AI is revolutionizing higher education at all levels

From the classroom to the back offices, use of artificial intelligence is driving better outcomes and more efficient workflows.

According to a 2024 report from education software company Ellucian,

the use of artificial intelligence (AI) in higher education surged by 2.3 times over the past year,[1] with just 15% of teachers saying they weren't using the tool at all.

That surge will continue; 93% of higher ed leaders expect even more use over the next two years, and 75% of them believe that AI will play a key role in shaping the future of their institutions.

But it's not just the future that's being shaped by AI in higher ed. Today's administrative offices, classrooms, and research labs are being impacted by it, too. It's not hard to see why artificial intelligence is gaining ground in our institutions that build natural intelligence. AI can simplify complex topics for learners, increase accessibility to learning, streamline workflows, and allow teachers and institutions to focus more on students and less on the "other stuff." Many AI experts tout the technology's potential to transform education into a more

personalized learning experience and help educators become more efficient at their jobs. In the Ellucian survey, eight in 10 higher ed administrators stated that they expect AI to improve efficiency and productivity.

"This technology is going to transform society in ways other technologies haven't," says Western University's chief AI officer, Mark Daley. "It's being compared to the internet and the steam engine. Those are legitimate comparisons, but I think this is even bigger. I think this is more like the discovery of fire."

All of which is to say: AI is here to stay, and it's changing the way universities teach, research, and manage their business. You're going to want to get on board if you haven't already.

This eBook presents an in-depth examination of how AI is impacting higher ed to drive better instruction, more efficient management, and accelerated research.

Where AI is being used

The Ellucian study found that 62% of academic institutions are planning to implement AI in the processes within the next two years. AI is most frequently used in:

- External affairs (advancement, alumni relations, marketing): **77%**
- Data and analytics (institutional research and business intelligence): **63%**
- Executive leadership (presidents, chancellors, vice presidents): **62%**

Chapter 1

In the offices

Benefits in administration

Arizona State University

Arizona State University, one of the largest public universities in the United States, recently entered a collaboration with OpenAi to use ChatGPT to shape higher education learning, research, and the future of work. As part of this initiative, faculty and staff were invited to submit ideas for using AI to enhance student success, forge new avenues for innovative research, and streamline organizational processes.

Within weeks, the ASU team received proposals representing more than 80% of its schools and colleges. "We thought we'd get a few early adopters," says Lev Gonick, the university's chief information officer. "Our few adopters quickly became hundreds of faculty interested in using ChatGPT for research and in the classroom."[2]

The demand was so high that in March 2024, ASU initiated a second round of proposals that included student researchers. By July, ASU had received more than 400 proposals, with more than 200 projects activated across most of its departments and colleges.

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Western University

And in 2023, Western University in Ontario, Canada, appointed Daley as chief AI officer. He's establishing more than 30 pilot AI projects, including automating financial auditing processes and working with faculty to develop new courses in the humanities.

These are just two examples of universities incorporating AI into their environments. In an Intelligent survey from 2023, 82% of respondents said their institutions planned to fold AI into their admissions workflows in 2024.[3] Predictive analytics is the most popular AI function in admissions; a large majority believe analytics can help with enrollment, student success, advancement, and fundraising. Respondents in the Ellucian study were highly optimistic about AI's ability to create marketing materials, optimize course scheduling, and align curricula to workforce needs.

AI

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Streamlining and automating manual processes

Universities, like businesses, are discovering that repetitive tasks have been stealing significant chunks of time from employees. A UiPath survey found that employees lose about 4.5 hours weekly on routine, mundane work that could be automated.[4]

AI can do that automating. Quite a few AI tools, software, and plugins can take over straightforward, repetitive responsibilities, such as drafting and revising communications, entering data, transcribing audio, and automatically deploying paperwork after a student receives an acceptance notice.

By shifting these responsibilities to AI, higher ed institutions can reduce the cost of education administration by 20-30%[5] during a time when many schools, colleges, and universities are operating from smaller budgets.

