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LIVE EDUCATION: TOWARD LIFELONG AND PURPOSEFUL LEARNING

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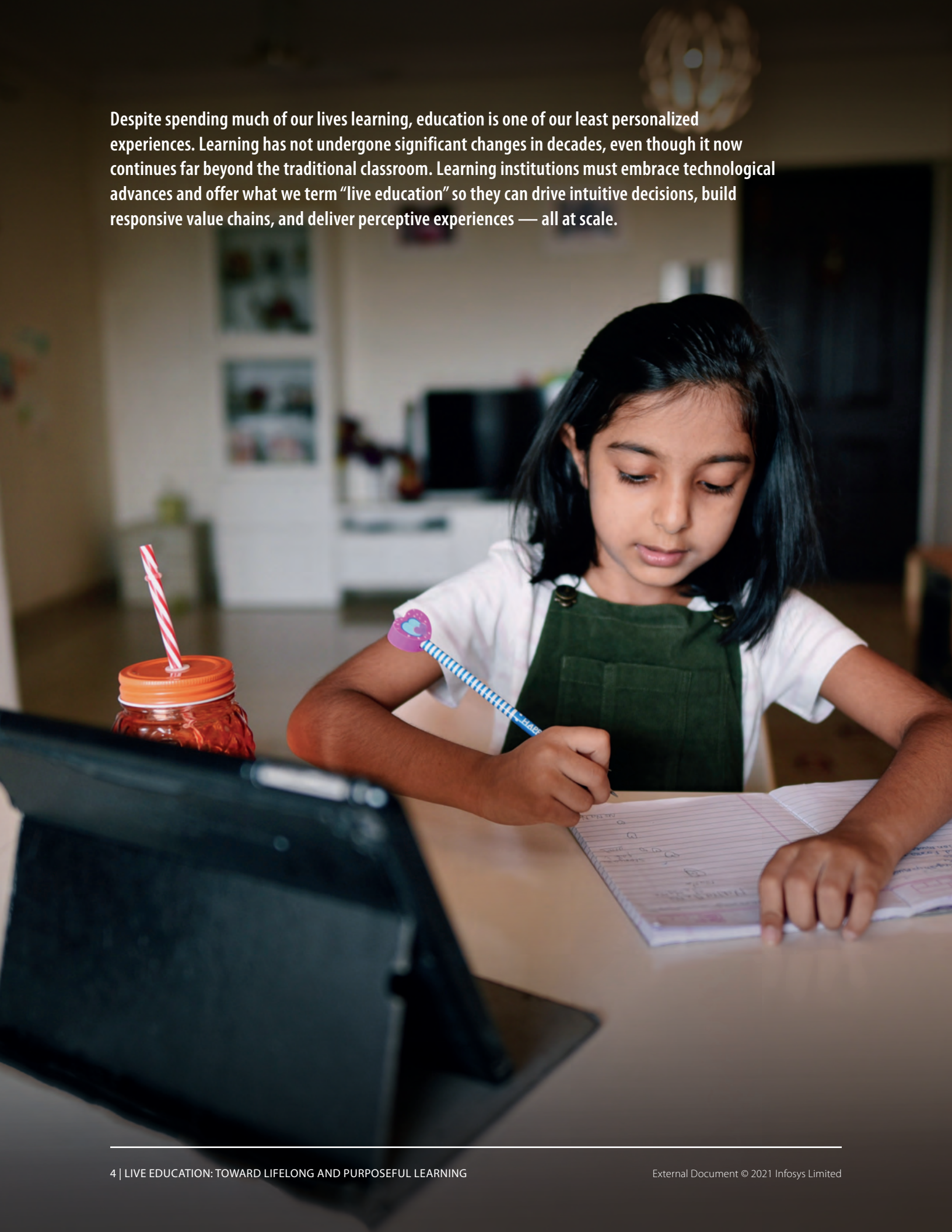
Contents

Despite spending much of our lives learning, education is one of our least personalized experiences. Learning has not undergone significant changes in decades, even though it now continues far beyond the traditional classroom. Learning institutions must embrace technological advances and offer what we term "live education" so they can drive intuitive decisions, build responsive value chains, and deliver perceptive experiences — all at scale.



