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Review Article

Useful online open-access digital resources and their selection for researchers in the digital information world

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ABSTRACT

Open educational resources are becoming important in achieving the research goal and quality education. Available open education resources were recognized early on by UNESCO in 2004 when they first used the term “Open Education Resources”. In the current era of digital information, many types and subjective, open resources are available for the world’s education. The Researcher and scholars can take advantage of these open resources with the consultation of librarians. The scholars need to meet your librarian and discuss the correct information for your work. In the digital era, much wrong information is available, but searching for correct information from open resources is challenging. Open access online resources and selection for research work: The selection of correct information for research work is essential therefore, research scholars and researchers must focus on the different components and platforms of open resources.

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1. Introduction

Online availability enables the user to get relevant information and acquaint themselves with the latest developments in their respective field. The enormous selection of digital and analogue media that are available to students has an impact on their learning preferences. In the past ten years, there has been a tremendous uptake of digital platforms that let students share knowledge and seek information. Since the beginning of the “Information Age,” information technology has played a significant role in our daily lives. In recent years, IT has significantly impacted our daily life.

Open online resources are handy to the educational and research scholar communities. These kinds of resources are freely available 24x7 for full-text access; many other open resources are also for completing the task and aim of the research and are freely available for unlimited use. This

chapter will provide the help and support for fulfilling the needs of your research. ¹⁻⁴

“Quality resources are essential for quality research and innovation; therefore, researchers need to select qualitative and valuable resources with the help of various analysis components of resources in the wide sphere of online digital information.”

2. The Essential Components for the Selection of Open-Access Online Resources for Researchers

Selecting quality open-access online resources for research involves several essential components to ensure the credibility, reliability, and relevance of the information you’re using. Here are the key components to consider:

1. *Source authority and reputation:* Check the reputation of the organization or institution behind the resource. Established universities, research institutions, government agencies, and reputable organizations are more likely to provide reliable information.

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2. *Peer review process*: Look for resources that have undergone a peer review process. Peer-reviewed articles and journals have been evaluated and approved by experts in the field, ensuring their quality and validity.
3. *Author credentials*: Investigate the qualifications and expertise of the authors. Reputable authors often have affiliations with respected institutions and a history of publishing in reputable journals.
4. *Citation and references*: High-quality resources should cite their sources and provide references to the research they've used. This allows you to verify the accuracy and credibility of the information presented.
5. *Transparency*: Ensure the resource provides transparent information about its methodology, data sources, and research process. Transparency adds to the credibility of the information.
6. *Up-to-date content*: Research evolves, so it's essential to use up-to-date resources. Check for publication or last update dates to ensure the information is current.
7. *Domain expertise*: Look for resources specific to your research field or subject area. Domain-specific resources are more likely to provide relevant and accurate information.
8. *Licensing and usage rights*: Verify the licensing terms associated with the resource. Open-access resources should clearly state their usage rights, which can vary from resource to resource.
9. *Community engagement*: Some open-access resources have active communities of researchers who contribute and discuss the content. Engaged communities can signify a valuable and reliable resource.
10. *Cross-referencing*: Compare the information from the open-access resource with information from other reputable sources. Consistency and agreement among multiple sources can validate the accuracy of the information.
11. *Avoid bias and misinformation*: Be cautious of resources that exhibit bias or present unsubstantiated claims. Quality open-access resources should strive for objectivity and accuracy.
12. *Funding and sponsorship*: Transparency about funding sources is important. Be aware of potential conflicts of interest that could affect the objectivity of the information.
13. *Technical standards*: In technical fields, ensure that the resource adheres to accepted technical and scientific standards.
14. *Robust search and navigation tools*: Resources with effective search and navigation tools can help you find the information you need efficiently.
15. *Archiving and preservation*: Reliable open-access resources often have strategies in place to ensure the long-term preservation of their content.

16. *Accessibility*: Check if the resource is easily accessible and usable by researchers worldwide, including those with disabilities.
17. *Feedback and reviews*: Look for user reviews or feedback about the resource. The experiences of other researchers can provide insights into the resource's quality and usefulness.

