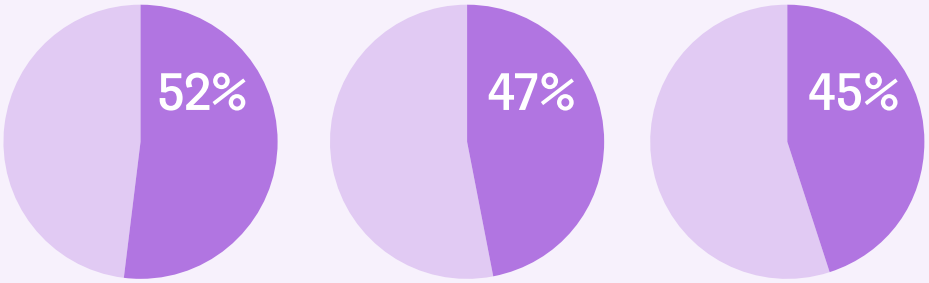
Generative AI and the future of library services

Opportunities and challenges in a changing technology environment

Ex Libris
Part of **Clarivate**

According to the 2024 Pulse of the Library report, over 60% of libraries are evaluating or planning for artificial intelligence integration, with 43% prioritizing AI-powered tools for patrons in the coming year. Key objectives include supporting student learning (52%), promoting research excellence (47%), and enhancing content discoverability (45%).

Libraries' key objectives for AI



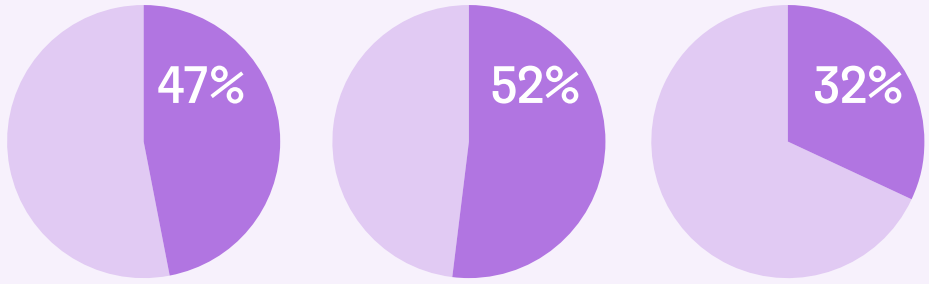
Supporting student research: **52%**

Promoting research excellence: **47%**

Enhancing content discoverability: **45%**

Despite this enthusiasm, librarians report significant hurdles. About 47% of respondents identified shrinking budgets as a primary concern, while 52% pointed to a skills gap, noting the need for upskilling in AI competencies. Additionally, 32% reported a lack of available training opportunities. These challenges emphasize the need for strategic planning and collaboration within the library community to effectively implement AI solutions.

Hurdles libraries face with AI integration



Shrinking budgets: **47%**

Upskilling staff: **52%**

Lack of training opportunities: **32%**

Libraries, long-standing stewards of knowledge, now face both the challenge and the opportunity to harness AI's potential. **The rise of Generative AI demands a reexamination of traditional practices, offering new avenues for discovery, automation, and personalized user experiences.** This shift is no longer theoretical: Academic AI is already integrated into library services through tools that are enhancing discovery processes and streamlining metadata management.

In this paper, we examine the quickly evolving state of Generative AI—its transformative capabilities, inherent risks and extraordinary potential. We also consider the impact of OpenAI's ChatGPT on user expectations and the way libraries manage, share and utilize data within trusted institutions and academic communities.

The emergence of Generative AI

Generative AI represents a significant leap in the evolution of artificial intelligence. Rather than merely identifying patterns in large volumes of data to recommend or assist, Generative AI is designed to generate new content or data.

OpenAI's introduction of ChatGPT in 2022 marked a watershed moment. With its accessible, simple user-friendly interface and context-aware conversational abilities, ChatGPT brought Generative AI to the masses. Any user could harness its capabilities according to their needs.