Driving data-driven decisions

But AI isn't just about automating simple tasks. Its data analytics capabilities can help improve data-driven decision-making. Colleges and universities generate vast amounts of information but struggle to leverage it for real-world value. Often, this is because the data rests in siloed databases, its separation preventing any unified narrative.

In a Chronicle of Higher Education survey, 97% of college administrators believed that higher education needs to use data and analytics better to make strategic decisions.[6] An AI platform can unite and analyze real-time data from across the university and help teams gain new insights into student and finance outlooks.

For instance, traditional higher-ed financial planning methods rely on historical data and assumptions, which can lead to inaccuracies and limited predictive capabilities. By drawing on AI's predictive analytics to forecast future financial scenarios, however, the finance team can investigate historical financial data alongside external factors such as market trends, student behavior, and economic indicators. AI's algorithms can then identify hidden patterns, uncover non-linear relationships, and generate more accurate forecasts.

With AI automating data entry, consolidation, and analysis, finance teams can streamline operations and focus on exceptions. This ultimately saves valuable time and enhances the efficiency of financial processes.

All of this allows institutions to plan how to allocate resources best to create enhanced student outcomes and make informed decisions that optimize financial performance, mitigate risk, and support institutional goals.

Creating equitable applications and hiring processes

When the U.S. Supreme Court made its June 2023 ruling ending college admissions affirmative action, it left in its wake concerns about bias in higher ed admissions. AI can calm those concerns and facilitate holistic, equitable applications.

With AI, institutions can identify the demographic and behavioral traits that most closely align with their objectives. Factors like perseverance and empathy, though challenging to quantify, can be analyzed through this mapping of institutional and programmatic missions to specific variables, allowing machines to optimize the composition of diverse student cohorts. Allowing AI to evaluate applicants on multiple unique criteria—not just standard test scores or other numerical rankings—minimizes or eliminates the biases that can lead to a nondiverse student body.

This same approach can be brought to hiring; through AI's unbiased, character-targeted analysis, higher ed institutions can build stronger workforces inside and outside of the classroom.

Impacting the classroom

Even at the administrative level, AI can reach into classrooms.

By analyzing historical learner data, AI can provide valuable insights and inform decision-making processes in the classroom and eLearning environments. For example, AI's predictive analytics can optimize instructional design by analyzing learner data and performance outcomes. With that data, AI can identify learner patterns and trends to inform the design of instructional materials, course structures, or assessment strategies. Analyzing learners' interaction patterns and engagement can suggest content modifications that might enhance instructional materials or increase learners' engagement.

Executives are already embracing AI's capabilities to create operational efficiencies

Executive leadership is one of the top groups using AI. One study shows that 97% of higher ed vice president respondents used AI in the past few months, and 76% identified themselves as AI-forward or AI evangelists.[7]

Not just VPs but executives at every level are integrating AI into their institutional strategy — especially in plans to improve operational efficiency. With budgets at all-time lows, leadership, particularly at small and mid-size institutions, can draw on AI to replace outdated systems, consultants, and processes that the institution can no longer afford. This saves time while enhancing the leader's knowledge and decision-making.

Chapter 2

AI in the classroom

The benefits of AI for teachers

Perhaps paradoxically, the introduction of artificial intelligence allows education to become more human-focused. By taking advantage of AI tools, teachers can concentrate on the most essential part of their work—teaching students—rather than building a curriculum and grading assignments.

This is because AI can personalize the learning experience, support student success, and streamline teaching processes, leaving instructors with more time to work directly with learners and meet their needs.

Propelling personalized learning

"No two people learn in exactly the same way, and innovation has proven to be the most powerful asset that we have," says Michael M. Crow, President of Arizona State University, which recently partnered with OpenAI. "Essential to ASU's success is that we use technology, and now AI, to deliver lifelong learning and to drive human potential."

With AI, no two students need to learn the same way—and we're seeing the benefits of that in the classroom: A study by Knewton, an adaptive learning company, found that students using its AI-powered adaptive learning program improved their test scores by 62%.[8] Adaptive learning is a teaching method that uses data and technology to personalize the learning experience for each student.