3. Key Components for the Selection of Quality Resources for Researchers

1. Publisher details
2. ISSN (International Standard Serial Number)
3. ISSN (International Standard Serial Number)
4. E-ISSN (Electronic -International Standard Serial Number)
5. Indexing status
6. ISBN (International Standard Book Number)
7. CCF(Common Communication Format)
8. Organisation details
9. Impact factor
10. SCImage JR
11. H-Index
12. Paper/articles Influence
13. Abstract
14. Summary
15. Contents
16. Tables
17. Data analysis
18. Findings
19. Terminology

By considering all these components, researchers can identify and utilize high-quality open-access online resources and contribute meaningfully and credibly to their work. Many criteria are used for the search, but it is essential to use systematic procedures to search resources for research work.³⁻⁹

4. Online Open-Access Digital Resources

Online open-access resources refer to digital materials, information, or content freely available on the internet for anyone to access, use, and share without any cost or restrictive barriers such as paywalls or subscription fees. These resources include academic research papers, scholarly articles, books, journals, educational videos, datasets, software, and more.

A massive or open online course is aimed at unlimited participation and open access via the Web. In addition to traditional course materials, such as filmed lectures, readings, and problem sets, many MOOCs provide interactive courses with user forums or social media discussions to support community interactions among students, professors, and teaching assistants (TAs), as well as immediate feedback to quick quizzes and assignments.

“Open access resources refer to freely available online content for anyone to access, use, and share. These resources can include research papers, articles, textbooks, educational materials, data sets, and more. The main idea behind open access is to remove barriers to access knowledge and information, promote a more equitable distribution of information, and facilitate collaboration and innovation.”

There are two primary forms of open-access resources:

1. *Green open access*: In this model, authors self-archive their work in repositories or institutional websites. This allows researchers to share their work without violating copyright agreements with publishers. Many universities and research institutions have their own repositories where researchers can upload their preprints (versions of their papers before peer review) or post-prints (versions after peer review).
2. *Gold open access*: This model publishes content in open-access journals or platforms. Authors might pay a publication fee, often called an article processing charge (APC), to cover the costs of peer review, editing, and publishing. The content is then freely available to everyone, often under a Creative Commons license that specifies how the content can be used and shared.

5. Key Features of Online Open-Access Resources

1. *Free accessibility*: Users can access the content without paying for it. This promotes equitable access to information and knowledge.
2. *No copyright or licensing restrictions*: Open access resources often come with licenses that allow users to read, download, copy, distribute, and even modify the content, depending on the specific open access model or license used.
3. *Global reach*: Open access eliminates subscription barriers, making content accessible to researchers, students, and the public worldwide. These resources are typically hosted online, making them easily accessible to a global audience with an internet connection.
4. *Publicly accessible*: Open access resources are intended for the public, researchers, students, and anyone interested in the subject matter, regardless of their institutional affiliation.
5. *Diverse content*: Open access resources cover various topics and formats, from scientific research articles and textbooks to creative works and cultural heritage materials.
6. *Increased visibility*: Open-access materials are more easily discoverable, leading to greater visibility and potential for citation.
7. *Collaboration and innovation*: Open access fosters collaboration and encourages the reuse of data and

findings, which can accelerate research progress.

8. *Public engagement*: The public can access and engage with scientific research and other educational content.

Open access can be precious in the academic and research community, where it promotes the free exchange of knowledge and helps advance scientific discovery. It also plays a crucial role in democratizing access to information and supporting lifelong learning for individuals worldwide. Various models of open access exist, such as green open access (self-archiving in repositories), gold open access (publishing in open-access journals), and hybrid models that combine open access and traditional subscription-based publishing.^{9–13} However, there can be challenges:

1. *Funding*: In gold open access, there's often a need for funding to cover publication fees, which can be a hurdle for researchers without sufficient resources.
2. *Quality control*: Ensuring the rigour of peer review and maintaining high-quality standards in some open-access journals can be a concern.
3. *Sustainability*: Some open-access models struggle with maintaining financial sustainability while keeping content freely accessible.

To find open-access resources, you can use platforms like PubMed Central, Directory of Open Access Journals (DOAJ) and institutional repositories hosted by universities and research organizations. Major search engines also index many open-access resources.

Remember that the open access landscape continually evolves, with ongoing discussions about business models, funding, quality control, and the overall impact on the research ecosystem.