Generative AI's influence extends beyond content creation. **AI tools now play a critical role in transforming how users interact with information systems.** Conversational AI models are reshaping search and discovery processes, enabling users to pose natural language queries and receive contextually relevant responses. Unlike traditional keyword-based searches, these AI-driven systems can interpret the intent behind queries, offering more intuitive and personalized user experiences.

Growing educational optimism

While some concerns about plagiarism and student shortcuts continue, optimism about AI's potential in education continues to grow. In a recent study by Educause, **67% of respondents reported they are currently using Generative AI,** with an additional 13% anticipating future use. Higher education institutions are quickly adapting, providing AI guidelines, and integrating AI literacy into their curricula to promote responsible usage. Recent developments show that many educators are shifting from reactive restrictions to proactive integration of AI tools in learning environments. Institutions are focusing on AI literacy to teach students how to critically assess AI-generated content, improving information evaluation skills and fostering academic integrity. Additionally, AI is being utilized for adaptive learning technologies that personalize educational experiences based on individual student performance, creating dynamic feedback loops that support continuous learning.

For decades, the promise of education technology has been truly individualized learning, tailored to each student's background and skill set. Generative AI is beginning to deliver on that promise by enabling adaptive learning experiences that respond to individual needs. For educators, AI's ability to analyze and generate text supports automated grading beyond multiple-choice assessments, offering efficiencies in evaluating written work, providing feedback, and identifying learning gaps.

While challenges remain, the integration of Generative AI in education presents an opportunity to rethink traditional approaches, balancing innovation with the critical need for academic integrity and information literacy.

Benefits too significant to ignore

The consensus is that, for the foreseeable future, humans and AI will work in tandem to boost productivity, enhance decision-making, and drive innovation. In library environments, this partnership is already evident, with AI assisting in tasks such as resource discovery, metadata management, and personalized learning support while **librarians provide critical oversight, ethical guidance and domain expertise.**

The stakes are high for libraries. They are trusted sources of knowledge, offering access to high-quality, scholarly, and scientific data. That trust has been built over hundreds of years of standards that outline meticulous selection and indexing of collections, ensuring users engage with authoritative and reliable academic resources. To maintain that trust, libraries must harness AI's power responsibly. This involves not only adopting AI tools but also actively shaping how they are used, ensuring they align with core values of accuracy, inclusivity and academic integrity.

Choosing partners who understand and share traditional academic values is essential.

Clarivate's AI-based solutions provide users with intelligence grounded in trustworthy sources and embedded in academic workflows, reducing the risks of misinformation bias, and intellectual property abuse. These solutions are **built on a wealth of expertly curated content, a deep understanding of academic processes, and rigorous testing and validation.** Clarivate maintains close partnerships with the academic community to ensure AI governance is driven by academic principles and ethical standards.

Enhancing discovery and enriching user experiences

As we explore the possibilities of AI, we should never lose sight of our ultimate goal: to provide the best service to our users. AI is a means to that end, not an end in itself.

A transformational trend emerging from AI is conversational discovery, enabling users to interact with search tools through natural language queries. As patrons' continually look for faster, more intuitive ways to search and explore the vast array of content available, simple search can fall short, leading to frustration and underutilization of valuable resources.

Primo Research Assistant enhances the research experience by enabling users to search intuitively using natural language, making information retrieval more accessible and efficient. It provides narrated answers enriched with references and direct links to full-text sources, allowing for deeper engagement with scholarly materials. By uncovering fresh perspectives and new ideas, it helps users gain valuable insights while maximizing the use of the library's electronic collection. A notable advancement is the integration of Retrieval-Augmented Generation (RAG) technology, which ensures responses are grounded in trusted academic sources, significantly reducing the risk of AI-generated misinformation.

