Understanding the Needs of Student Users of Digital Smithsonian Resources (vol. 2 of 7)

A Comparison of Systems and Features

Environmental Scan of Digital Learning Platforms Popular with Young Learners

Prepared for
The Smithsonian Center for Learning and Digital Access

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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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Table of Contents

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)[1]. 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.[2] Therefore the goal of this Environmental Scan, as a piece of a larger research effort, *Understanding the Needs of Student Users of Digital Smithsonian Resources,* focuses on the features of existing digital learning platforms and tools commonly used by students and teachers. 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[3] 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 Environmental Scan 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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[1] 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/>

[2] "smithsonian-digital-learning - Teacher Toolkit (Research Findings)." 2013. 28 Sep. 2016 <https://smithsonian-digital-learning.wikispaces.com/Teacher+Toolkit+(Research+Findings)>

[3] 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>

Methodology

In the area of Digital Learning Systems/Platforms[4], all systems identified were assessed for various features and tools across four (4) distinct categories. Categories and the relative facets examined were generated based on an analysis of dominant features found across popular learning management systems.

Systems analyzed were initially selected from widely used platforms supporting targeted users ages 13-17 years old in both formal and informal learning environments and fit online learning guidelines as published in national reports identified below.

- **The International Society for Technology in Education (ISTE), "19 places to find the best OERS"**
  https://www.iste.org/explore/articleDetail?articleid=538
- **The International Association for K–12 Online Learning (iNACOL), "Student-Centered Learning: Functional Requirements for Integrated Systems to Optimize Learning"**
  http://www.inacol.org/wp-content/uploads/2016/05/iNACOL_FunctionalRequirementsForIntegratedSystems.pdf
- **State Educational Technology Directors Association (SETDA), "Ensuring the Quality of Digital Content for Learning Recommendations for K12 Education"**
  http://www.setda.org/wp-content/uploads/2015/03/Digital_brief_3.10.15c.pdf

Project team members narrowed lists down to 10 platforms that focused on use of open education resources, structured and semi-structured learning activities, and distributed tools allowing teacher and learner to modify existing materials or engage in self-assembly of learning activities.

The review assessed each system for the presence of specific features or tools, but did not attempt to assess relative effectiveness. Four categories were established and numbers of assessed features were tallied and reported in terms of overall % (listed in order of most addressed features):

1. **Resource Management Tools and Features**
   a. Sub-elements included: Resource Discovery, Resource Selection, Resource Sharing, Resource Storing/Saving, and Resource Systems Integration/Interoperability
   b. Systems on average addressed **61.0%** of the 40 specific facets assessed
2. **Learner Actions Tools and Features**

[4] Digital Learning Systems/Platforms refers specifically to web-based environments designed to help users access direct learning content or learning support resources as individual learners or part of a learning community.

    a. Sub-elements included: Learner Access Methods, Import/Upload Features, Export/Download, Reuse/Remix/Modify, Learner Progress/Achievement, User Activity Management, User Authoring, Creation Tools, and Curricular Integration,
    b. Systems on average addressed **60.9%** of the 38 specific facets assessed
3. **Community Collaboration Tools and Features**
    a. Sub-elements included: Resource Sharing, Groups, Discussion, Communication, and User Activity Management
    b. Systems on average addressed **43.5%** of the 20 specific facets assessed
4. **Overall Design (UI/UX) Features**
    a. Sub-elements included: General User Interface, UI Personalization, Form Factor Design Elements, General User Experience, Accessibility, UI Learning Progress/Achievement, and Customize Profile
    b. Systems on average addressed **42.7%** of the 22 specific facets assessed

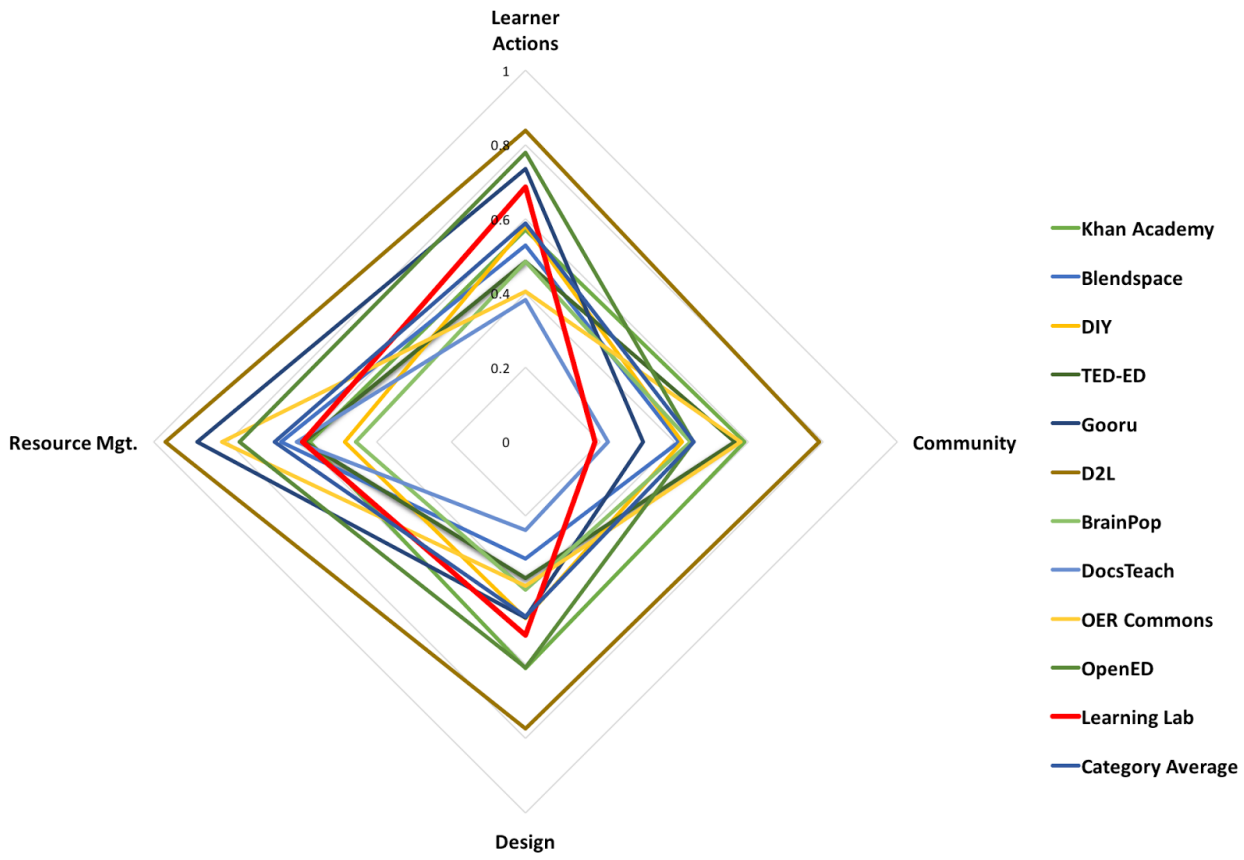
The data collection and analysis tool developed by the project team and used to analyze each of the learning systems can be found here: **Group 1** / **Group 2**

