit Smithsonian museums, SCLDA set out to identify how it might best enrich education by making Smithsonian experts and collections accessible to everyone regardless of where they live.

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## Background

Since 2011, the Smithsonian Center for Learning and Digital Access (SCLDA) has strived to better understand and address the needs of educators utilizing digital assets through a variety of research and user testing studies that have led to the creation of a new digital learning platform, the Smithsonian Learning Lab (SLL)<sup>1</sup>. The Smithsonian Learning Lab provides access to the digital resources from across the Smithsonian's 19 museums, 9 major research centers, and the National Zoo, to be used as real-world learning experiences. With a repository of over 1.6 million objects and a new resource being digitized and added every 6 seconds, the Learning Lab provides specialized tools to aid in the discovery and creative use of its rich digital materials. For students using the Learning Lab, it is designed to aid in building lasting knowledge and critical skills that take learners from simply finding resources to thoughtful selection, examination, organization, and creation of new resources.

The SLL, as it currently exists, was largely informed by the input and practice of diverse and effective educators.<sup>2</sup> Therefore the goal of this Usage Data Analysis, as a piece of a larger research effort, *Understanding the Needs of Student Users of Digital Smithsonian Resources*, focuses on comparing activities performed on the SLL by users in the project's target age range (13–17) to adult users. While not intended to be a mere validation of SLL's features, the design for this review and summary report is to lend additional insight into how digital systems, tools, pedagogy and content, can be adapted to better meet students' learning needs. As educational psychologist Paul A. Kirschner<sup>3</sup> points out, "If the student is viewed as the end user... participatory design needs to include a more direct participation/contribution of the student in the design of (technology enhanced) learning environments". The overall project will assimilate the findings of this Usage Analysis along with other research to address some key questions around methods or requirements for enhancing student motivation and engagement with digital content and tools.

1. What are the ways that students engage with digital content in academic settings?
2. What are the motivations for student use of digital content?
3. What are the interface requirements/scaffolds needed to enable and enhance student engagement with rich digital resources?

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<sup>1</sup> Milligan, D., and M. Wadman, M. 2015. "From Physical to Digital: Recent Research into the Discovery, Analysis . . ."

<<http://mw2015.museumsandtheweb.com/paper/from-physical-to-digital-recent-research-into-the-discovery-analysis-and-use-of-museums-resources-by-classroom-educators-and-students/>>

<sup>2</sup> "smithsonian-digital-learning - Teacher Toolkit (Research Findings)." 2013. 28 Sep. 2016

<[https://smithsonian-digital-learning.wikispaces.com/Teacher+Toolkit+\(Research+Findings\)](https://smithsonian-digital-learning.wikispaces.com/Teacher+Toolkit+(Research+Findings))>

<sup>3</sup> Kirschner, P. A. 2015. "Do We Need Teachers as Designers of Technology-Enhanced Learning?"

<<http://link.springer.com/article/10.1007/s11251-015-9346-9>>

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## Methodology

Using anonymous usage data from the SLL, a series of user actions was analyzed for two groups. Youth users (n=1452) in the project’s target age range of 13–18 were compared to adult users, anyone over 18 (n=7937) for a thirteen month time period spanning 2015 and 2016.

	<b>Youth Users 13 - 17 (n=1452)</b>	<b>Adult Users 18+ (n=7937)</b>
Number of uploaded resources =	1109	6420
Number of collections copied =	1021	5858
Number of assignments started =	569	406
Number of items favorited =	244	6906
Number of collections developed =	139	1058
Number of assignments completed =	37	97