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By leveraging algorithms to analyze vast amounts of learner data, such as preferences, behavior patterns, performance, and strengths and weaknesses, AI can generate customized recommendations, content, and instruction processes tailored to individual students—enabling this adaptive environment that students thrive in.

AI-enabled learning systems can increase student engagement by presenting content through different formats, such as videos, interactive simulations, or text-based materials, that better draw in and engross students. Enhancing this, AI can suggest supplementary resources and activities that correspond with the student's interest.

When students are in the thick of their assignments, AI can provide instantaneous feedback based on the student's responses. If there's a chatbot embedded in an institution's learning management system (LMS), students can use it to investigate a topic or concept further. The chatbot can also differentiate lessons for specific learners, which can be especially important for students with learning disabilities; those students can then draw on AI's text-to-speech ability and natural language process (NLP) to overcome barriers to education. By putting education in the form of a dialogue between the system and the student, AI can provide the tools that will help the student learn more efficiently.

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Tagging struggling students for proactive intervention

Importantly, teachers can use AI's predictive analytics to identify at-risk students—and get them the help they need before it's too late. Using data on student performance, engagement, environmental factors, and many other data points, predictive analytics can forecast future academic problems.

Then, AI-powered educational tools can facilitate additional support like practice exercises, remedy materials, or one-on-one tutoring. These forms of support are directed toward the individual student, which enhances the likelihood the student will understand and retain the information.

Automating tasks to free up teachers to engage with students

AI's capability to automate tasks like grading assignments—one study found that AI can reduce the time spent on grading work by 80%[9] —can free up teachers to meet student needs in real time instead of spending hours or days sourcing materials or writing assignments. They can craft individualizing learning experiences, create better learning tools, and improve access and accessibility—through things like multilingual support and assistive technology—that improve student retention.

AI platforms can help teachers diversify student assessments, including formative, normative, and ipsative evaluations. Then, they can use AI's predictive analytics to optimize instructional design and content delivery. In this way, AI analytics give teachers the tools to better understand learner preferences and performance, which will ultimately help them become more effective teachers.

AI applications for students and educators

- Developer tools
- Video collaboration
- Video Editing
- Text to image
- AI image indexing
- Music separation and voice to text
- Optimized LLMs
- Gesture controls
- 3D rendering
- Graphic design
- Video streaming
- Game upscaling
- Photo editing
- Personal assistant
- AI audio enhancement
- Data visualization

The powerful AI PCs for education that you, and students, need

Powered by Intel vPro,® an Intel® Evo™ Design with the latest Intel® Core Ultra processors, Lenovo's hardware and software to make collaboration in the classroom and outside of it seamless. The ThinkPad® X1 Carbon, running Windows 11 makes it easy for students and teachers to collaborate and stay productive with a strong, reliable connection.

POWERED BY Intel® Evo™ 13th Gen Intel® Core™ vPro® CPU, Lenovo ThinkSmart devices are built on the popular Microsoft Teams and Microsoft Teams Rooms platforms, so they can transform anywhere into a connected learning space with built-in ThinkShield security and ThinkSmart Manager. The Lenovo ThinkPad® X1 2-in-1 gives teachers and students the ultra-flexibility they want and need in a versatile, AI-ready laptop that's a tablet, sketchpad, and more.

Outside of the classroom, universities need to give students access to a high-powered AI PCs that will allow them to engage in esports, a rising sport in the United States. Playing video games holds a significant place in the lives of many teens—90% of adolescents play video games.[10] Esports is a way to engage students who weren't participating in traditional before- or after-school activities. By embracing gaming, universities are not only catering to the interests of a new generation of students but also providing them with valuable skills and opportunities.

Data shows that esports students are more likely to pursue STEM fields, with 62% of League of Legends players in Riot Games leagues being STEM majors,[11] for example. This means that, while they're playing the sport, they're preparing for the future.

Slow-performing devices that freeze up at critical minutes, though, will frustrate players and lead them to give up the sport. So it's vital that students have access to high-performing PCs that allow them to keep up with the competition in the competitive arena.