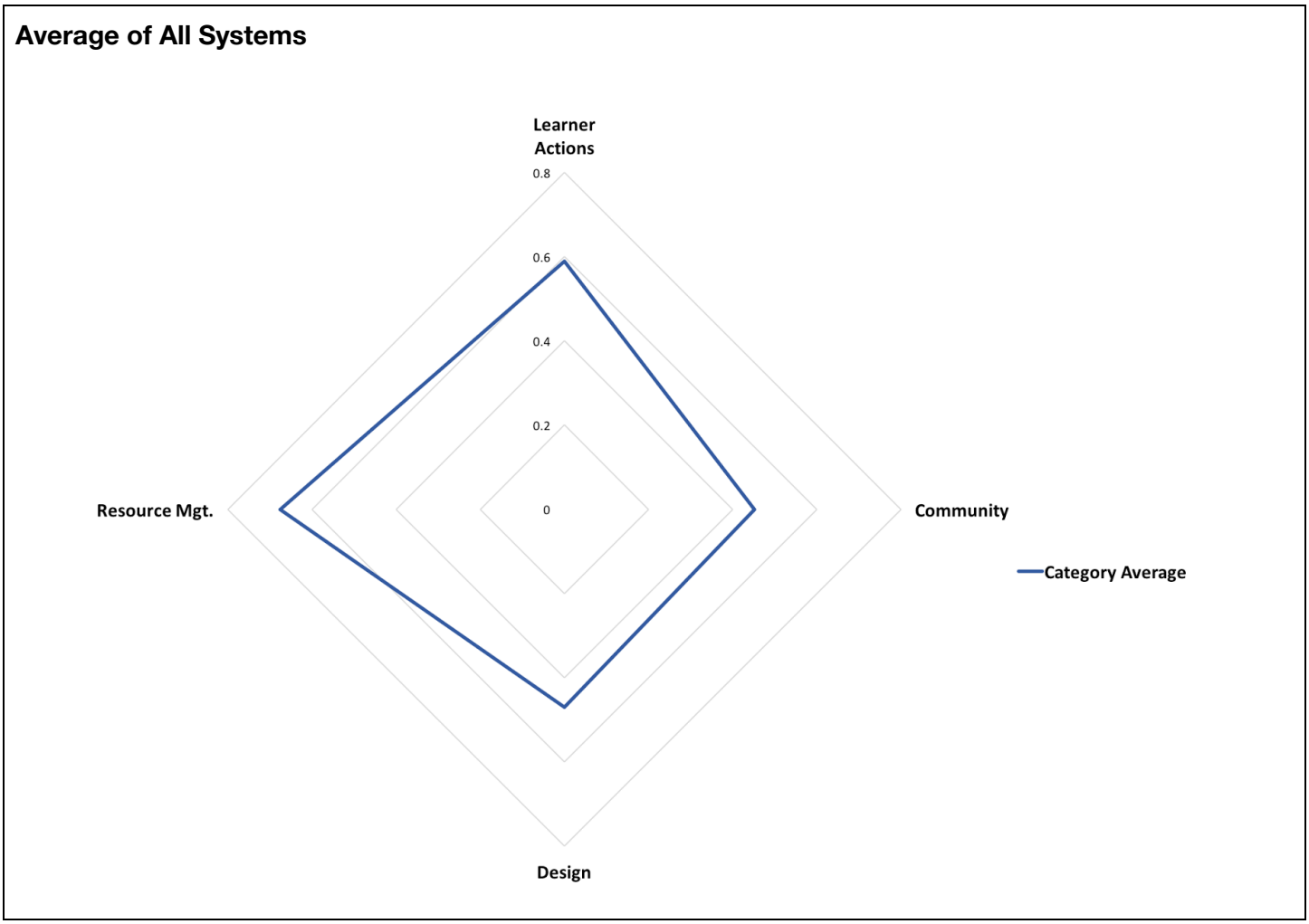
Findings

The following visualizations provide a comparison of data where similar features/tools did or did not exist in each system. Radar charts were used as the method of presenting data across different learning applications. These provided a means to compare four categories as graphed elements simultaneously.