Student retention and future success have been the main objectives for most educational institutions, but that often requires personalized learning.[1] Universities do this effectively but often with relatively small teacher-to-student ratios and at a high cost. Technology holds great promise to engage students and deliver personalized learning at scale, even at the corporate training level. However, most institutions have not yet embarked on their digitization journey — a needed step to expand learning beyond classroom limits.

This clash of tradition and technology has come to the forefront as the pandemic created sudden demand for remote learning and challenged educational platforms. Almost all platforms were designed for different circumstances; they are not able to provide learning anytime, anywhere, and from any device. But institutions have increasingly realized that they need to correct these shortcomings.

Technology can help increase student success rates through personalized progress monitoring, improved collaboration, sentient analysis, microfeedback, and just-in-time nudges. Institutions need to become more predictive and prescriptive rather than being only reactive. As a result, colleges and universities can become live education platforms for teaching and learning.

However, purely analytics-based applications pose the risk of bias creeping into the decision-making process as decisions are based on decontextualized data. Live platforms can offset these risks by correlating multiple data points and presenting the faculty with a 360-degree view of learners. As a result, educational leaders are better able to adopt the best teaching practices. These platforms also offer institutions greater flexibility to teach with many educational modes, such as fully self-service online programs, and synchronous and asynchronous classrooms. In addition to improving the experience of students, faculty, staff, and parents, these learning platforms can also optimize operating costs.

Transformation journey — The three horizons

Institutions are already aware that they must meet the needs of many types of learners: high school students who want to learn at their own pace or review past lectures, time-crunched part-time employees, or full-time workers seeking to upskill or reskill. To be ready for this varied future, educational institutions should embrace digitization, automation,

and micropersonalization. They must transition from the pre-cloud to the cloud-native era and from rigid stand-alone applications to device-independent apps and platforms. Organizations must also adapt sentient, artificial intelligence (AI) processes. These changes will allow institutions to become live campuses that are responsive, agile, and flexible to improve students' experiences.

Many institutions have started to incorporate technology into selected areas. But most have not undertaken the kind and scale of digital transformation needed to fully serve their students. In many cases, institutions do not know where or how to start. However, a simple digitization maturity assessment can help define their digital transformation roadmap and offer guidelines for implementation.

Institutions with sufficient funds can quickly jump-start these efforts by building a 360-degree view of student data to help clear bottlenecks and barriers to success. Institutions with fewer resources can start with cost optimization models, such as automation, cloud migration, technology standardization, vendor consolidation, and application rationalization (retire, replace, reengineer, retain).

Institutions can also meet current challenges and future demands by developing an innovative culture. In that approach, organizations would brainstorm new ideas, short list a few of them, invest in prototypes, implement pilot programs, and then roll out solutions. This also helps organizations refresh their digital strategies.

We have analyzed the evolution of educational technology and categorized it into three levels, or horizons — H1, H2, and H3 — in increasing order of technological advancement. To plan their next digital transformation strategy and roadmap, institutions need to first identify their current horizon.

H1 is the baseline level. Here, institutions use digital communication and collaboration to make student learning simple and accessible anytime, anywhere. In H1, central tasks are migrating and modernizing legacy technologies to make student record-keeping more efficient. Communication is digitized through emails providing the latest updates and student progress.

In H2, education is student-centric and focused more on the learner's success. Schools leverage next-generation approaches, such as project-based, personalized, and social learning. Students are informed through enriched collaboration and communication channels, such as instant messages, push notifications, and bulletin boards. H2 institutions also invest in digitization and migrate their systems to the cloud to save costs.

H3 institutions use the latest capabilities to transform into smart, live campuses through the use of AI, distributed and portable computing systems, online networks, internet of things (IoT), virtual reality (VR), and augmented reality (AR). Education here is a lifelong, purposeful learning journey where passion-driven students earn required skills and microcredentials.

When institutions move to H3 — a lofty but important goal — they become more role-centric and skills-centric, rather than focused only on awarding degrees. Industry needs rapid innovation and the required reskilling and upskilling that make it possible. Companies thus need to collaborate more than ever with higher education institutions on research, innovation, and preparation of industry-ready students with the right skills for specific roles. To accomplish this ask from the industry, institutions need to align traditional degrees with micro- and nanodegrees that help build a specific skill or set of skills.