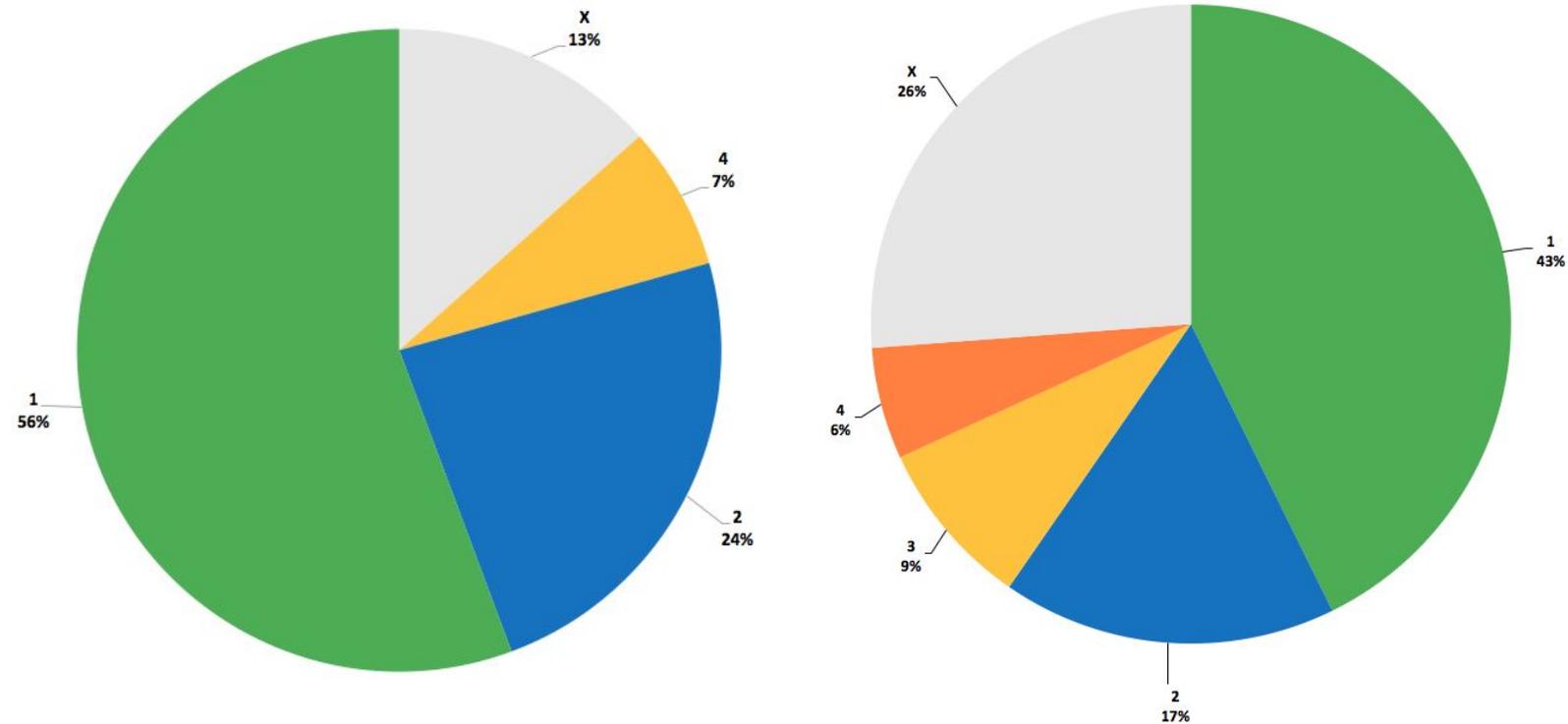
The actions analyzed ranged in their level of complexity. Some actions require a single click while others require a series of steps and generation of descriptive data. We developed a simple scale to provide a comparative index of the complexity of various actions. Using a scale of 1-5, we assigned each action a “*complexity score*” relative to the steps required to fully execute the action:

- 1** = single click to execute action
- 2** = single click + addition of descriptive data to execute action
- 3** = multiple clicks to execute action
- 4** = multiple clicks + addition of descriptive data to execute action
- 5** = single/multiple clicks + addition of descriptive and learning performance data to execute action

<b>Action</b>	<b>Description of Process</b>	<b>Complexity Score</b>
Favoriting an Item	Single click on favoriting icon appended to any resource, collection, or person	1
Copy a Collection	Single click and the option to add a single piece of descriptive data for a new, personalize title	2
Upload a Resource	Multiple clicks and addition of descriptive data to describe resource.	3
Create a Collection	Multiple clicks and addition of descriptive data to describe collection	4
Start an Assignment	Multiple clicks and addition of descriptive data and learning performance data	5
Complete an Assignment	Multiple clicks and addition of descriptive data and learning performance data	5

## Findings

Each chart presents the percentage of users that engaged in each of the analyzed actions. In the charts, X represents a combined range of individual actions conducted by less than 5% of the users. This allowed us to include a placeholder for low percentage outlier data<sup>4</sup> while showing dominant trends in user behavior comparing Youth Users (13-17 years of age) with Adult Users (18+ years of age).