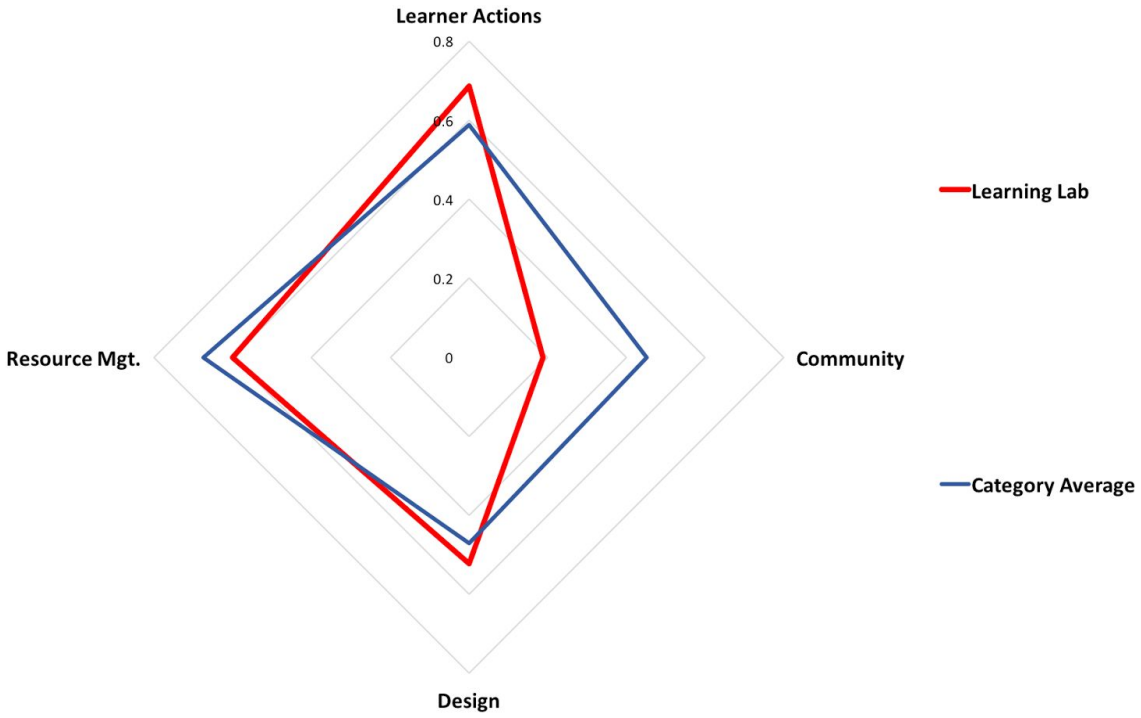
- Chart 1 is a compilation of all systems' results for all four categories, compared to the SLL (shown in red).
- Chart 2 is an average of results for all systems.
- Each chart thereafter shows independent system's results as compared against the overall average to indicate where systems focused their features and tool sets.

All Systems Combined

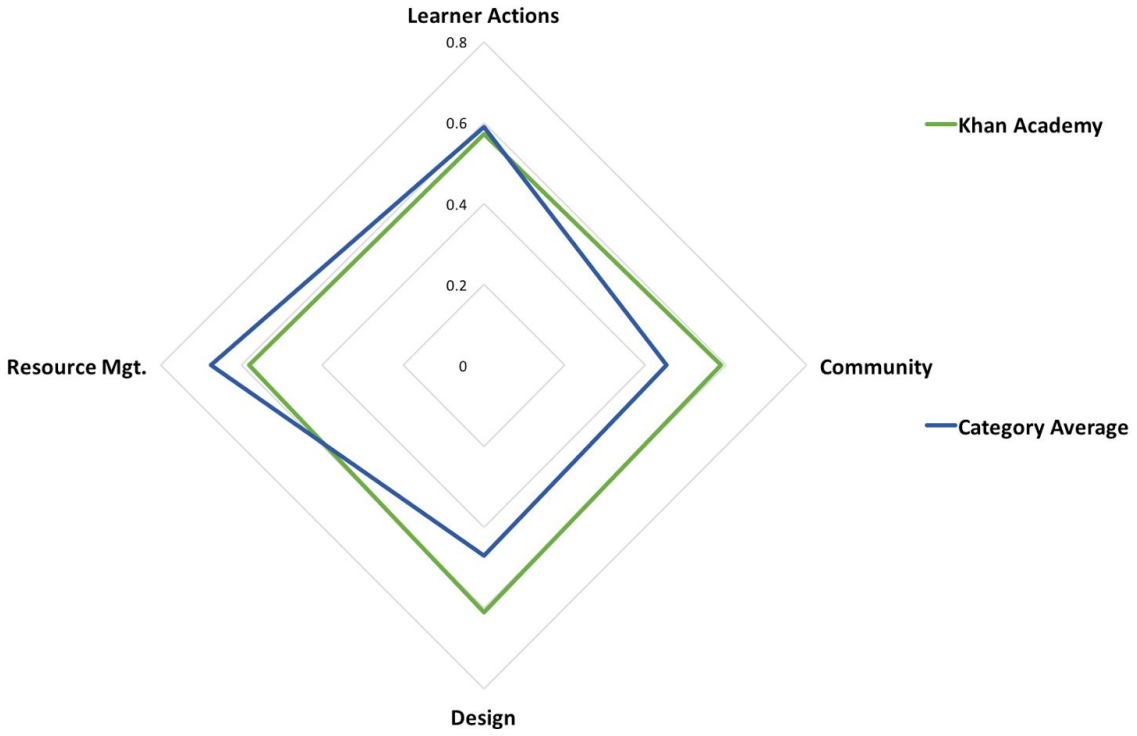



Average of All Systems
Learner Actions
0.8
0.6
0.4
0.2
0
Resource Mgt.
Community
Design
Category Average

Smithsonian Learning Lab
https://learninglab.si.edu/
The Learning Lab infuses real-world experiences into learning to build lasting knowledge and critical skills that take learners from simply finding resources to thoughtful selection, organization, and creation of new resources.