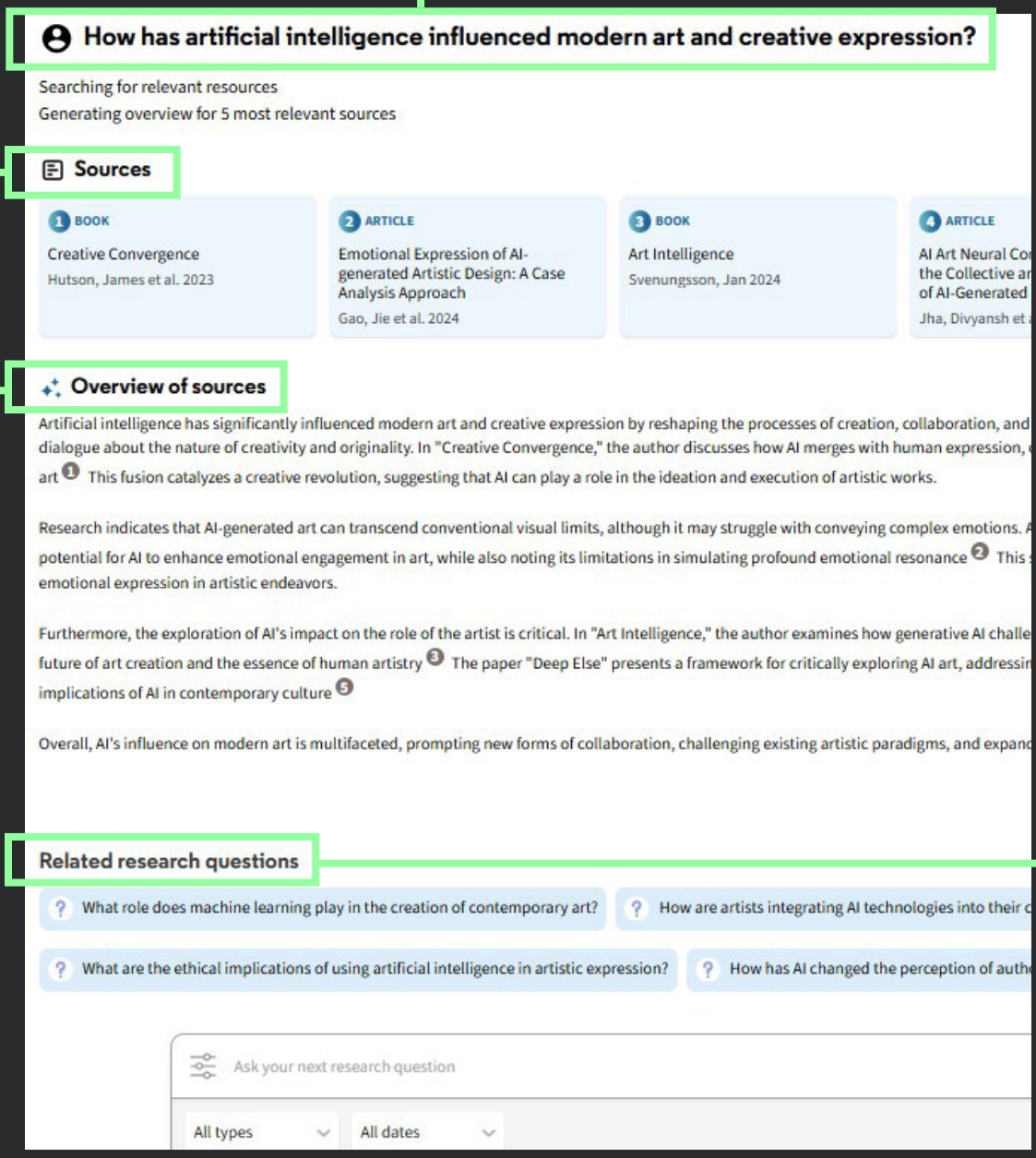
At the Universitat Oberta de Catalunya Library, librarians have experimented with Primo Research assistant and other AI tools to assess the impact they make on search and user experience. In just three months, library search adoption increased from 6.75% to 11.63% and user satisfaction increased to 83.7%.