6. Open-Access Resources in India for Researchers and Scholars

India has several open-access research digital libraries that provide access to a wide range of scholarly resources, academic publications, research papers, and more. These platforms aim to promote knowledge dissemination and support researchers, students, and educators in pursuing academic excellence. Here are some frequently used open-access research digital libraries in India:

1. *National Digital Library of India (NDLI)*: Managed by the Ministry of Education, Government of India, NDLI provides access to various academic materials, including textbooks, articles, theses, and more, across various subjects and languages Figure 1.
2. *Shodhganga*: This platform hosts electronic theses and dissertations (ETDs) submitted by researchers from universities across India. It's a repository of research work from various disciplines Figure 2. Theses and dissertations are a rich and unique source

of information, often the only source of research work that does not find its way into various publication channels. Theses and dissertations remain an untapped and under-utilized asset, leading to unnecessary duplication and repetition that, in effect, is the antitheses of research and wastage of huge human and financial resources.

3. *Indian Academy of Sciences Journals*: The Indian Academy of Sciences publishes a range of scientific journals that are freely accessible. These journals cover subjects like physics, chemistry, biology, mathematics, and more.
4. *Indian Council of Agricultural Research (ICAR) e-book collection*: ICAR provides access to e-books and resources related to agricultural research and related fields.
5. *J-STAGE (Japan Science and Technology Information Aggregator, Electronic)*: While not Indian, J-STAGE hosts numerous academic journals from India, offering access to research articles in various disciplines.
6. *Open Access Journals from Indian Institute of Science (IISc)*: IISc hosts several open-access journals covering topics such as engineering, science, and management.
7. *Open Access Institutional Repositories*: Many Indian universities and research institutions maintain their own open-access institutional repositories, providing access to research outputs produced by their faculty and students.
8. *Bioinformatics Centre (University of Pune)*: This platform offers access to bioinformatics resources, databases, and tools for researchers in the life sciences.
9. *Indian Journals*: IndianJournals.com is a platform that hosts a variety of open-access journals in different disciplines, providing access to research articles and academic content.
10. *Open Thesis India*: Open Thesis India offers access to electronic theses and dissertations from Indian universities and institutions.
11. *Directory of Open Access Journals (DOAJ)*: While not exclusive to India, DOAJ lists numerous open-access journals from Indian publishers, covering a wide range of subjects.
12. *Economic and Political Weekly (EPW)*: EPW provides free access to select articles, discussions, and research papers related to economics, politics, and social sciences.

These open-access digital libraries in India provide a wealth of knowledge and research materials to support the academic and research endeavors of individuals across various disciplines. Researchers can explore these platforms to access high-quality scholarly resources and stay updated with the latest developments in their fields.^{14–22}

Several other reputed open-access eBook sites worldwide provide access to a wide range of digital



Figure 1:



Figure 2:

books on various subjects. Here are some popular ones:

1. *Project Gutenberg*: One of the oldest and most well-known sources for free eBooks. It offers a vast collection of classic literature and older works that are in the public domain.
2. *Internet Archive*: This digital library offers access to millions of free books, including a mix of classics, academic works, and more. The "Open Library" project within the Internet Archive is particularly focused on eBooks.
3. *OpenStax*: Provides open-access textbooks and educational resources primarily aimed at college and university students. It covers various disciplines.
4. *HathiTrust Digital Library*: A partnership of major research institutions and libraries, HathiTrust offers a vast collection of digitized books, including academic and research materials.
5. *BookBoon*: Offers free eBooks, primarily in the fields of business, science, and technology. It also has a premium section with more specialized content.
6. *Free-eBooks.net*: Provides a wide range of eBooks across various genres, including fiction, non-fiction, academic, and self-help.
7. *LibriVox*: Specializes in free audiobooks of public domain works, often read by volunteers from around the world.
8. *Bartleby*: Offers an extensive collection of classic works of literature, non-fiction, and reference materials