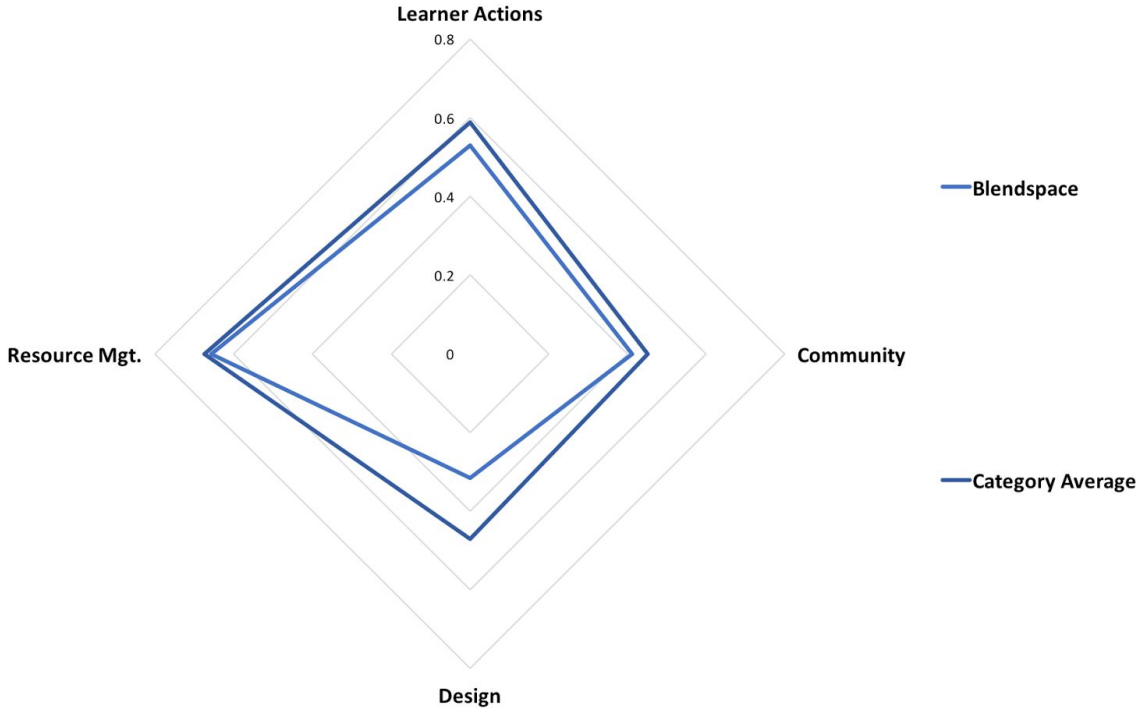
Khan Academy
https://www.khanacademy.org/
Khan Academy offers online practice exercises, instructional videos, and a personalized learning dashboard that lets learners study at their own pace. Topics include math, science, computer programming, history, art history, economics, and more.



Blendspace

https://www.tes.com/lessons

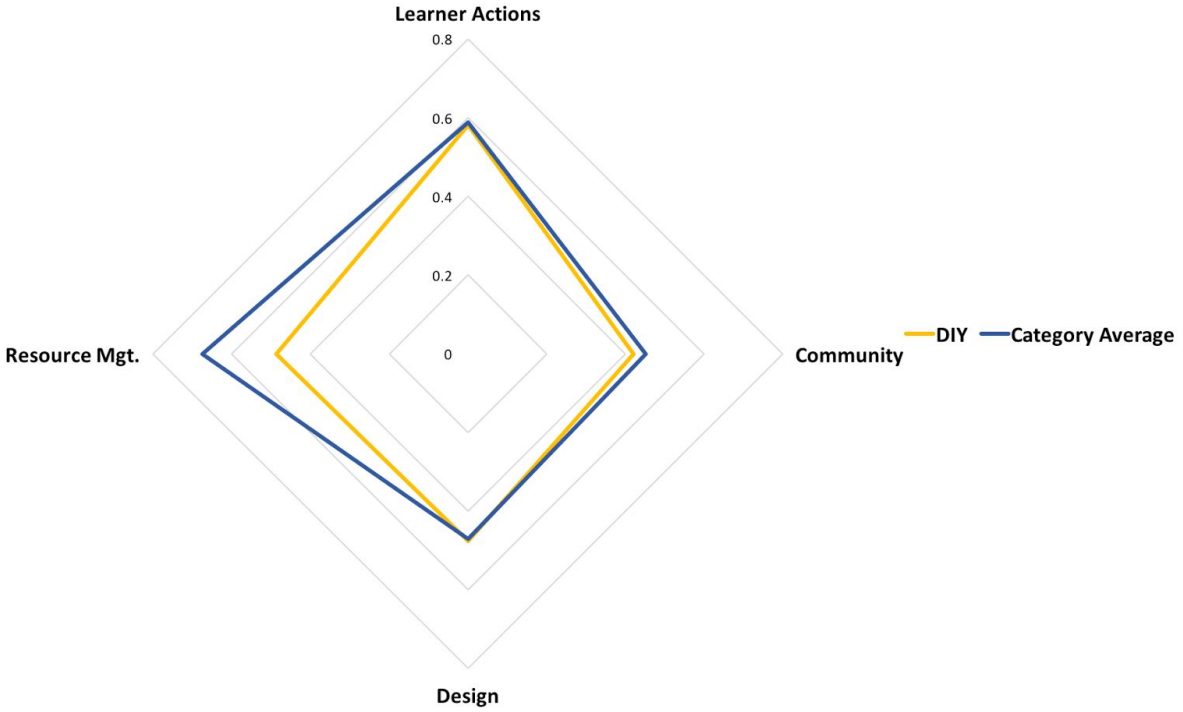
Blendspace (TES Teach), provides educators a place to search through libraries of digital learning media, upload their own files and favorite learning sites and organize them into lessons for their students to complete with assessments and tracking.