Read their article and full infographic here

Incorporating academic AI into discovery workflows also improves glanceability, helping users quickly identify the most relevant resources. AI can generate concise, meaningful summaries, highlight key insights, and even suggest related materials, supporting more efficient research and deeper engagement.

Real-time AI-powered summaries and references based on Top 5 Abstracts

Semantic search/Natural language queries



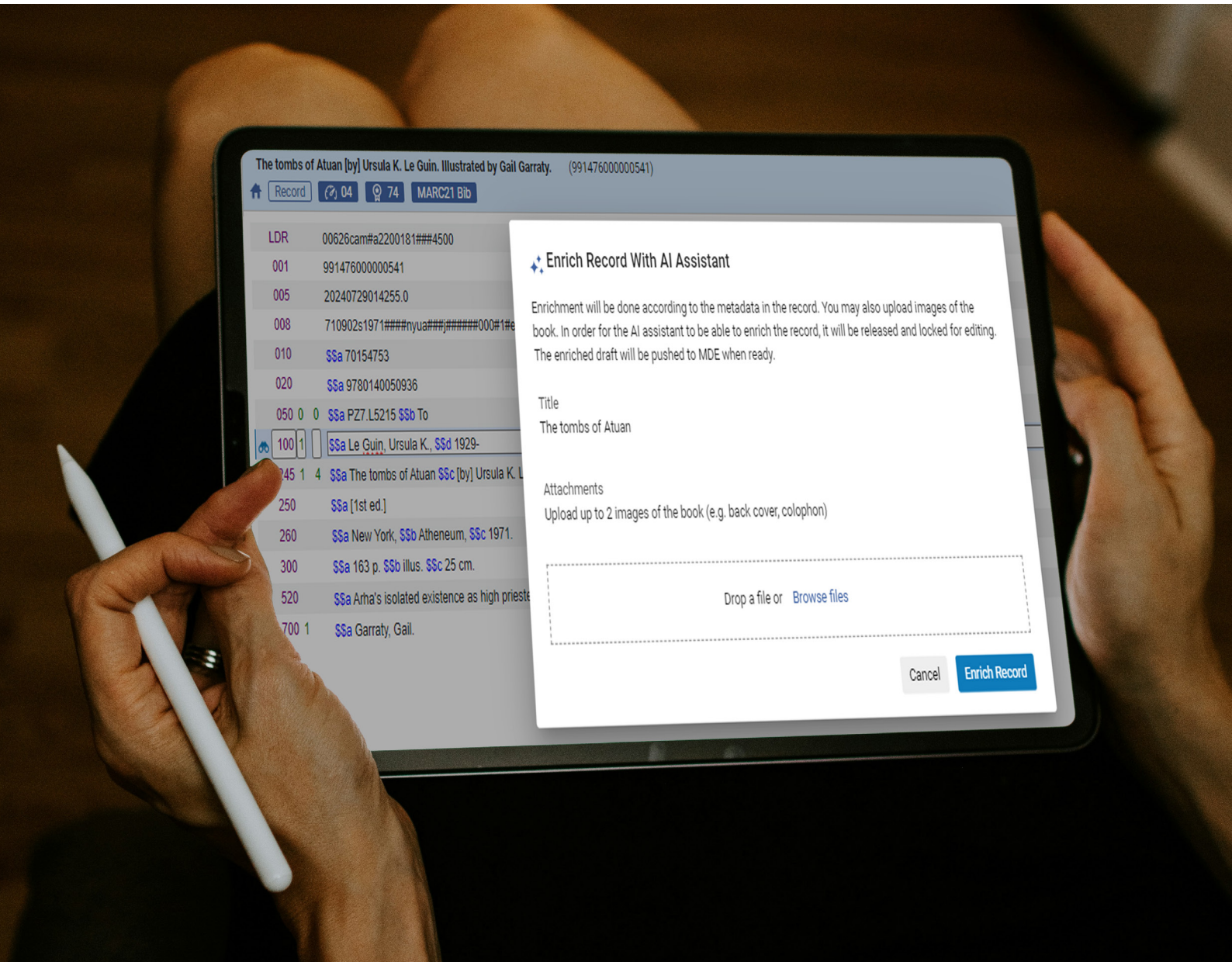
- Answers based on results found in the Central Discovery Index (CDI)
- Links to the full text
- Links to the full result in Primo