Of the 101 Youth Users that have favorited at least 1 item in the Learning Lab, the top 3 results are below:

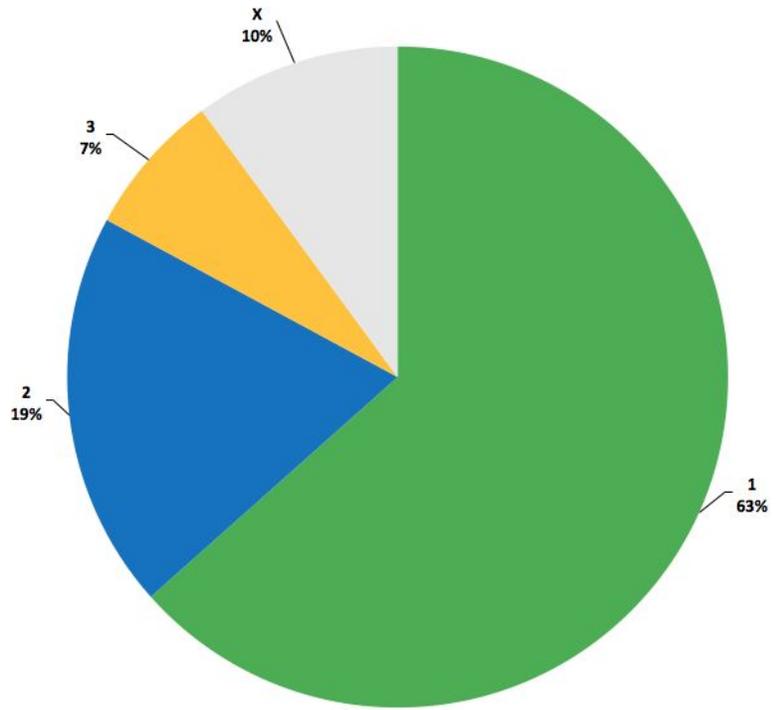
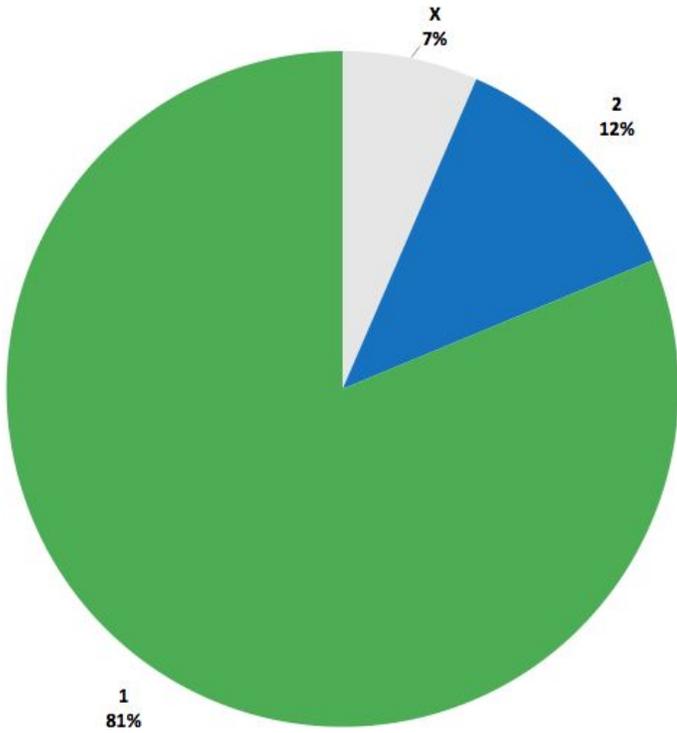
- 1 item favorited = 54 users (56%)
- 2 items favorited = 23 users (24%)
- 4 items favorited = 7 users (7%)

Of the 1,333 Adult Users that have favorited at least 1 item within the Learning Lab, the top 3 results are below:

- 1 item favorited = 566 users (43%)
- 2 items favorited = 224 users (17%)
- 3 items favorited = 113 users (9%)

<sup>4</sup> As a means to highlight trends across data series for actions, any actions representing less than 5% of the user population is excluded.