DIY

https://diy.org/

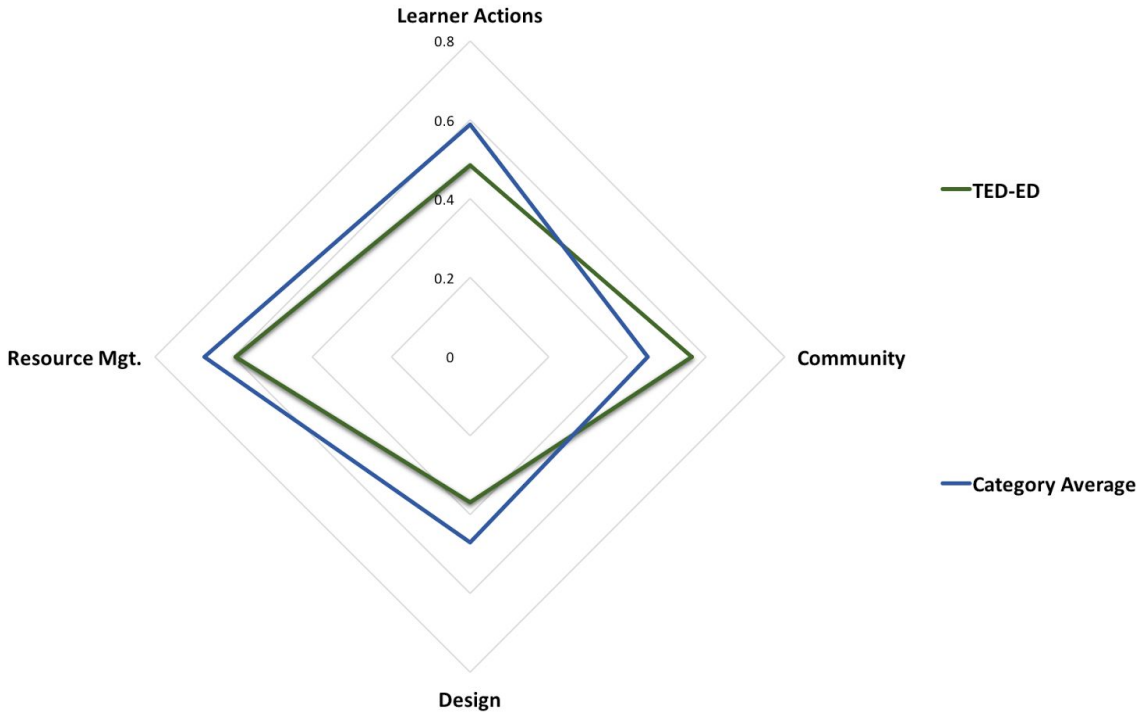
DIY is an online community for kids to discover new skills and engage in video-tutorial based projects as part of a maker's community. As learners submit their own products or exhibitions of skills, they can get feedback from the community and badges for their accomplishments.



TED-ED

http://ed.ted.com/

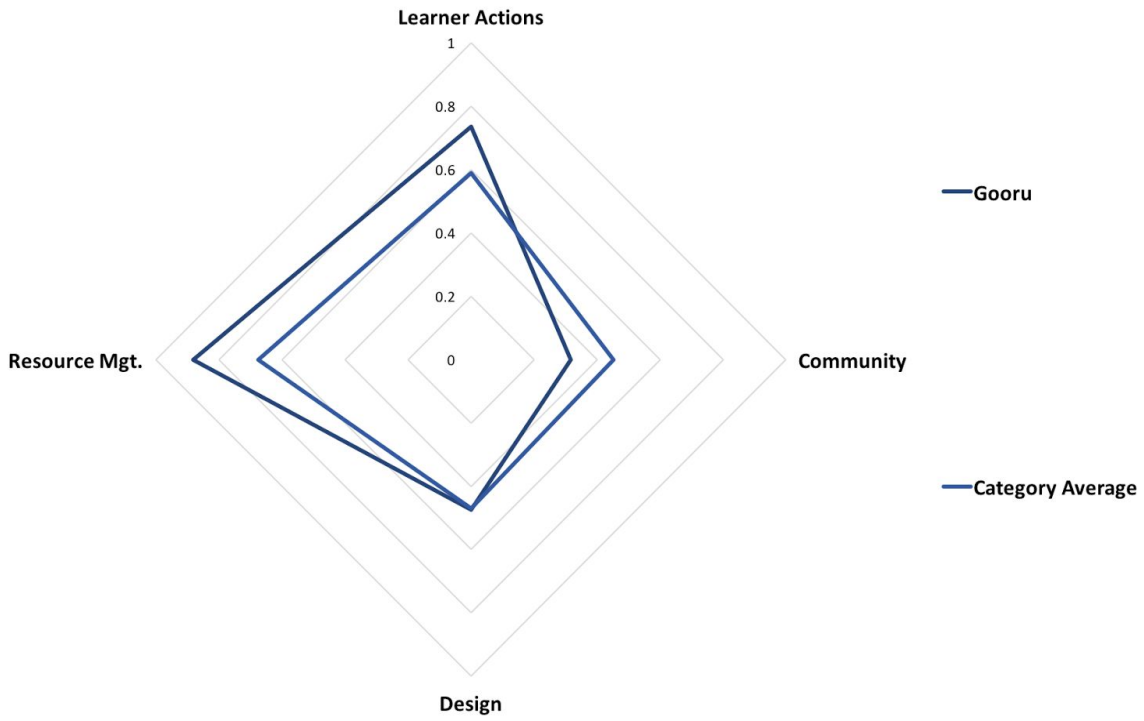
TED-Ed provides educators and learners a growing library of original animated videos within a platform for teachers to create their own interactive lessons using TED videos, and curious students access to expert information and presentation literacy skills.