Search suggestions to help the user expand the topic and learn more about it

Solving metadata challenges

One notable advancement in the library sector is the significant progress of AI in metadata automation Beyond simple data tagging, AI can now generate rich, structured metadata, identify relationships between disparate content and even assist in curating collections. These capabilities not only **improve searchability but also reduce the manual workload for library staff,** allowing them to focus on more strategic tasks to support academic excellence at their institution.

Despite the rapidly changing technology landscape, metadata remains a fundamental aspect of content organization. The challenge, however, lies in the scale at which it must now operate. With content in numerous formats coming from varied sources, maintaining consistency and connectivity in metadata has become more important and challenging than ever before. **The ability to effectively manage and utilize metadata is critical in the efficient operation of large-scale discovery systems.**



Sustaining cataloging excellence through innovation, **the Alma Metadata Assistant cuts cataloging time while keeping librarians in control, without compromising professional standards.** This feature anchors libraries in their transition from manual operation to expert-guided automation, driven by a community-led vision. It embeds within the existing catalogers' workflow in the Alma Metadata Editor and can detect and correct inconsistencies, suggest contextually appropriate metadata, and improve the accuracy of resource classification. Human-in-the-loop systems play a crucial role in this process, ensuring that AI-generated metadata is validated by library professionals to maintain accuracy, context, and alignment with institutional standards. Effective management ensures users can easily find and access the information they need, supports academic and research activities, and enhances the overall user experience. It also integrates community feedback to ensure the tool evolves and meets the real-world needs of catalogers.

AI generated metadata enhancements provide more robust bibliographic information, making collections more discoverable to library users. This will support users in accessing relevant resources that support their learning goals and research areas, opening the way to exciting and often novel insights, knowledge and understanding – as well as potential increases in usage of library resources.

AI Metadata Generator – Enhancing bibliographic records at scale

The AI Metadata Generator enriches bibliographic records in the Alma Community Zone, using AI to add essential fields such as Library of Congress Subject Headings, Summaries and Language Tags. Currently enriching ProQuest Ebook Central titles, the tool automates the enrichment process, helping content providers save time and reduce costs while ensuring high-quality metadata for libraries.

Recent developments have expanded its capabilities to include context-aware metadata suggestions, which improve the accuracy of subject classifications and resource recommendations.

Ensuring every voice is heard

It's important to remember that AI is trained on data, and that data can reflect the biases of the society that created it. Addressing these biases requires proactive strategies, such as training AI models on diverse datasets and incorporating bias-detection mechanisms to identify and mitigate potential issues in real time. Additionally, recommending resources that present a range of perspectives helps promote a more balanced information landscape.

Emphasizing diversity not only enhances representation but also encourages interdisciplinary research and broader accessibility. By prioritizing works from underrepresented regions, cultures, or publishers, libraries can broaden their collections and foster a more inclusive and holistic learning environment. AI can assist in this process by identifying gaps in collections and suggesting materials that support diverse viewpoints, ensuring that discovery systems reflect the full spectrum of scholarly voices.

Equally important is the emphasis on ethical AI practices within library systems. AI tools are designed with mechanisms to ensure data privacy, safeguard user information, and maintain transparency in how recommendations are generated. Continuous user feedback loops help AI systems improve over time, allowing libraries to refine discovery experiences based on real-world usage and evolving academic needs.

As AI technologies continue to evolve, libraries have an opportunity to lead in shaping how these tools are integrated responsibly, with the goal of enhancing discovery, improving patron services, and reinforcing the library's role as a trusted hub for knowledge and learning.

