ORACLE

Higher Education & Research Industry Viewpoints

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Introduction

In this ebook, we'll explore the disruptive new technologies transforming higher education, and the new models being adopted across administration, learning, and research. We'll discuss how student expectations and demographics are changing, and how new fiscal realities put institutions under pressure. We'll examine the crucial role of research and discuss how cloud transformation can help both educators and administrators prepare for the challenges ahead—and explore the opportunities that come their way.

With a competitive market, performance-based funding, and tighter budgets to contend with, institutions must seek increasingly efficient, cost-effective ways to deliver world-class education and empower groundbreaking research.

Chapter 1

Digital Disruption

1

The classroom, the lab, and the back office have transformed almost beyond recognition. The rapid influx of new technologies is driving digital transformation in almost every industry, touching almost every aspect of our lives. These technologies are helping higher education institutions enhance campus-wide student and faculty experiences and open up new revenue streams.

Here are some of the groundbreaking technologies changing the face of higher education and research.

> Imagine lifelong learning companions powered by AI that can accompany and support individual learners throughout their studies—in and beyond school—or new forms of assessment that measure learning while it is taking place, shaping the learning experience in real time."
>
> - Nicole Engelbert, Director of Research and Analysis. 'Intelligence Will Transform Student Information Systems', Ovum, October 2017

New technologies, new teaching models

Artificial intelligence (AI)

Artificial intelligence is exactly as it sounds—an intelligent tool capable of learning on its own, processing data, and developing a measured response. In higher education, AI has the ability to enhance business processes and deliver more seamless experiences for students, staff, and faculty. It can foster groundbreaking research, enhance in-class teaching, and enrich student experiences like never before—anticipating each student's unique needs, illuminating their personal path forward, and empowering them to succeed.

Machine learning

Machine learning is one of many potential applications of artificial intelligence. Effectively, it involves 'training' a computer by providing it with vast quantities of data until it 'learns' correct responses by identifying patterns.

The ability of machine learning to spot such patterns in large data sets—and with far greater accuracy and reliability than humans—makes it an ideal educational tool, empowering virtual assistants to assess student performance and suggest future actions.

Chatbots

Chatbots, and virtual assistants—created by Oracle within Student Management—can engage directly with students, answering questions on enrolment, class choices, accommodation, and much more. These virtual assistants use adaptive intelligence and machine learning capabilities to become both proactive and reactive in creating a personalised, supportive environment for students.

All higher education institutions could benefit from Luci's capabilities, but she perhaps promises the most value for those institutions with extremely high advisor-to-student ratios, such as large Universities or TAFEs.

Luci can free the advisor from mundane tasks – answering questions about curriculum offerings or major requirements – allowing them to provide more focused, higher-level interactions with the students who need the assistance.

With Luci, Oracle is expanding the ways in which institutions can enable further personalisation in the student learning environment and increase efficiency in their business processes.

> Adaptive intelligent virtual assistants can "free the advisor from mundane tasks – answering questions about curriculum offerings or major requirements – allowing them to provide more focused, higher-level interactions with the students who need the assistance."
>
> - Dr. Joyce Kim, Analyst. 'Oracle Increases Educational Accessibility and Enhances Student Success', Ovum, October 2017

New technologies, new teaching models

Adaptive learning

Adaptive learning can deliver real-time, value-added experiences and analyse student responses to provide unique feedback and resources. It aims to transform the learner from a passive to an active participant, prompting students to assess their own learning experiences and providing tailored educational material accordingly.

Mobile learning

Mobile learning enables students to learn anywhere, at any time, and gain new skills specific to their needs at the time of their choosing. It helps to democratise the learning experience, delivering education beyond the classroom and enabling students in remote areas to access a higher standard of learning.

Mobile platforms can unify interactions and deliver micro-personalised student experiences. A student lifecycle management solution will help higher education institutions recruit the right students onto the right courses in the right numbers, while smoothing the entire lifecycle—including admissions, enrolment, and assessments.

Wearable tech

Augmented reality (AR) and virtual reality (VR)-enabled headsets and other wearable technologies are transforming how learning can be delivered. They're capable of providing immersive 3D experiences to offer engaging, guided learning wherever required.

For researchers, VR-enabled wearable tech is a fantastic opportunity to learn, experiment, and test hypotheses in an entirely risk-free environment.

Mobile analytics can be used to create campus communications tailored to resonate with particular audiences—whether students, faculty and staff, or alumni. More relevant communications help optimise campus operations—improving students' campus experiences and sense of community.