Gooru

https://www.gooru.org/welcome/

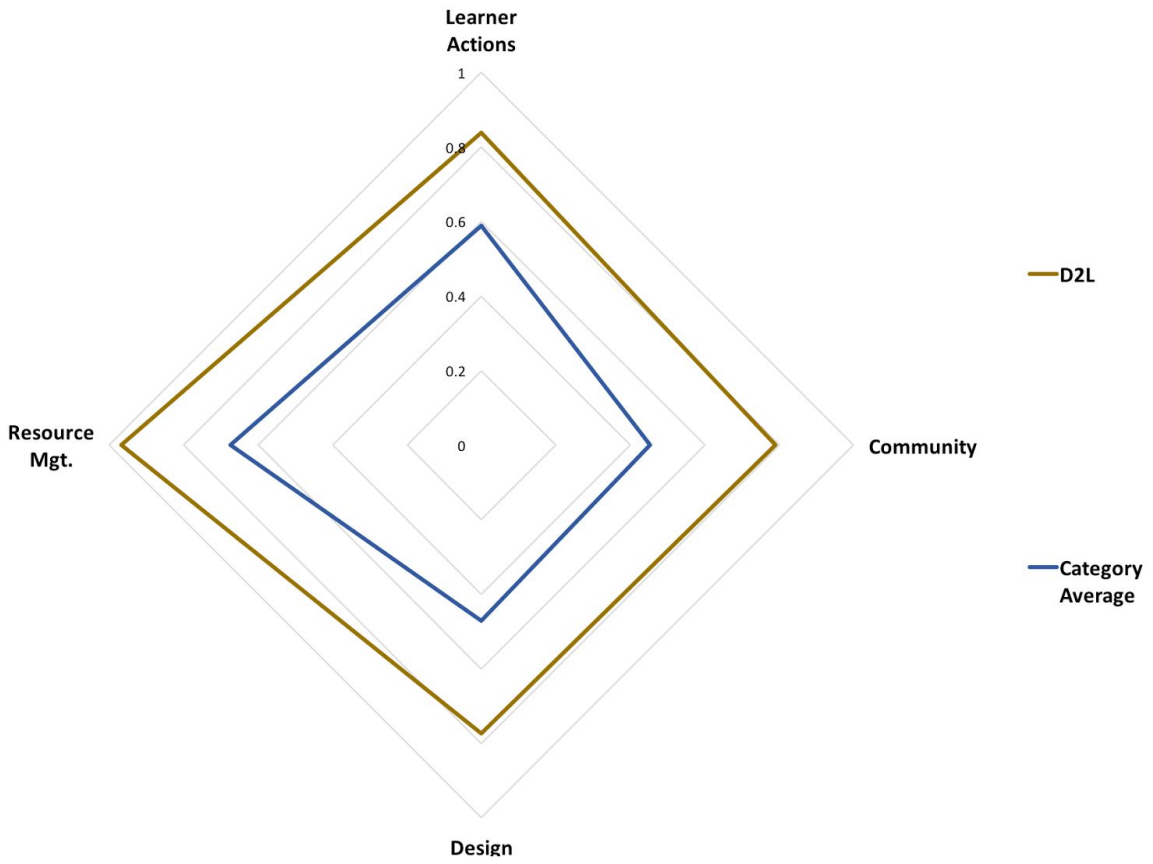
Gooru's learning navigator provides open and free resources, collections, and courses and cover a variety of K-12 topics. Thousands of collections and quizzes created and shared by educators can be customized for personalized learning in every class.



Desire2Learn

https://www.d2l.com/

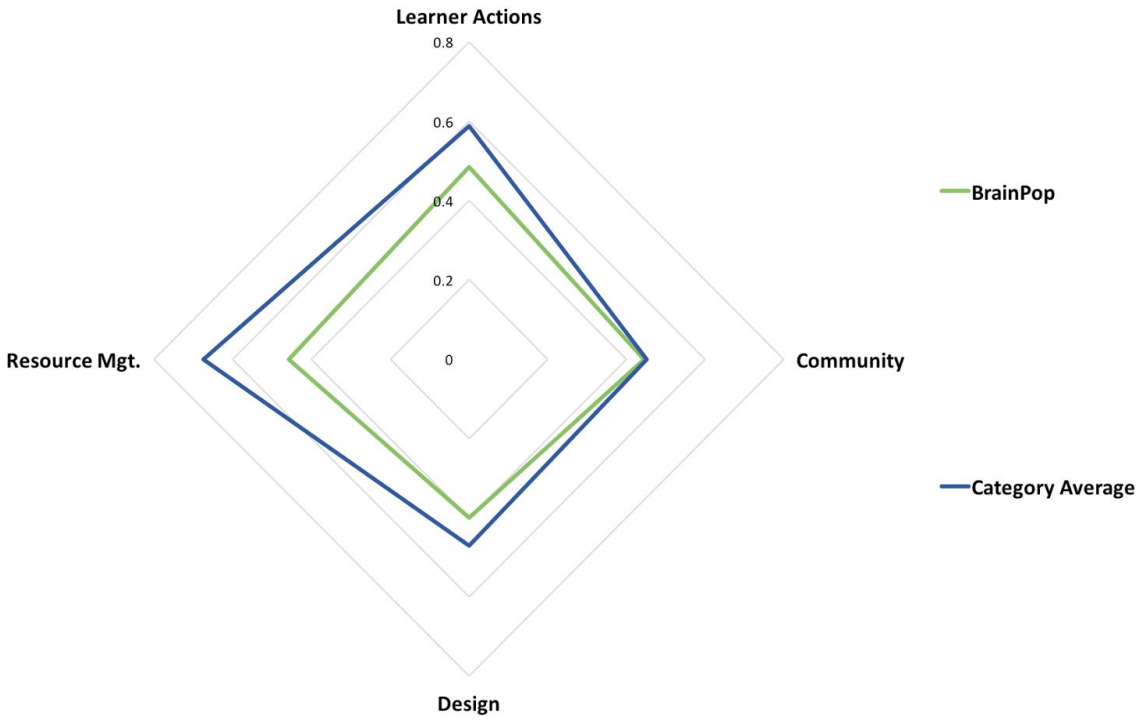
The D2L Brightspace LMS allows educators to design courses, create content, and grade assignments for the management of fully online courses. The D2L system supports collaborative authoring of content, and learner analytics and tracking.