9. *Open Book Publishers*: Focuses on academic and research eBooks, making scholarly works available for free online reading and downloading.
10. *Directory of Open Access Books (DOAB)*: A platform that provides access to a wide range of academic and research eBooks from various publishers.
11. *Wikibooks*: A Wikimedia project that offers open-content textbooks and educational resources on a wide range of topics.
12. *Feedbooks*: Provides a mix of free and paid eBooks, covering various genres, including fiction, non-fiction, and public domain classics.
13. *Google Books*: While not all books are available for full-text access, Google Books offers previews, excerpts, and full texts for a significant number of titles, including many in the public domain.
14. *Free-Ebooks net*: This platform offers a mix of free and paid eBooks across various genres.
15. *Digital Public Library of America (DPLA)*: DPLA provides access to millions of photographs, manuscripts, books, and more from libraries, archives, and museums across the United States.
16. *African Digital Library*: This platform focuses on providing access to digital content from and about Africa.
17. *Smashwords*: Smashwords is a platform for independent authors and publishers to share and distribute their eBooks. While not all books are free, many authors offer their works for free.

Remember that open-access eBook sites can vary in terms of the quality, reliability, and relevance of their content. Always evaluate the source, consider the credibility of the publisher, and cross-reference information, when necessary, especially for academic and research purposes.^{21–24}

7. Large Repositories of the World

Large repositories worldwide provide extensive collections of academic, research, and cultural materials. These repositories play a crucial role in preserving and disseminating knowledge. Here are some of the notable large repositories from various domains:

1. *Internet Archive*: The Internet Archive is a massive digital library that offers access to a wide range of digital content, including books, movies, music, websites, and more. It aims to provide "universal access to all knowledge."
2. *PubMed Central*: Operated by the National Library of Medicine, PubMed Central (PMC) is a free full-text archive of biomedical and life sciences journal literature, containing a vast collection of research articles.
3. *ArXiv*: ArXiv is a preprint repository for research papers in the fields of physics, mathematics, computer

- science, quantitative biology, quantitative finance, statistics, electrical engineering, systems science, and economics.
4. *Europe PMC*: Europe PMC is a free database of life sciences and biomedical literature, providing access to a wealth of research articles, patents, clinical guidelines, and more.
5. *CERN Document Server*: CERN's repository offers access to a vast collection of documents, reports, articles, and data related to high-energy physics and particle physics research.
6. *NASA Astrophysics Data System (ADS)*: ADS provides access to scientific articles, conference proceedings, and data in the fields of astronomy, astrophysics, and related disciplines.
7. *Smithsonian Open Access*: The Smithsonian Open Access initiative offers access to millions of digital assets from the Smithsonian's museums, libraries, and archives.
8. *HathiTrust Digital Library*: HathiTrust is a partnership of major research institutions and libraries, offering a digital repository of a vast collection of books, journals, and other materials.
9. *Digital Public Library of America (DPLA)*: DPLA provides access to millions of photographs, manuscripts, books, and more from libraries, archives, and museums across the United States.
10. *Electronic Theses Online Service (ETHOS)*: ETHOS is a database of UK doctoral theses, providing access to a vast collection of research theses from universities across the United Kingdom.
11. *NARCIS*: NARCIS is the gateway to scholarly information in the Netherlands, providing access to research output, datasets, and publications from Dutch universities, research institutes, and organizations.
12. *Europeana*: Europeana is a digital platform that provides access to millions of cultural heritage items from museums, galleries, libraries, and archives across Europe.
13. *Wikimedia Commons*: Wikimedia Commons is a repository of free media files, including images, sound, and video clips, that can be used in Wikimedia projects and beyond.
14. *Library of Congress Digital Collections*: The Library of Congress offers a vast collection of digital materials, including historical documents, photographs, maps, and more.

These repositories serve as invaluable resources for researchers, educators, students, and the general public, offering access to information and cultural artefacts.^{24–28}

8. Valuable Resources and Details for Adding Quality Courses to the Career of Researchers

For researchers looking to enhance their skills and knowledge through quality courses, various resources are available, both online and offline. Here are some valuable resources to consider and complete the career courses:

1. **SWAYAM:** SWAYAM (Study Webs of Active-Learning for Young Aspiring Minds) is an Indian government initiative that aims to provide free online courses and learning resources to learners across the country. Launched by the Ministry of Education, Government of India, SWAYAM offers a wide range of courses in various subjects, making quality education accessible to anyone with an internet connection Figure 3.