To help institutions transform to H3 from their current state, technology can play a key role. Technology promotes digitization of workflows; flexibility to perform actions anytime, anywhere with any device; and personalized experiences to suit individual needs. In education, technology can be used in these ways for all roles: prospective student, admitted student, graduated student, parents, teaching staff, nonteaching staff, and institution leaders. Below are the broad functional areas of the typical educational institution, which covers primary and supporting functions.

We explore important trends (see Figure 2) within these functional areas. These trends transform educational institutions from fragmented and ad hoc systems to more live and resilient institutions.

Figure 1. Adapting to market dynamics: The three horizons

KEY PATTERNS

- Ecosystem oriented
- AI-first processes
- Sentience
- Business platforms
- Hyperproductivity
- Human + gig + machine
- Elastic and edge infra
- XR-assisted virtual labs (AR, VR, MR, haptic)
- Open educational resources
- Borderless skills-based certification

H3
LIVE CAMPUS, LIFELONG, PURPOSEFUL LEARNING

Microcredentials, smart campus, smart staff, live institute, engaged parents, passion-driven students

- Industry needs innovative, Agile-friendly, and adaptive employees
- Industries partner with universities for research, education, and innovation
- Courses matched to industry-specific roles
- Virtual degrees from multiple universities
- Social and digital brain for course recommendations
- Job-ready students with needed soft and technical skills

- Theme-based integrated courses, shared resources for content, lab-facilities, and faculty across university
- Learning via discussion, engagement, experience, sharing (physical, remote, blended)
- Evaluation through evidence-based work, on-the-job training, and problem-solving

- Content from multiple sources
- Immersive teaching and learning using AR-VR
- Microcredentials and anytime, anywhere learning
- Real-time data for students, staff, faculty, and parents to allow timely action
- Seamless experience for all roles

- Digitization
- Enterprisewide automation
- Bite-size and adaptive learning
- Competency based
- Predictive analytics
- Persona-specific journeys
- Modular platforms
- Agile model
- Cloud native
- Mobile and smart products

H2
NEXT-GEN LEARNING SPACES, STUDENT SUCCESS

Student success-focused, efficient staff, informed parents

- Recruit right students via microsegmentation
- Self-service for parents
- Smart service to staff, students
- Automate admission and operations using bots
- 24X7 virtual assistance

- Enable self-paced learning, flipped learning
- Teachers as mentors and advisors to track and guide courses and learning
- Enable social learning via sharing

- Plan and track career aspirations
- Measure and improve student engagement
- Industry partners: research, internships employment, and sponsorships
- Alumni: connect, contribute, and collaborate

- Online learning
- Anytime, anywhere access
- Online collaboration
- Online assessments
- Student information systems
- Migration and modernization