That's where Intel vPro® for Educators can come in. Intel vPro® is a platform that offers laptops and other devices with built-in security and manageability features for educational use. The devices feature:

- Maximum performance: Intel vPro® devices are designed for performance and can handle complex tasks.
- Hardware-based security: Intel vPro® devices have built-in security features.
- Remote management: IT administrators can remotely log in to and manage devices, even if the operating system fails. This can help reduce downtime and save time on-site service.

Intel support for students and instructors

Intel's Academia and Community Programs prepare students for the future—while enhancing instruction. These programs connect the key pillars of the ecosystem—students, educators, researchers, and developers—to drive innovation that runs the engines of tomorrow.

- **Academic Resources for Edge & IoT**: With the right lesson plans and activities, the curriculum could ignite the next generation of digital world-builders. Intel's collection of free tools and instruction aids to create a course that showcases the latest in AI inference for IoT.
- **Educator Program**: Shape the future of heterogeneous computing with educational resources for software educators around the world. Quickly and efficiently integrate these industry-shaping concepts into appropriate university STEM courses.
- **Introduction to Intel® Distribution of OpenVINO™ Toolkit**: A course that introduces the AI algorithms and framework in the Intel® Distribution of OpenVINO™ toolkit, which is used to solve complex problems.
- **SYCL* Programming for Accelerated Computing**: An introductory course that explores the challenges of heterogeneous computing. Throughout the 11 modules, students learn how to use the SYCL* programming language and how it can target different types of accelerator devices like CPUs, GPUs, and FPGAs.
- **Intel® FPGA Academic Program**: Specifically for use in university-level courses, this material includes tutorials, lab exercises, IP cores, example systems, and software, designed for the Terasic DE-Series boards.
- **Intel® Digital Readiness Programs**: Intel® Digital Readiness Programs empower the non-technical audiences with the appropriate skill sets, mindsets, toolsets, and opportunities to use technology impactfully and responsibly in the AI-fueled world.

Chapter 3

AI in the lab

Benefits for research

"Now is the most exciting time to be a researcher," says Shwetak Patel, director of Google's health technologies and an endowed professor of computing and electrical engineering at the University of Washington.[12] His statement is accurate because the breadth of AI tools available to researchers has accelerated research in recent years.[13]

An Oxford University Press survey found that 76% of respondents used an AI tool when conducting their research.[14] Translation machines and chatbots were the most popular tools, followed by AI-powered research tools or search engines.

Accelerating research every step of the way

AI holds potential benefits for research at all stages.

Administrative staff can use it to automate tedious tasks, freeing them up to be where they need to be when they need to be to further the research process.

Researchers can use it for nearly every phase of research, from brainstorming ideas and background research through publication. The first daunting step of any research involves assimilating and integrating a universe of existing literature into a coherent framework. AI tools can significantly simplify this process by finding relevant studies in a fraction of the time. Platforms like Elicit, Consensus, and Inciteful can act as scholarly concierges that curate a customized repository to assist with literature review so scientists can focus on analysis rather than background data collection.