Wearable tech can empower students to interact with—and potentially better understand—intangible subjects, allowing them to visualise and experience learning material in entirely new ways. Instead of being told about human biology, or reading about it in a textbook, students can now go on a virtual 'tour' of the most complex systems, aiding comprehension.

> An annual survey conducted in 2016 by the Campus Computing Project found that 96% of higher education CIOs agreed that adaptive learning technology shows great promise for improving learning outcomes."
>
> - NMC Horizon Report: 2017 Higher Education Edition

New technologies, new teaching models

Cloud

Cloud's agility is the driving force behind technological transformation. It enables higher education institutions to embark on disruption projects at a convenient pace, instead of taking a complete rip and replace approach, that may take two or three years—and fall behind technology or business needs. Any project that fails to deliver results can be discarded with minimal cost and risk and replaced. For administrators, cloud solutions offer: lower IT costs, simple, scalable data storage, mobile learning, and the compute power for tools such as AI and VR.

Oracle Higher Education Cloud

Meet the demands of today's modern students, faculty, and staff by delivering social and collaborative experiences, identifying top talent, and increasing campus-wide productivity.

- **Mobile and engaging**—make it easy for everyone to use, on every device.
- **Social and collaborative**—integrate social capabilities institution-wide.
- **Insightful**—provide actionable insights for key constituents.
- **Extensible**—tailor and extend your cloud with optimal flexibility.

Blockchain

Blockchain is a true game-changer: reliable, effectively tamperproof, and secure. It removes the 'third party' element from digital transactions, underpinning cryptocurrencies like Bitcoin.

For higher education and research, blockchain promises to help solve challenges such as credential and degree verification. In a blockchain, credentials can be checked and validated more effectively than in a paper filing system—helping to protect the value and validity of higher education.

Chapter 2

Empowering Student Success

2

So, digitalisation is transforming higher education and research. But it isn't the only transformative influence. Institutions must adapt to a new breed of student: lifelong learners from all backgrounds, digital natives and digital 'newcomers', international and non-traditional student populations. They must adapt to new student expectations—many students value applicable skills over credentials, and expect a consumer-like experience. Institutions must also adapt to a changing workplace, where today's students will confront tomorrow's challenges, and forge careers in jobs that don't yet exist.

And they must achieve all this while modernising their administrative and academic operations, securing performance-based funding, and ensuring fiscal sustainability.

Student expectations, student experiences

Those entering higher education today take consumer-like experiences for granted. They receive them from their banks, from utilities suppliers, from transportation—why shouldn't they receive them from Universities or TAFE's?

Today's students want to learn at their own pace and have the necessary materials at their fingertips wherever they are, whenever they need them. They expect their institution to provide them with the knowledge and skills to succeed in their career—even if that career is yet to be imagined.

And above all, students expect value from higher education. They're spending more than ever on higher learning, and demand value for money. Increasingly, they're realising that the skills they develop at University or TAFE are far more valuable than the qualifications themselves.

> "There is a growing focus on the student experience in higher education, driven by an increasing emphasis on student success and scrutiny on educational outcomes."
>
> - Gartner, "The Future of the Student Experience is Personal", Glenda Morgan, April 25 2017

Micro-Personalisation

Higher education institutions face fierce competition. To remain relevant, they must deliver engaging, responsive, insightful personal experiences throughout the student lifecycle. Education is no longer a case of 'one size fits all'. Increasing numbers of non-traditional and international students and the contrast between those re-skilling for the new world of work and digital natives eager to learn in exciting new ways mean institutions must cater to all demographics. Individualised learning has become essential.

To deliver superior personalised experiences, student information systems (SISs) are evolving into student lifecycle management systems (SLMs), which blend and harmonise student experience management with traditional administrative transactions: class choices, timetables, funding, advising, fees, and so on.

> **Next Generation Student Management**
> While the diverse requirements and configurations of these non-traditional educational models are difficult to support in most conventional SISs, Student Management provides flexible, extensible, and integrative capabilities, according to each institution's user-defined needs.

> A personalised, integrated and coherent student experience will become a key differentiator for higher education institutions, and CIOs need to start building the strategies and infrastructures to make this happen."
>
> - Gartner, "The Future of the Student Experience is Personal", Glenda Morgan, April 25 2017

Changing fiscal realities

Increasingly, higher education and research funding is distributed based on performance. It's a measure that has increased the pressure on institutions—pressure to deliver exceptional learning and ensure outstanding student outcomes. Money talks. And in an environment where every institution must battle for funding, administrators must modernise their academic and administrative operations to run as efficiently as possible.