Brain Pop

https://www.brainpop.com/

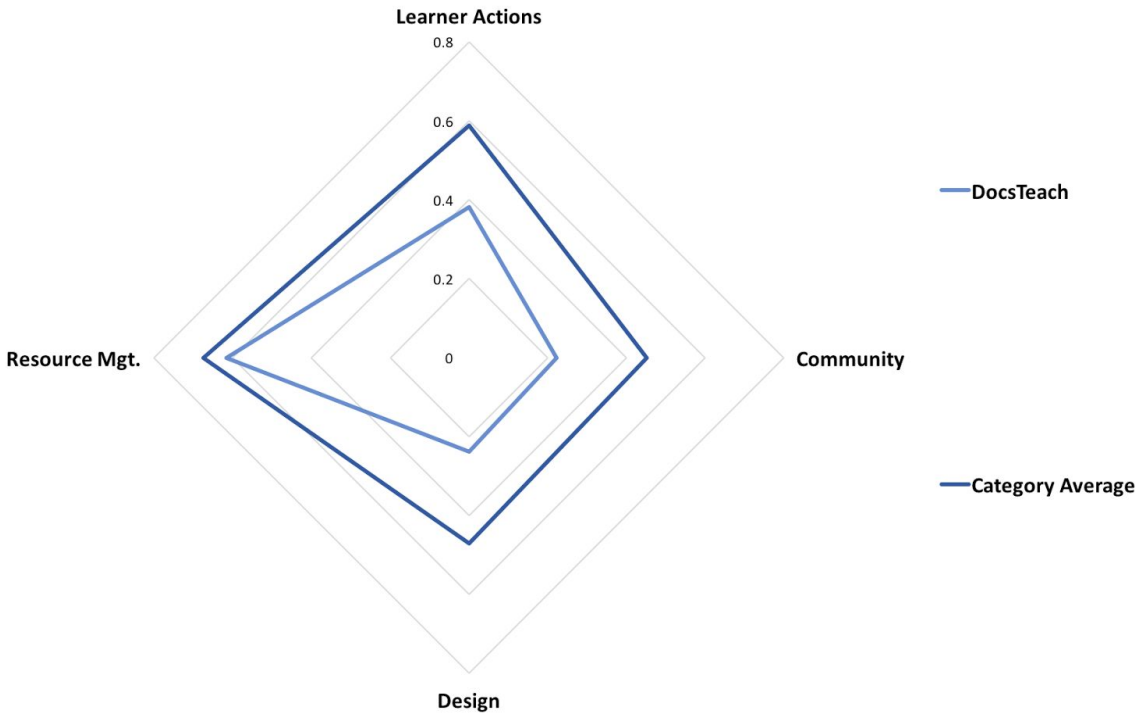
BrainPOP contains animated movies, learning games, interactive quizzes, primary source activities, concept mapping, and more. It provides learners with media-based activities across topics such as Science, Math, Social Studies, English Language Arts, Technology, Engineering, Arts, Music, Health, Reading, and Writing.