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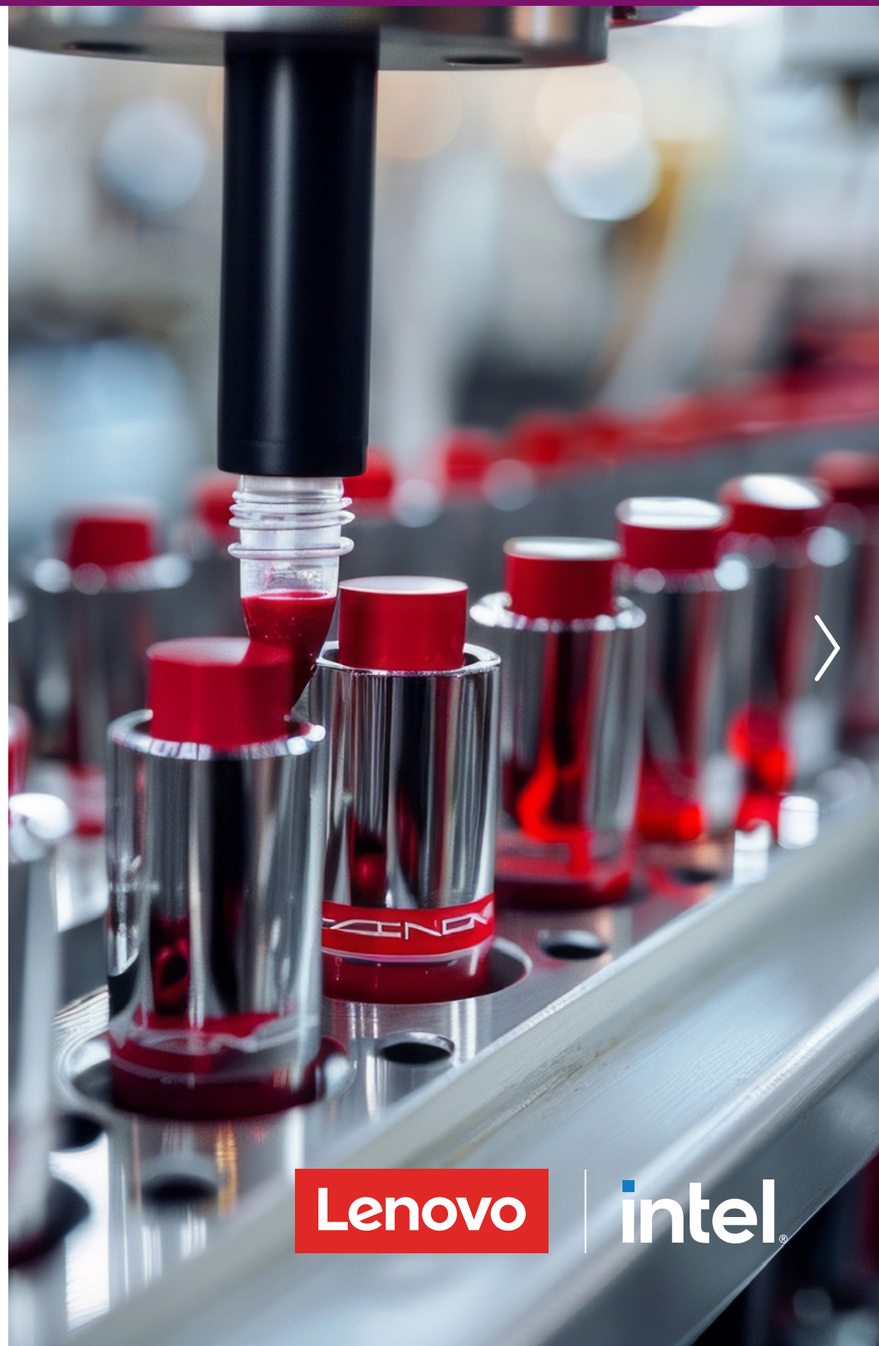
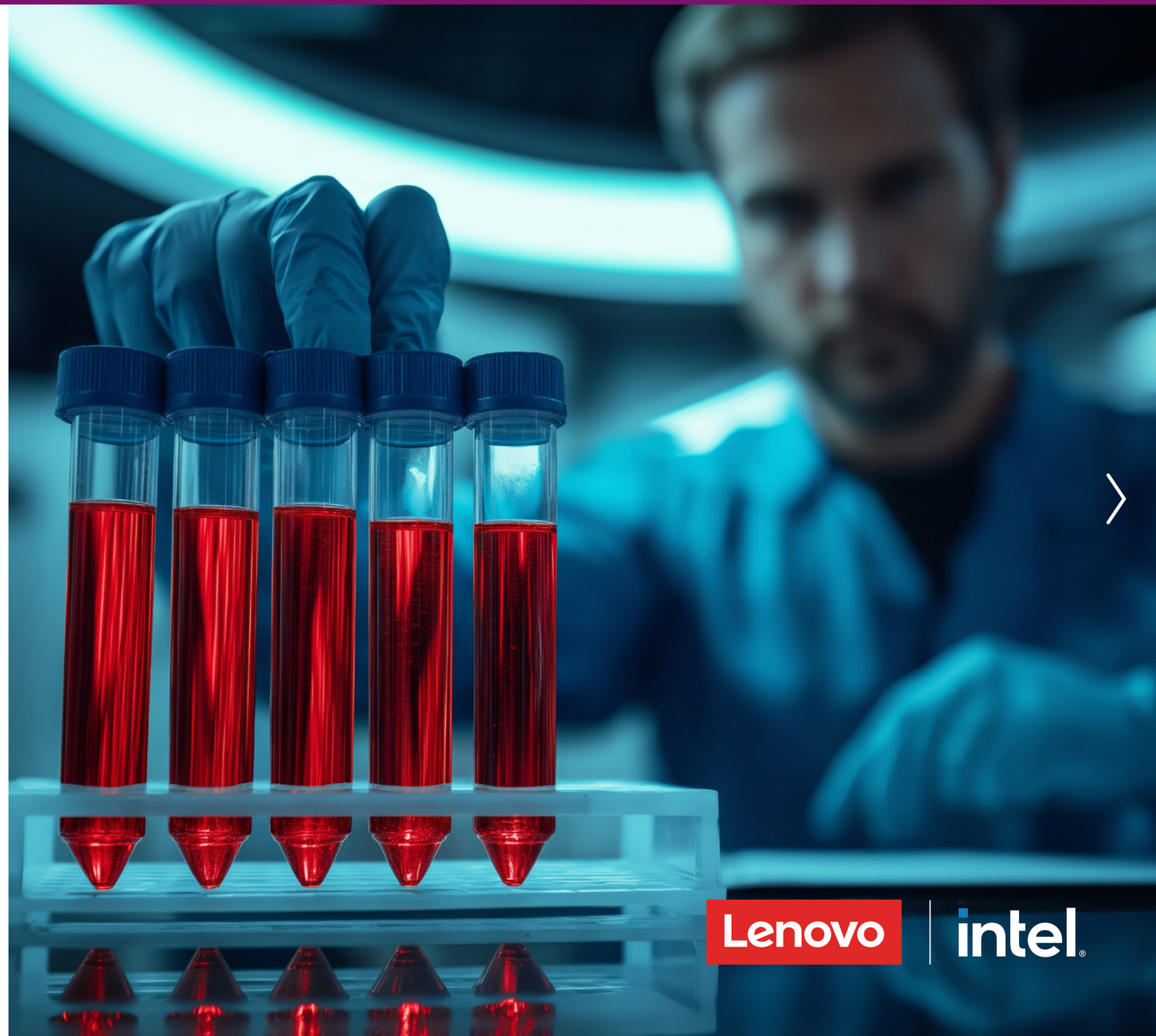