Student performance is directly linked to fiscal realities. So once enroled, it's crucial that students stay on their path to success. By harnessing the deep insights offered by big data and AI, institutions can identify at-risk students and micro-personalise experiences to more effectively keep them on track. And if a student's success becomes at risk, campus leaders can quickly intervene with personalised tactics to bring them back on the path to success.

> **Creating a modern campus advantage**
> With Oracle Higher Education Cloud, institutions can offer support throughout the student journey, utilising technology solutions to improve outcomes and power the entire student lifecycle. Social and mobile cloud tools offer further advancement to engage constituents.

Chapter 3

Accelerating Research

3

Research has always been a core mission of higher education. It brings additional prestige and credibility to institutions, attracts funding, and furthers human understanding in some of our most crucial fields.

But while research is now more crucial than ever, it's never been more complex to conduct.

Research challenges

There are numerous complicating factors standing in the way of meaningful research. Collaboration between interdisciplinary teams and amongst global contributors, uber data sets with millions or even billions of data points, intellectual property protection, commercialisation, and monetisation are just a few of these.

Couple these challenges with growing competition for the best faculty, principle investigators, and staff, and it's clear that institutions have a battle on their hands to enable and deliver leading research projects. Institutions must adopt a data-driven culture, with cloud architecture capable of combining data from any source—enhancing decision support through data visualisation and empowering collaboration with enhanced clarity.

> Research information and the context of research projects are being held in numerous systems run by different organisational units, which often use different formats and data models for storing this information. For this reason, it becomes difficult, if not impossible, to combine, aggregate, or integrate this rich information to serve specific institutional requirements."

- Misheck Nyirenda, Durban University of Technology

The importance of research

Despite these challenges, research remains of vital importance to higher education institutions. Research is intrinsically tied to institutional ranking and prestige, affecting future funding and recruitment. And it's a self-perpetuating cycle—the best students, educators, and researchers are attracted to those institutions with the finest reputation for research, leading to more pioneering research, leading to greater funding and more effective recruitment, et cetera ad infinitum...

Cloud-enabled institutions can unlock the digitally-enhanced potential of a whole new generation of pupils. In the cloud, researchers can access the high-performance technologies they need—including comprehensive compute, storage, integration, security, big data, advanced analytics, the internet of things, mobile, and more.

> Oracle's range of innovative cloud solutions enable researchers to access the high-performance technologies they need. Only Oracle offers the full stack of compute, storage, integration, security, big data, advanced analytics, mobile and IoT solutions, and only Oracle can provide an enterprise cloud solution for administration and research.

Chapter 4

Cloud is the Destination

4

For higher education, cloud is no longer the next step—the time to act is now. Institutions need to stop waiting and begin their cloud transformation—if they haven't done so already. Many institutions are already modernising, moving to the cloud to deliver more engaging, personalised experiences, empower innovation, enable research at scale, and gain competitive advantage. Laggards are likely to fall behind.

The benefits of cloud transformation for higher education and reaearch are numerous.

> 81 percent of higher ed IT leaders or professionals said their institutions would be increasing spending on cloud computing in 2017. Today, 39 percent of apps are cloud-based. By 2021, it could be closer to 62 percent."
>
> - Higher Ed Cloud Adoption on the Rise, Campus Technology, 2016

Modernising education

To survive and thrive in a volatile competitive landscape, higher education institutions must modernise their educational offerings, how the engage with students, and their research capabilities. They must develop the ability to enrol students in a variety of ways in order to achieve their enrolment objectives. And they need to adopt flexible learning paths to effectively define, monitor, and report on student progress.

Only Oracle Higher Education Cloud offers the flexibility and scalability to modernise education as student and fiscal demands dictate.

> The primary drivers for cloud adoption: cost savings, increased flexibility, scalability, and speed. 71 percent reported that they've seen cuts in application costs with their moves to cloud-based computing."
>
> - Higher Ed Cloud Adoption on the Rise, Campus Technology, 2016

Delivering personalised experiences

Student-centric cloud solutions like Oracle Student Cloud can be used as a hub for financial aid, payment, class selection, enrollment, and registration management. They provide sophisticated social and interactive engagement capabilities to deliver the over-the-top student experiences now seen as the norm.

By embedding AI and analytics into an institution's IT, student cloud solutions can drive personalized services and enhance the user experience. Users also gain the freedom to rapidly respond through social and mobile channels.

Empowering students with accellerated insights

Many institutions lack the capacity for a data-driven culture beyond their research efforts—particularly as it impacts the business. Student-centric cloud solutions like Oracle Student Cloud empower users to explore data in context, allowing them to base their decisions on facts—not hunches.