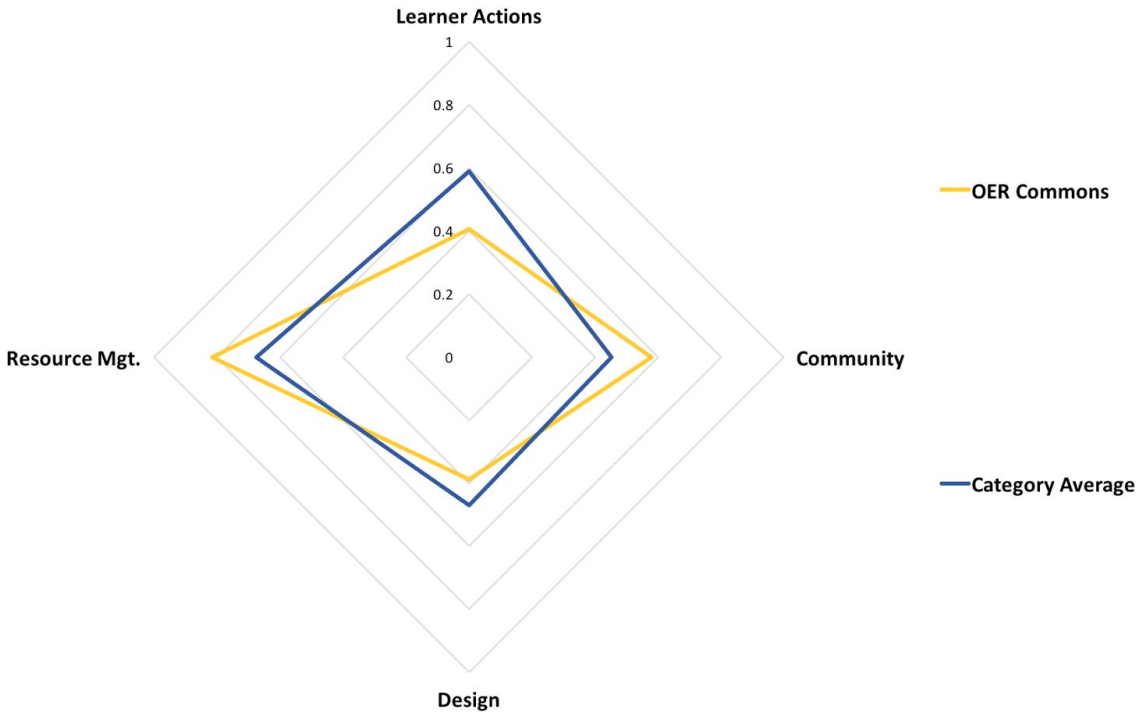
Docs Teach

https://www.docsteach.org/

DocsTeach is provided by the U.S. National Archives and affords educators the means to browse, save, create, and share their own activities using the records of the American people.



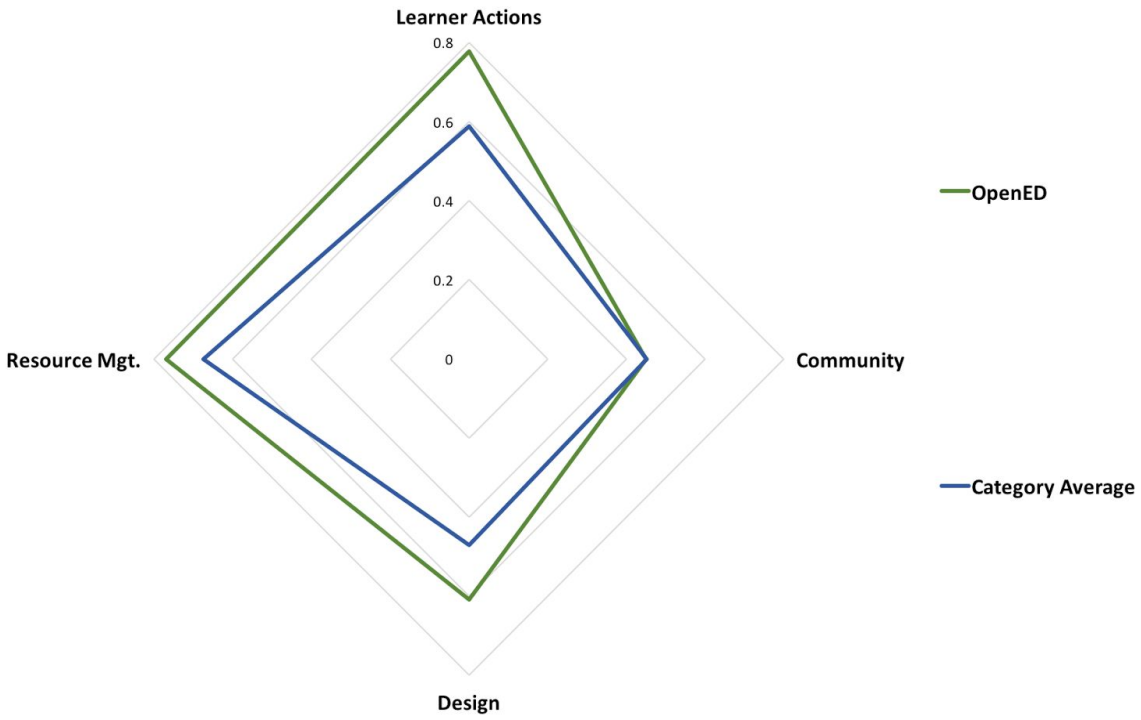
OER Commons
https://www.oercommons.org/
OER Commons is a comprehensive infrastructure for curriculum experts and instructors to identify high-quality OER and collaborate around their adaptation, evaluation, and use to address the needs of teachers and learners. Educators and learners can search, browse, and evaluate resources in OER Commons' growing collection of over 50,000 high-quality OER.



Open Ed

https://www.opened.com/

OpenEd is a K-12 educational resource library that offers over a million assessments, homework assignments, videos, games, and lesson plans aligned to standards. Teachers can find almost any online resource they need, organized by what is most effective for students based on auto-graded assessments.



Analysis

The system category receiving the most tools and development effort across all **Digital Learning** platforms reviewed were those directed towards **Resource Management** with the average system addressing 61% of the assessed features. Sub-elements within this category included:

- Resource Discovery
- Resource Selection
- Resource Sharing
- Resource Storing/Saving
- Resource Systems Integration/Interoperability

*Subsequently, **Learner Management** tools and features were also significant with the average system addressing 60.9% of the assessed features.*

Categories that were afforded the least resources/development efforts across all systems:

- ***Community Development** tools and features (peer to instructor and peer to peer collaboration & communication) and*
- ***User Design** features (customization of the system to meet specific user needs in relation to user interface features)*

Observation

With a growing reliance on digital resources as a primary content source, many systems are enhancing the tools and features to better capture, store, describe and deploy more robust resource repositories within their systems. Learner management tools will inherently always be a focused feature set in almost all digital learning environments.

This analysis and report prepared by Navigation North Learning Solutions under the direction of The Smithsonian Center for Learning and Digital Access