Key features of SWAYAM include:

- (a) **Massive Open Online Courses (MOOCs):** SWAYAM offers MOOCs that cover a diverse range of subjects, including science, engineering, humanities, social sciences, business, and more. These courses are designed to be interactive and engaging.
- (b) **Instructor-led courses:** SWAYAM provides courses taught by experienced instructors from renowned Indian universities and institutions. These instructors create content, conduct lectures, and facilitate discussions.
- (c) **Free access:** The SWAYAM courses are free to learners. This makes it a valuable resource for individuals who want to enhance their skills and knowledge without financial barriers.
- (d) **Certification:** Learners who complete SWAYAM courses can earn certificates issued by participating institutions. These certificates can carry value for professional development and academic pursuits.
- (e) **Flexibility:** SWAYAM courses offer flexibility in terms of scheduling. Learners can access course materials at their own pace, allowing them to balance learning with other commitments.
- (f) **Interactive learning:** The platform incorporates multimedia elements, quizzes, assignments, and discussion forums to promote active engagement and learning.
- (g) **Diverse content formats:** Courses on SWAYAM include video lectures, reading materials, quizzes, assignments, and assessments, ensuring a comprehensive learning experience.
- (h) **Quality control:** The courses go through a review process to ensure the quality of content and instructional design.
- (i) **Learner community:** SWAYAM fosters community through discussion forums where learners can interact with peers and instructors,

ask questions, and share insights.

- (j) **Multilingual content:** To cater to India's linguistic diversity, some courses are offered in multiple languages, allowing learners to choose the most comfortable language.
- (k) **Integration with academic institutions:** SWAYAM is integrated with universities and institutions across India, allowing learners to earn credits and degrees by completing specific courses.
- (l) **Accessibility:** Efforts are made to ensure that the SWAYAM platform is accessible to users with disabilities.

SWAYAM plays a crucial role in democratizing education in India by providing high-quality educational resources to learners across the country, including those in remote areas and disadvantaged backgrounds. It aims to bridge gaps in access to education and promote lifelong learning.²¹

2. **Coursera:** Coursera offers a wide range of courses from top universities and institutions. Many courses are focused on research-related skills, such as data analysis, research methodology, and academic writing.
3. **edX:** Similar to Coursera, edX provides courses from universities and institutions worldwide. They offer courses in various disciplines, including science, technology, social sciences, and more.
4. **LinkedIn Learning:** Formerly known as Lynda.com, LinkedIn Learning provides a vast library of video courses on topics ranging from technical skills to soft skills and management.
5. **Udemy:** Udemy offers a diverse selection of courses on topics like data science, programming, research methods, and more. Courses are often created by industry experts.
6. **Khan Academy:** While more focused on K-12 education, Khan Academy offers courses in mathematics, science, and other subjects that can benefit foundational knowledge.
7. **MIT OpenCourseWare:** Massachusetts Institute of Technology (MIT) offers free access to course materials from many of its classes. These resources can be valuable for in-depth learning in technical fields.
8. **Stanford Online:** Stanford University provides online courses and materials, often for free, covering various subjects, including technology, health, and entrepreneurship.
9. **Harvard Online Learning:** Harvard University offers online courses through Harvard Online Learning. These courses cover diverse subjects and can provide a rigorous learning experience.
10. **Coursera for Campus (formerly Coursera for Universities):** This program allows universities to offer Coursera courses to their students for free or at a

discounted rate, enhancing the educational experience.

11. *Research methodology workshops*: Many universities and research organisations organize workshops on research methodologies, data analysis, and academic writing. Check with local institutions for opportunities.
12. *Webinars and online seminars*: Many professional organizations and academic institutions offer webinars and online seminars on specialized topics and research areas.
13. *Conference workshops*: Research conferences often include workshops on specialized skills and techniques relevant to the conference theme.
14. *Local libraries and community centers*: These institutions may offer workshops on various topics, including research-related skills.
15. *Networking groups*: Joining networking groups and associations related to your research field can provide access to workshops, seminars, and conferences.
16. *MOOC aggregators*: Platforms like Class Central aggregate courses from multiple MOOC providers, making it easier to discover and compare courses from different sources.
17. *Professional organizations*: Many professional organizations offer resources and courses for researchers in specific fields.
18. *Open-access courseware*: Some universities provide free access to their course materials and lectures. These resources can be valuable for self-directed learning.
19. *Open course library*: The WA Open Course Library project offers 81 of Washington’s most enrolled courses. There are a lot of great readings in these course files. Great community college content
20. *Open learning initiative*: Complete courses from Carnegie Mellon University
21. *Modules*: A series of modules in the field of Psychology from Introductory courses to more advanced topics.
22. *OERu*: OERu offers several full courses in fields like business, economics, digital literacy, and history from partner universities around the world.