Administrators can see patterns in the data and use them to identify any at-risk students, enabling timely interventions to get them back on track. Big data and AI help provide recommendations and proactive guidance, enhancing student success by helping them graduate on time—and at a lower cost.

Enabling research at scale

Cloud-enabled institutions can unlock the digitally-enhanced potential of a whole new generation of pupils. Oracle is the only company that can provide an enterprise solution for both cloud and research. Our range of innovative cloud solutions can help researchers access the high-performance technologies they need—including comprehensive compute, storage, integration, security, big data, advanced analytics, internet-of-things, mobile, and more.

It's time to begin your cloud journey, and reap the benefits of cloud transformation.

Chapter 5

The Latest News and Updates

To keep up with changeable student expectations, assess new research priorities, and contend with demanding fiscal realities, you'll need all the insights and information available to you. But it's impossible to read everything. That's why we've hand-picked a selection of links to provide you with the best information and opinions on the hottest topics in higher education and research.

Oracle transforms the student experience with Oracle Student Cloud

Discover how Oracle has equipped higher education institutions with the tools they need to deliver data-driven, consumer-like, personal experiences for the lifelong student. By offering a student-centric lifecycle management system, you can anticipate the needs of your students, illuminate the right path, and empower them to succeed.

Read the full article and find out more about the future of student experience.

Read article

College 'back to school' prep offers glimpse into the future

As smart devices become the norm for digitally-savvy students, higher education institutions must deliver consumer-like, always-on experiences in order to stay relevant.

Read the article and discover how social media and cloud can deliver next-level student experiences.

Read article

The cloud goes to college to control higher education costs

Many students leave higher education with an education-related debt. New fiscal realities are squeezing institutions' budgets tighter than ever, and higher education must deliver the best quality of education at the greatest possible value.

To combat these budgetary woes, higher education is increasingly looking to the cloud.

Read the article and find out how cloud can revolutionise education and deliver unparalleled value for money.

Read article

Chapter 6

Customer stories

6

> Oracle has supported us with robust database technology over the past 15 years. The new environment enables us to proactively service administrative staff, researchers, and students alike with state-of-the-art technology at an affordable cost—preparing us for the future."
>
> - Jack Groot, Senior Database Administrator, Wageningen University and Research Centre

> SUNY is dedicated to continually innovating to deliver the best learning experiences for our students and modern, efficient services for our staff. We are excited to stand up the Oracle Cloud at the State University of New York (SUNY) Information Technology Center (ITEC) and provide a public cloud experience within the SUNY Private Cloud."
>
> - Mike Notarius, CIO, State University of New York Information Technology Exchange Center (ITEC).

A new cloud environment

Wageningen University and Research Centre focusses on exploring the potential of nature to improve human quality of life. This work relies on the combined efforts of specialised research institutes and the university itself to make scientific breakthroughs that can quickly be put into practice.

The university needed to find a database architecture that would support back-office functions such as finance and student admin, while also providing targeted database services for scientific researchers. The solution? Oracle Database 12c. Designed for the cloud, Oracle Database 12c offers cost-effective database services to admin staff and researchers in a private cloud environment.

Read the case study

Nimble compute power

Increased demand for data-driven research means high-performance computing has become essential to many fields of study at Penn State university. In an ideal world, experts would enjoy simple interdisciplinary collaboration—enabling the research necessary to find innovative solutions. But as this type of work often generates sensitive workloads, there's also a growing requirement for better security.

To get the nimble compute power it needs, the university has been testing different cloud solutions. Oracle Cloud Infrastructure is helping the university extend its data centre footprint into the cloud, delivering an option to run workloads on bare metal when low-latency communications are vital.

Read the case study

A powerful, modern research platform

Nara Institute of Science and Technology (NAIST) is Japan's premier research university, offering graduate courses in information science, biological sciences, and materials science.

NAIST was looking for a way to centralise its Hadoop-based file systems and provide a high-performance, secure, and flexible cloud-based information processing platform. With Oracle solutions, the university secured a powerful integrated information processing environment that meets its business requirement for a research platform academics and students could rely on.

Read the case study

Modernising the learning experience

The State University of New York (SUNY) is the largest comprehensive university system in the US. It has 64 institutions and more than 1.3 million students within its digital remit.

The university needed to digitally transform its IT infrastructure while meeting stringent data regulations and improving services to staff, faculty, students, and researchers. State mandates and regulatory concerns meant that any cloud solution the university chose would have to sit behind a firewall—yet still offer the modern capabilities of a public cloud.

SUNY selected Oracle Cloud Machine, enabling innovation in the cloud while keeping data secure behind the university's firewall.

Read the case study

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