AI-powered engines can highlight overlooked or underexplored study areas that are ripe for research. Litmaps allows researchers to visualize the relationships between different papers in literature review and find derivative work of others.

Then, there are AI tools that make lengthy articles more digestible by creating succinct summaries, saving time while providing clarity into the article's content. Meanwhile, other AI platforms can help generate a preliminary literature review.

AI can even assist in formulating focused research questions based on current knowledge and help with study design and methodology. Then, during the research, it can analyze large datasets more efficiently, identify patterns and insights previously difficult to uncover, and automate repetitive tasks. It can uncover potential biases in data, patterns, and trends and bring the data to life; tools like Julius and GPT-4's Advanced Data Analysis can autonomously analyze and visualize complex datasets, revealing hidden patterns that can guide further research.



Streamlining the publication processs

When the research is complete, AI can even help researchers get their discoveries out into the academic world. Apps like MirrorThink can help scholars scrutinize papers, verify questionable assertions, and safeguard academic integrity.

It can even streamline the process of annotating documents, formatting reference lists, and generating infographics. AI-driven peer review platforms can provide constructive feedback to ensure the work resonates with academic communities.

All of these AI-powered efficiencies and processes empower researchers to conduct deeper and more complex investigations.

Intel's Centers of Excellence

Part of Intel's Academia and Community Programs, AI and oneAPI Centers of Excellence play a pivotal role in advancing open accelerated computing by spurring the next wave of innovation through open standards, collaboration, and ecosystem support. They primarily focus on pioneering open, standards-based, cross-architecture, unified programming models. Guided by leading figures in academia and industry, these centers accelerate the adoption of AI and oneAPI by fostering open source code bases, curriculum development, and the expansion of the AI and oneAPI ecosystem initiative.

Some of the world's most prestigious universities and organizations are now integral to the AI and oneAPI academic community and oneAPI Centers of Excellence.

In a data-rich, time-poor world, researchers need to be flexible and at the forefront with their technology. Subscription-based models like Lenovo Device-as-a-Service (DaaS) and TruScale infrastructure solutions let them stay agile in a changing landscape.

Lenovo's solutions powered by Intel for the Internet of Things (IoT) and mobility, all of which are made smarter by AI, help them capture and stream millions of data points to build the big datasets researchers need for deep research. Meanwhile, Lenovo's scalable storage, cloud computing and end-to-end security solutions rise to the challenge of ensuring data remains secure yet accessible on demand from anywhere. And Lenovo's Analytics & AI solutions help researchers uncover insights fast enough to keep research at the vanguard. The only data center CPU with built-in AI acceleration, 3rd Gen Intel® Xeon® Scalable processors enable faster time to solution. For researchers, that means faster solutions and more data analysis with less hassle.

Conclusion

A way forward in the AI world

Lenovo + Intel is your trusted partner for higher education security

Higher education IT professionals rely on Lenovo powered by Intel for smarter devices, expertise, and services tailored to meet the ever-increasing needs of the institution:

- Unmatched built-in security with Lenovo ThinkShield, Intel® Hardware Shield, and Windows 11 Pro
- Windows 11 is the most secure Windows yet with multiple layers of protection
- High-performance devices perfect for training LLMs, like the Lenovo ThinkStation PX powered by 4th Gen Intel® Xeon® Scalable processors
- Close partnerships and a thorough reference architecture to enable secure, private, on-premises implementation of generative AI
- Expert contract and compliance management
- Multiple US government certifications for public-sector partnerships and device durability
- Rigorous supply chain transparency from R&D on up
- Extensive support and service options for the entire lifecycle of your devices and solutions

Despite some hesitation, artificial intelligence is here to stay in higher education. And that's a good thing; it's evolving how lessons are taught, institutions are run, and research is conducted for the better.

Meeting this new AI-driven world requires the right tools, like those Lenovo + Intel offer. Each device comes with Windows 11, which provides the tools to accelerate learning and enable productivity, security, and AI readiness for students and staff.

Lenovo's ThinkShield security is a unique approach that covers every component and every supplier. Smart solutions allow institutions to create collaborative and connected environments with practical solutions for hybrid learning. Lenovo TruScale DaaS is a fully managed subscription-based model that gives institutions a cost-effective way to offer faculty, staff, and students a complete portfolio of devices and software with built-in security.

When making a large-scale device purchase for your academic institution, you want confidence that your selection will support the diverse needs of your students, faculty, and IT staff—today and in the future. Ensuring whatever device you select is based on a secure, proven, and stable platform is paramount. Intel vPro® is a holistic PC platform that can help to deliver the most performance for your school. Superior performance enables seamless multitasking, productivity, and collaboration. Integrated, hardware-based, multilayer security technologies help protect your students, faculty, and staff. Modern manageability tools make PC fleet management easier for your IT teams.

When you think of an AI-powered campus, think of Lenovo powered by Intel processors

Checklist

Where can AI work across your instructional lifecycle:

- ☐ In administrative offices
- ☐ In labs
- ☐ With on-the-go executives and directors
- ☐ With teachers, in-class and out-of-class for hybrid learning
- ☐ In the LMS
- ☐ In admission processes, in-person and online
- ☐ In recruiting and outreach offices
- ☐ In athletic offices
- ☐ In scheduling processes, in-person and online
- ☐ In student advising
- ☐ In residential housing processes, in-person and online

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