H1
E-LEARNING AND COLLABORATION

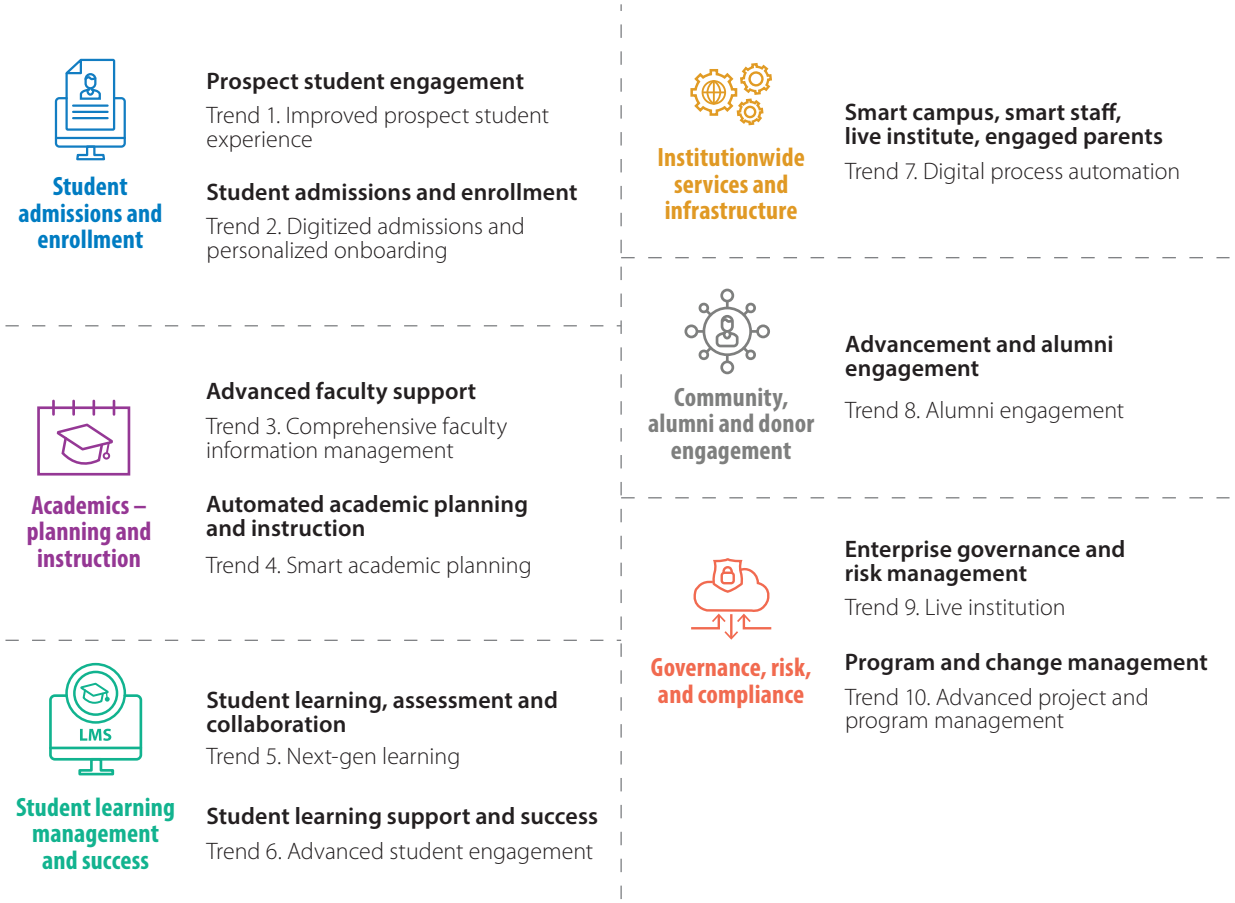
Modern, connected, anytime-anywhere learning

- Digitize content
- Leverage tools and technology in teaching and evaluation
- Information is stored and consolidated

- Analytics to know institute, class, and student performance
- Leverage systems in academic year planning and course delivery