**Number of Collections Copied by Users - Complexity Score = 2**



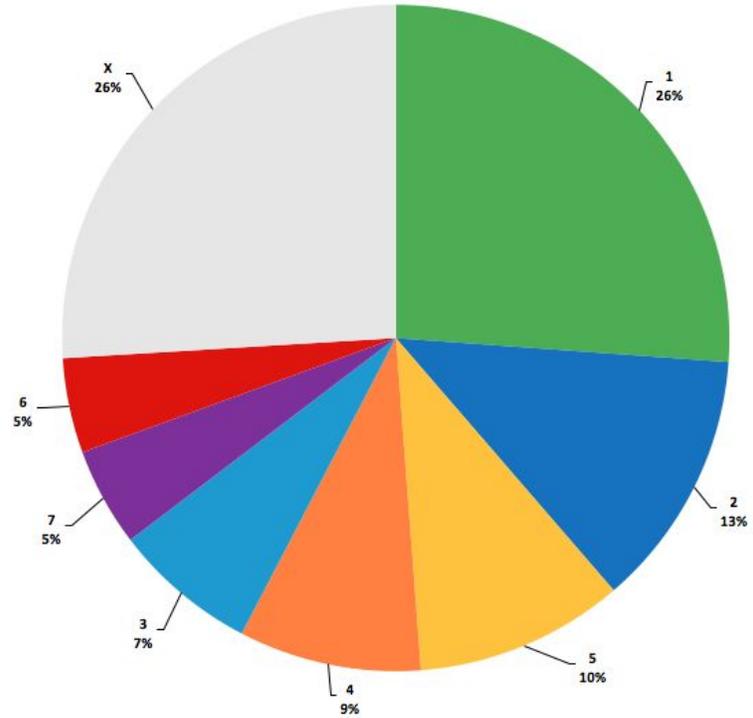
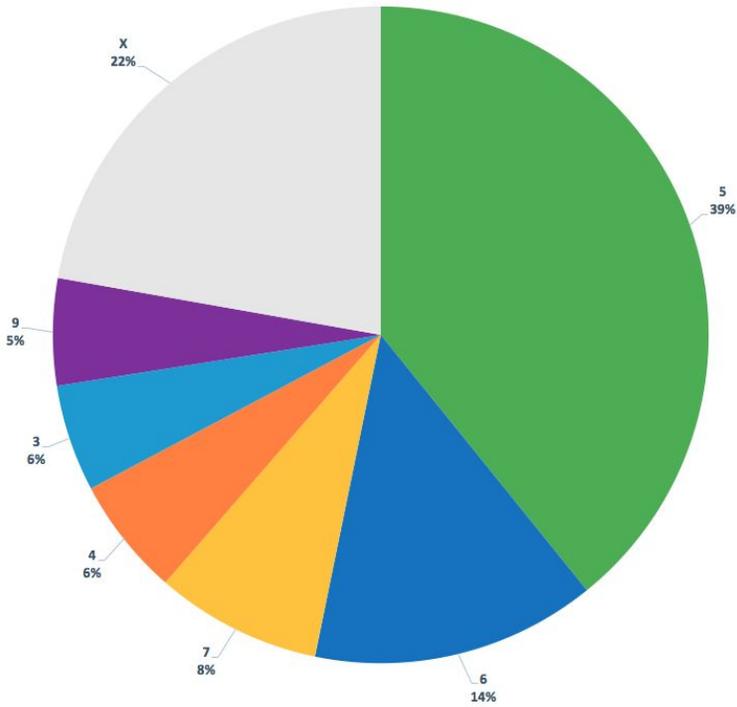
Of the 767 Youth Users that have copied at least 1 collection in the Learning Lab, the top 3 results are below:

- 1 collection copied = 623 users (81%)
- 2 collections copied = 94 users (12%)
- 3 collections copied = 24 users (3%)

Of the 2,786 Adult Users that have copied at least 1 collection within the Learning Lab, the top 3 results are below:

- 1 collection copied = 1760 users (63%)
- 2 collections copied = 540 users (19%)
- 3 collections copied = 195 users (7%)