When selecting courses, consider your research goals and career aspirations. Look for courses that align with your needs, offer relevant skills, and are taught by qualified instructors. Always check reviews and ratings, and ensure that the course content matches your expectations. Additionally, if you’re pursuing a formal academic program, check if the courses offer certifications or credits that can contribute to your academic progress.^{18–25}

The most frequently used important resources platform by learners and research scholars are given below:

1. **TED**: Inspiring thinkers on a range of subjects present big ideas and lectures on a regular basis- completely CC licensed.
2. **Khan Academy**: Hundreds of short educational videos covering many subjects, especially strong collections in science and math.
3. **PhET Science Simulations**: These interactive tools from the University of Colorado at Boulder are mostly CC licensed.
4. **Wikimedia Commons**: The thinkers behind Wikipedia bring you images, video and music all openly licensed or in the public domain.
5. **HippoCampus**: HippoCampus, a Monterey Institute of Technology and Education (MITE) project, is full of high-quality resources in various subjects. It is aimed at high-school and college-level users.

9. Jamendo: Songs by Musicians Who Want to Share Their Music

1. **Vimeo**: A social network of video producers. This is a great place to look for a wide variety of content- some is completely open for redistribution, some is open access.
2. **Critical Commons**: A community of people seeking to promote media use in teaching. The materials posted here are mostly presented using Fair Use guidelines.

10. Images and Artwork Resources Services

1. **Creative Commons Search**: Creative Commons has created this handy search engine that lets you search for CC-licensed resources. The image search is the most useful.
2. **Guide to the Public Domain**: We’ve put together this page on the Public Domain and how to find images and artwork that are in the Public Domain. Included are several resources for searching and finding images in the Public Domain.
3. **Smithsonian Open Access**: You can download, share, and reuse millions of the Smithsonian’s images. With new platforms and tools, you can easily access nearly 3 million 2D and 3D digital items from the Smithsonian collections.



Figure 3:

4. Unsplash: Over 1 million photos that can be freely downloaded and used for commercial or non-commercial purposes, no permission is needed (though attribution is appreciated!).

11. OpenAI: Artificial Intelligence

OpenAI (Open Artificial Intelligence) is an artificial intelligence research organisation that focuses on developing advanced AI models and technologies. It was founded in December 2015 to promote and develop AI in an open and cooperative manner. OpenAI's mission is to ensure that artificial general intelligence (AGI) benefits all of humanity.

AGI refers to highly autonomous systems that can outperform humans at the most economically valuable work. OpenAI aims to create safe and beneficial AGI or to contribute to its development in collaboration with others.

One of OpenAI's most well-known achievements is developing the GPT (Generative Pre-trained Transformer) series of language models, including models like GPT-3. These models are designed to understand and generate human-like text based on the input they receive. GPT-3, for instance, is one of the largest and most powerful language models created, capable of performing a wide range of natural language processing tasks, such as generating text, answering questions, translating languages, and more.

OpenAI is known for its commitment to openness and collaboration. It has released many of its research papers, software tools, and even the code for some of its AI models to the public, allowing researchers and developers around the world to build upon their work.

Please note that my knowledge is based on information available up until September 2021, and there might have been developments or changes since then.^{25–31}

12. Conclusion

Open online resources are handy to the educational and research scholar communities. These kinds of resources are freely available 24x7 for full-text access, and many other open resources are also available for completing the task and aim of the research. This chapter will provide the help and support for fulfilling the needs of your research. In the digital information world, information is coming very fast, and artificial intelligence also plays a dynamic role in searching for information. Hence, checking and verifying the information carefully before finalizing the results is essential.

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14. Conflict of Interest

None.

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