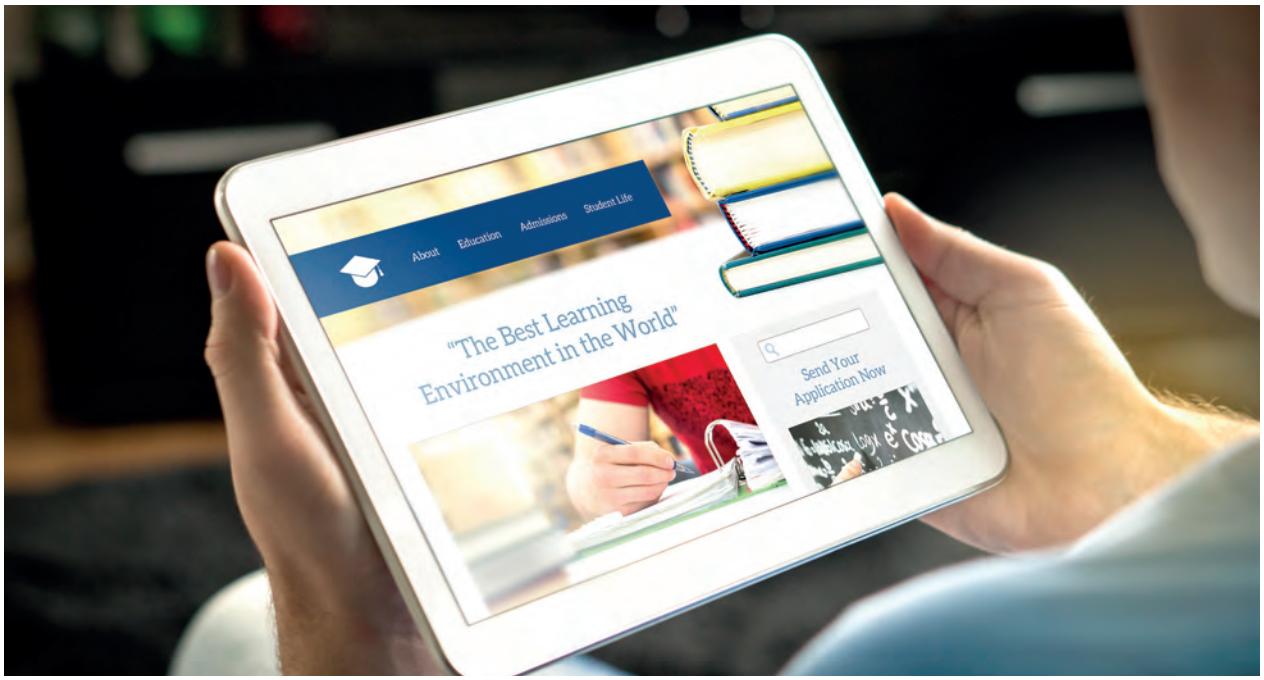
Source: Infosys

Figure 2. Key trends across education functional areas



Source: Infosys

STUDENT ADMISSIONS AND ENROLLMENT



Beyond implementing online and hybrid learning models, universities have also changed how they admit and enroll students. This has changed the college application cycle. Several institutions, including the California Institute of Technology, announced temporary test-blind or test-optional policies. And most colleges that took a test-optional approach in the pandemic appear unlikely to reinstate their traditional requirements, according to The Chronicle of Higher Education. The article said that "data from the next few years will be critical to understanding whether test-optional policies are tenable."[2]

While some pandemic-era changes in education are likely to be temporary, many are expected to remain and forever change student admissions and enrollment. Research shows that 13% of colleges and universities are digitally transforming and about 32% are developing a digital strategy that includes upgrading their online admissions and enrollment processes.[3]

Prospective student engagement

Trend 1: Improved prospective student experience

Changes in the global economy — such as financial crises and health outbreaks — have introduced new challenges to institutions and learners. These lead to reduced federal funding, technology challenges, shifting enrollment patterns, travel restrictions, and socioeconomic issues regarding student recruitment for college admissions.[4] The digital shift has opened new avenues to engage with prospective students. Virtual open houses and online events — featuring enriched digital experiences — help many prospective students learn about colleges without needing to be there in person. Institutions worldwide are engaging prospects remotely and providing an improved student experience. This is largely because educational

institutions have quickly evolved to meet both the needs of students and the demands for digital-first experiences.

Microsegmentation helps institutions achieve recruitment goals using prospective student data modeling techniques, predictive analytics, and personalized digital marketing. It also reduces marketing costs by optimizing resources to focus on students with high probability scores to apply, admit, and enroll.

Targeted outreach is a trend that takes advantage of social media marketing to identify and recruit the best prospects. Student recruitment teams use personalized surveys and engagement to cater to individual needs and preferences. Personalized digital marketing, including social media nudges, increases the prospective student pool and improves conversion rates.

Data analytics and campaign dashboards provide insights on prospective students in the funnel and help to analyze and adjust recruitment strategies to achieve student recruitment goals.

Admitted students

Trend 2: Digitized admissions and personalized onboarding

The recent move toward test-optional admissions policies have encouraged traditionally underrepresented students to apply to more selective colleges. That has, in turn, generated more pressure on admissions offices to process and respond to applications quickly.[5]

Virtual assistants, smart FAQs, and digital connections enable students, alumni, faculty, counselors, parents, and new applicants to access personalized FAQs and get answers to their questions from virtual assistants. And personalized tools like financial aid calculators, cost simulators, and digital payments provide more transparency and self-service options.

One of the largest U.S. educational services companies partnered with Infosys to automate prospective student data transformation, including data cleansing, standardization, and data enrichment. The transformed data were able to identify prospects, while a predictive analytics system using supervised learning techniques generated scores and ranks to further narrow down potential prospects.

Digital transformation of the admissions process includes smart application forms that can be accessed from any device and at any time, automated application reviews, and a system-guided course selection process. Altogether, this reduces manual effort and shortens admissions cycle times.

Digitized onboarding provides continuous nudges, saves time and effort, and allows students the flexibility to complete pending action items remotely and at their own pace.