## Number of Resources Uploaded by Users - Complexity Score = 3



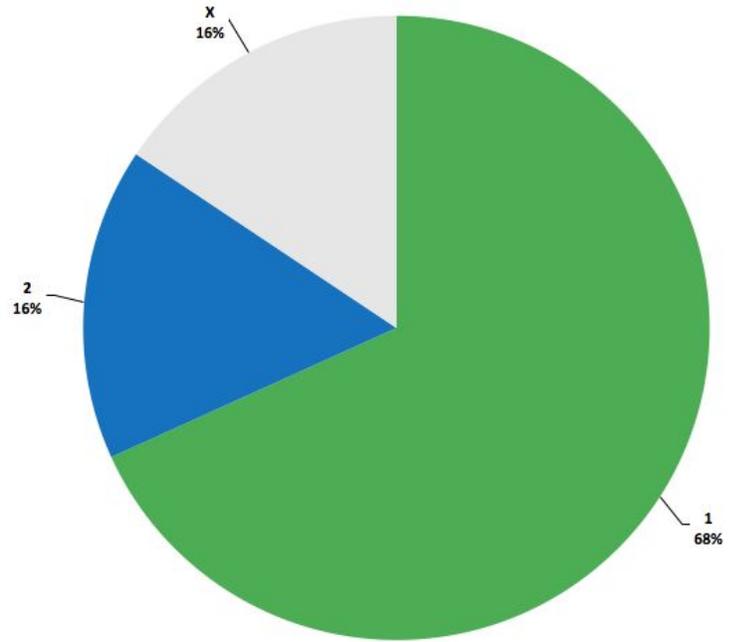
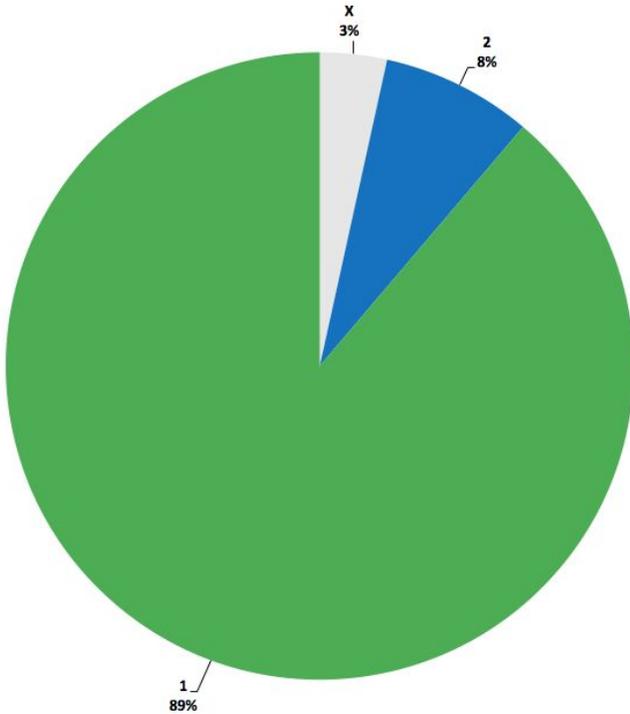
Of the 171 Youth Users that have uploaded at least 1 resource within the Learning Lab, the top 3 results are below:

- 5 resources uploaded = 67 users (39%)
- 6 resources uploaded = 24 users (14%)
- 7 resources uploaded = 14 users (8%)

Of the 606 Adult Users that have uploaded at least 1 resource within the Learning Lab, the top 3 results are below:

- 1 resource uploaded = 142 users (26%)
- 2 resources uploaded = 68 users (13%)
- 3 resources uploaded = 55 users (10%)