Collaborating as a community

The impact of AI on education and society necessitates a collaborative approach. Standards, agreements, and best practices can emerge from the collective efforts of all stakeholders, including libraries, organizations and individuals. **Engaging with community-driven initiatives fosters knowledge-sharing and facilitates improvements based on real-world feedback.** The active participation of librarians, educators, researchers and technology experts ensures that AI applications in education are aligned with scholarly needs and values, leading to more responsible and effective implementation.

Recent advancements highlight the importance of cross-institutional collaboration in AI development. Libraries are increasingly partnering within their institutions and with technology providers, and research organizations to co-create AI solutions that address shared challenges. Collaborative frameworks improve AI tools through diverse perspectives and promote ethical practices and data governance standards across the broader library ecosystem.

> "The adoption of AI is likely to produce an impact and changes that go far beyond the local improvements that libraries may initially be looking for. In thinking through those impacts and changes and deliberating on how we can collectively ensure AI benefits the broad academic and library ecosystem in the manner that is ethical, responsible, equitable and sustainable, community forums can play an important role."

Bohyun Kim,
Associate University Librarian at the University of Michigan

Established in 2024, **Clarivate's AI Advisory Council plays a key role in guiding the ethical development and deployment of academic AI technologies, ensuring that these solutions align with academic values, support data integrity and reflect the varied perspectives of the global library community.** Comprising senior leaders from libraries and higher education from around the world, the council addresses opportunities and challenges by providing best practices, recommendations and guardrails.

The council's goals are:

- Collaborate to promote the responsible application of AI in academia.
- Develop guidelines for using AI to improve research and learning experiences.
- Establish best practices for testing and verifying AI-based services.
- Share knowledge and expertise from AI initiatives across the academic spectrum.
- Explore and prioritize AI use cases for teaching, learning, and research processes.

The application of AI in the research and higher education sector is an area of personal and professional interest for me. There's a world of opportunity in this space. A collaborative spirit between universities and our partners is critical for realizing the full potential of AI. "By emphasizing transparency, inclusivity, and community engagement, we can harness the power of Academic AI to enhance educational experiences, broaden access to knowledge, and foster a learning environment that reflects the diverse perspectives of our global community."

Josh Sendall,
Director of Library Services at the University of Leeds

Seizing opportunity

In the long run, the best-fit technology is one that improves processes, reduces administrative burdens, and frees up time for library staff to focus on activities that truly matter, such as advancing research, supporting learning outcomes, and increasing the impact and visibility of the library within the academic ecosystem.

Generative Academic AI represents an unprecedented opportunity. It's an opportunity to **improve library services and enhance user experiences, making the library's impact more identifiable and meaningful.** The question is no longer whether we should embrace AI. Rather, it is about how we can thoughtfully integrate AI technologies to best serve the evolving needs of our researchers and students. By helping its stakeholders think forward, libraries can play a pivotal role in shaping how academic AI advances teaching, learning and research, ultimately transforming the educational landscape for the better.

Preparing libraries for the future

Library management systems of the past were built to simply manage collections. Today, cloud-based solutions like Alma position libraries to better serve the evolving needs of the academic community. With academic AI-powered capabilities, Alma ensures that libraries are not just keeping up, but are future-ready, enabling more intelligent discovery, enhanced metadata management and optimized workflows. The academic AI in Alma is developed with its timeless, singular vision: support the librarian. With Alma, the human remains at the core of academic library operations, ensuring that AI serves as an enabler rather than a disruptor.

AI-driven library solutions are no longer optional; they are essential. **Institutions that embrace safe, responsibly-developed AI-powered library systems are investing in the future, ensuring their libraries remain relevant, responsive and equipped to meet the needs of students, researchers, and faculty.** Don't miss out. AI in Alma is shaping the academic library of tomorrow, today.

Transforming libraries with Academic AI

Watch this video **showcasing solutions that are leveraging generative Academic AI to move libraries forward – driving academic integrity, advancing student learning outcomes, and increasing institutional and staff productivity. Make sure you can safely and responsibly navigate this new landscape, driving research excellence and student learning outcomes.**

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