Some of the other trending technologies used in student admissions and enrollment include:

- **Personalized learning recommendations, skills recommendations (adjacent skills)**
- **Sentiment, trend, and predictive analysis**
- **Improving discoverability of content, AI in search (learning to rank)**

ACADEMICS — PLANNING AND INSTRUCTION

Educational institutions should match their academic offerings to the needs of current learners but still position themselves for sustainable success in the future. Organizations need to keep up with shifts that affect academic planning and instruction in the education industry — including changes in technology, faculty roles, and credentialing (alternative and microcredentialing models). When developing course content and delivery models to address different learners, institutions need to use multiple channels that are easily available to learners. Those can include on-campus, off-campus, digital immersion, and remote learning via the internet (massive open online courses).

Advanced faculty support

Trend 3: Comprehensive faculty information management

New instructional models and innovative uses of technology allow higher education faculty to increasingly serve as coaches, advisors, and instructional leads. Their roles have changed because of sociological forces (smartphone usage, social media), technological forces (continuous internet access, immersive content, virtual assistants), and economic forces (higher college costs, reduced federal aid, research sponsorships).

A comprehensive information management system helps faculty digitize research, process and work flows, and publishing processes — all of which are traditionally complex and disaggregated. The new systems can enhance the faculty's role by allowing them to connect to and collaborate with relevant resources and processes.

Institutions are also creating digitally rich learning environments and pedagogically sound learning experiences. They bring in learning and instructional designers to create rigorous, high-quality programs. And institutions increasingly provide faculty with advanced training and professional development to improve the quality of instruction.

Real-time analytics and student dashboards help faculty to provide personalized recommendations and timely interventions.

Automated academic planning and instruction

Trend 4: Smart academic planning

The latest trends in credentialing are certificates, badges, stackable credentials, job-related curricula, and micro- and nanodegrees. They disrupt the reliance on traditional degrees and provide students with new alternatives. The growing interest in microcredentials helps workplaces remain competitive by ensuring that employees develop new capabilities. Microcredentials give a way to map these career paths and quantify skills.

A large U.S. university collaborated with Infosys to augment, accelerate, and enhance the learning experience of its graduate students. Students leveraged an Infosys learning platform that is built on the cloud and is a mobile-first accessible learning solution. The platform offers guided training in technology and career-based programs designed to make students industry ready.

Continuous course evaluation and feedback often lead to institutions becoming platforms. This transformation is supported by research that improves instructional methodology and helps institutions keep pace with rapidly changing demands from industry.

Immersive technologies, such as AR and VR, help expand instruction to bring in human-machine interactions. In education, these immersive experiences can range from sitting in a chair with a headset on to standing at a table displaying holographic content to navigating a complex virtual space and interacting with digital objects. These technologies provide engaging ways to help students work out problems in real, virtual, or augmented environments.

Some of the other trending technologies that are used in academic planning and instruction include:

- **Personalized learning recommendations, skills recommendations (adjacent skills)**
- **Sentiment, trend, and predictive analysis**
- **Using concept graphs for disambiguation and search suggestions**
- **Improving discoverability of content, AI in search (learning to rank)**

STUDENT LEARNING MANAGEMENT AND SUCCESS

Growing technological capabilities offer a variety of online media and learning support tools that can help students receive a high-quality education. Institutions are aligning teaching and learning methods with the skills needed for the future. These trends accelerate remote learning, which can also be combined with in-person classes. Teachers can provide practical skills face-to-face in the classroom or use AR-VR technologies to collaborate with other students.

Student learning, assessment, and collaboration

Trend 5: Next-generation learning

Personalized learning caters to diverse learning styles and needs. Advancements in technology allow institutions to deliver individualized content based on student preferences such as time, location, and mode of delivery. Institutions are using adaptive courseware, personalized learning pathways, and digital tutoring solutions to provide students with immediate feedback. Adaptive learning technologies emulate and support educators by providing personalized interactions with individual students. This provides the best possible personalized learning experience for every student.

Using the latest AI trends, virtual teaching assistants help faculty personalize lessons by gathering data on a student's learning progress, identifying strengths and weaknesses, and suggesting where extra support is needed. These virtual assistants also predict a student's success or failure in a course based on their prior performance and the course's historical data. This allows faculty to intervene and offer remedial training when required.

Changes in pedagogy, such as flipped learning, are a trend in which direct instructions are transformed from group learning to individual learning. The resulting group space is transformed into a dynamic, interactive learning environment in which the educator guides students as they apply concepts and engage creatively with the subject matter.