## Number of Collections Created by Users - Complexity Score = 4



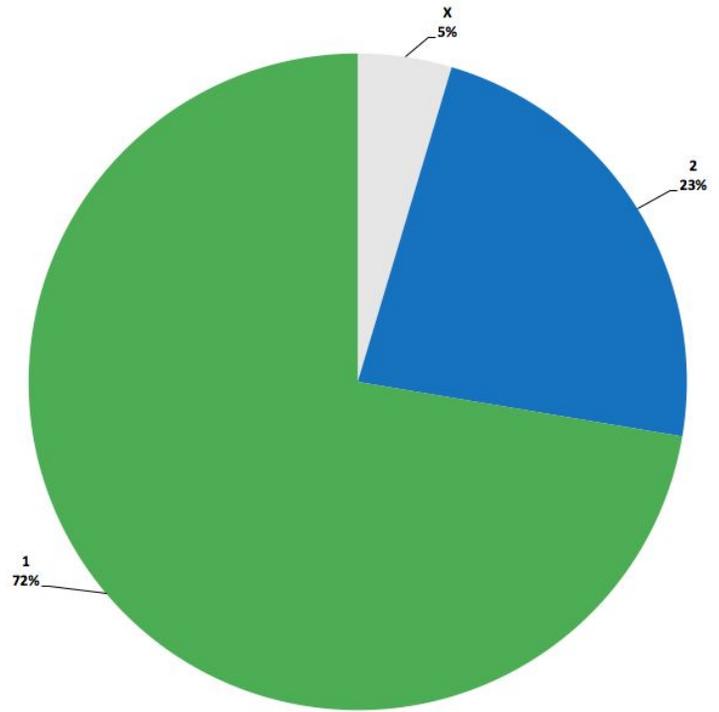
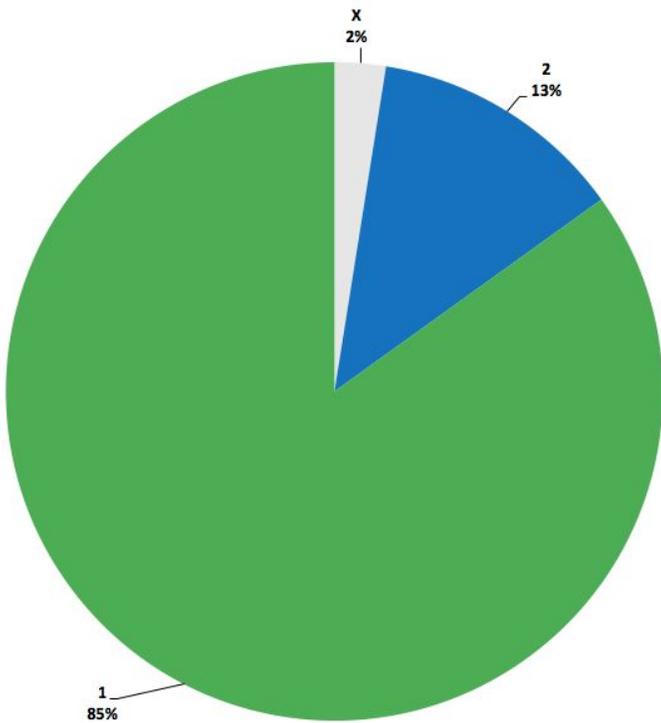
Of the 116 Youth Users that have created at least 1 collection within the Learning Lab, the top 3 results are below:

- 1 collection created = 103 users (89%)
- 2 collections created = 9 users (8%)
- 4 collections created = 2 users (1%)

Of the 519 Adult Users that have created at least 1 collection within the Learning Lab, the top 3 results are below:

- 1 collection created = 354 users (68%)
- 2 collections created = 84 users (16%)
- 3 collections created = 21 users (4%)

## Number of Assignments Started by Users - Complexity Score = 5



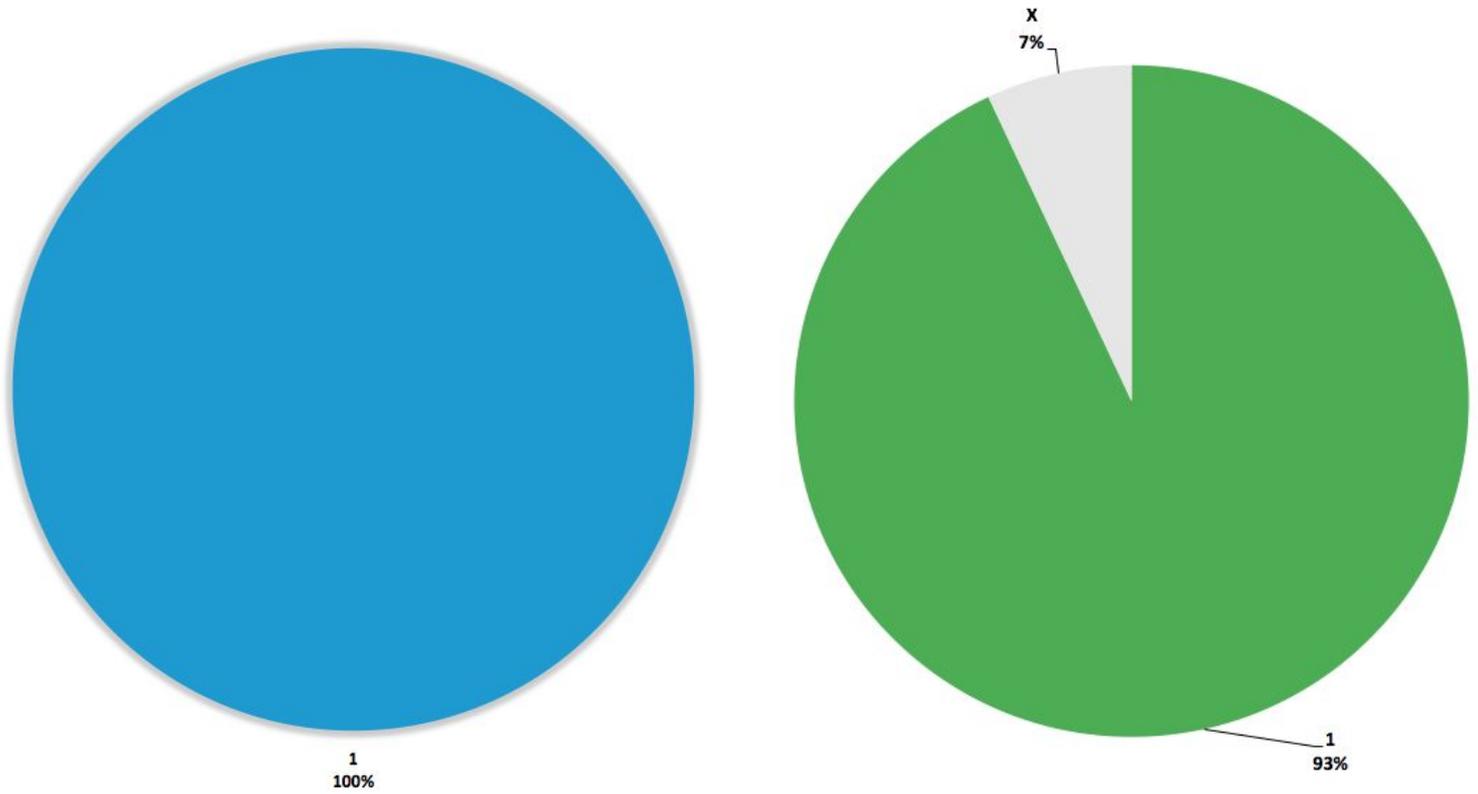
Of the 477 Youth Users that have started at least 1 assignment within the Learning Lab, the top 3 results are below:

- 1 assignment started = 405 users (85%)
- 2 assignments started = 60 users (13%)
- 4 assignments started = 6 users (1%)

Of the 282 Adult Users that have started at least 1 assignment within the Learning Lab, the top 3 results are below:

- 1 assignment started = 204 users (72%)
- 2 assignments started = 65 users (23%)
- 3 assignments started = 4 users (2%)

**Number of Assignments Completed by Users - Complexity Score = 5**



<p>Of the 37 Youth Users that have completed at least 1 assignment within the Learning Lab, the only result recorded thus far is 1 assignment:</p>	<p>Of the 85 Adult Users that have completed at least 1 assignment within the Learning Lab, the top 3 results are below:</p>
<ul style="list-style-type: none"> <li>• 1 assignment completed = 37 users (100%)</li> </ul>	<ul style="list-style-type: none"> <li>• 1 assignments completed = 80 users (93%)</li> <li>• 2 assignments completed = 3 users (4%)</li> <li>• 3 assignments completed = 2 users (2%)</li> </ul>

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## Summary

The single highest number of actions executed by users between 13-17 yrs. old within the Smithsonian Learning Lab was **uploading resources** (1109 actions).

It is worth noting, that actions taken by some youth use numbers may be influenced by directions provided by an educator. Many observations of teachers during this first year found them directing students to **copy collections** (1021 actions), and **begin assignments** (569) as a regular part of class-based activity.

Considering that fact, actions such as **favoriting an item** (244) or **developing a collection** (139) have most likely been performed by youth users in ways largely unmitigated by an educator. Therefore, while their numbers are lower, they could be seen as viable actions to consider for future development given the likelihood that students largely elected to perform these actions.

When comparing the trends present for youth users between 13-17 yrs. old against the same data for users 18+ yrs. old, all trends remain fairly consistent across the two populations with the following two exceptions:

- **Youth Users tend to use all of the tools slightly more than their adult counterparts.** *Across each action recorded, they have a slightly higher percentage of performing every one of the measured actions.*
- **Youth Users uploaded more resources on average.** *They upload between 5-7 resources on average whereas Adult Users tend to upload 1-3 resources.*