Next-generation hyperlearning management, or course management, systems can facilitate flipped learning.

Institutions are also changing how they approach exams, assessments, and awarding degrees. For instance, project-based learning is a new approach that provides the building blocks for organizational skills, collaboration, and time management — tools that all students need. With project-based learning, students are assessed by analyzing their learning paths through practical and experiential learning or fieldwork. Then they are awarded with microcredentials.

Student learning support and success

Trend 6: Advanced student engagement

Institutions are leveraging cloud-based software systems and software-as-a-service to create personalized learning experiences and to manage student data. Institutions are defining the data-capture process for learning situations and administrative processes; thus, over time, a body of data is built. Online and offline teaching platforms help students complete courses on time, with the assistance of AI systems that offer personalized guidance.

Other AI solutions include virtual personal assistants, early warning analysis, automatic attendance, grading automation, adaptive learning, and adaptive assessments.

A leading U.K. university and Infosys collaborated to create a flexible, innovative teaching and research approach that improves student experience in every interaction and increases student success rates. AI and machine learning were leveraged to develop cognitive models that take advantage of structured (assessments, student demography, classroom attendance) and unstructured (student interactions via voice, email, support tickets) student data. The systems identify disengaged students and trigger automated interventions to improve engagement. The student experience was further improved with a mobile app and virtual assistant.

Some of the other trending technologies that are used in student learning management and success include:

- **Personalized learning recommendations, skills recommendations (adjacent skills)**
- **Sentiment, trend, and predictive analysis**
- **Virtual proctoring**
- **Improving discoverability of content, AI in search (learning to rank)**
- **Adaptive learning, identify Ebbinghaus curve (forgetting curve)**

INSTITUTIONWIDE SERVICES AND INFRASTRUCTURE

Advances in cloud computing are transforming the way institutions serve their constituents. Cloud migration helps these organizations upgrade infrastructure and change it from a capital to an operating expense. On-premise legacy enterprise applications, such as human resources and finance, are moving to the cloud to enrich functionality and simplify operations and maintenance. Modernizing infrastructure also helps increase staff productivity and operational efficiency.

Smart campus, smart staff, live enterprise, and engaged parents

Trend 7: Digital process automation

Institutions are consolidating multiple support channels (email, chat, phone, web) under a single umbrella to help students, parents, and staff easily raise service requests. This allows optimization of support staff's time and efforts, while effectively supporting the users from multiple channels. A single dashboard view of all support requests streamlines the system and delivers consistent responses.

> A leading workforce solutions provider in the U.S. implemented omnichannel and self-service support to students that reduced agent handling costs. The Infosys-built, cloud-based virtual assistant addresses frequent student requests via Microsoft Teams chat, web chat, SMS, and voice channels.

One of the top goals of smart campuses today is to optimize the maintenance and utilization of physical spaces. This is often accomplished with devices that are paired with IoT sensors, AI, and robotic process automation. Institutions enhance the student experience through smart cards, digital attendance, digital signage and wayfinding, and facial recognition for room and resource access.

These technologies are incorporated into almost every new building and are designed to comply with the institution's smart campus principles. The technology architecture of each building is plugged into and supports a robust and secure data platform, integration capabilities, automation, and analytics.

COMMUNITY, ALUMNI, AND DONOR ENGAGEMENT

Maintaining consistent alumni engagement is crucial to building a great institution and ensuring continuity. This engagement, however, has come a long way from traditional direct mail campaigns and annual student reunions. Recent global changes forced advancement teams to reassess their strategies. But the increased use of technology offers tremendous possibilities for universities to engage their alumni on a deeper and more meaningful basis.

Advancement and alumni engagement

Trend 8: Alumni engagement

Institutions can gather more engagement data from social media interactions, email communications, mentor-mentee collaboration, and volunteer participation. Digitization of alumni engagement offers advancement teams the essential knowledge they require to make smarter decisions and develop stronger alumni relationships.

Trends in alumni engagement are further extended to help prospective students in their admission and enrollment. For example, institutions can encourage prospective students to connect with alumni for guidance and suggestions in choosing the right courses.

Institutions are enlisting alumni to mentor current and recent graduates in career guidance and placement and coordinate student internships. Alumni can also facilitate collaboration between their employers and institutions for research projects.

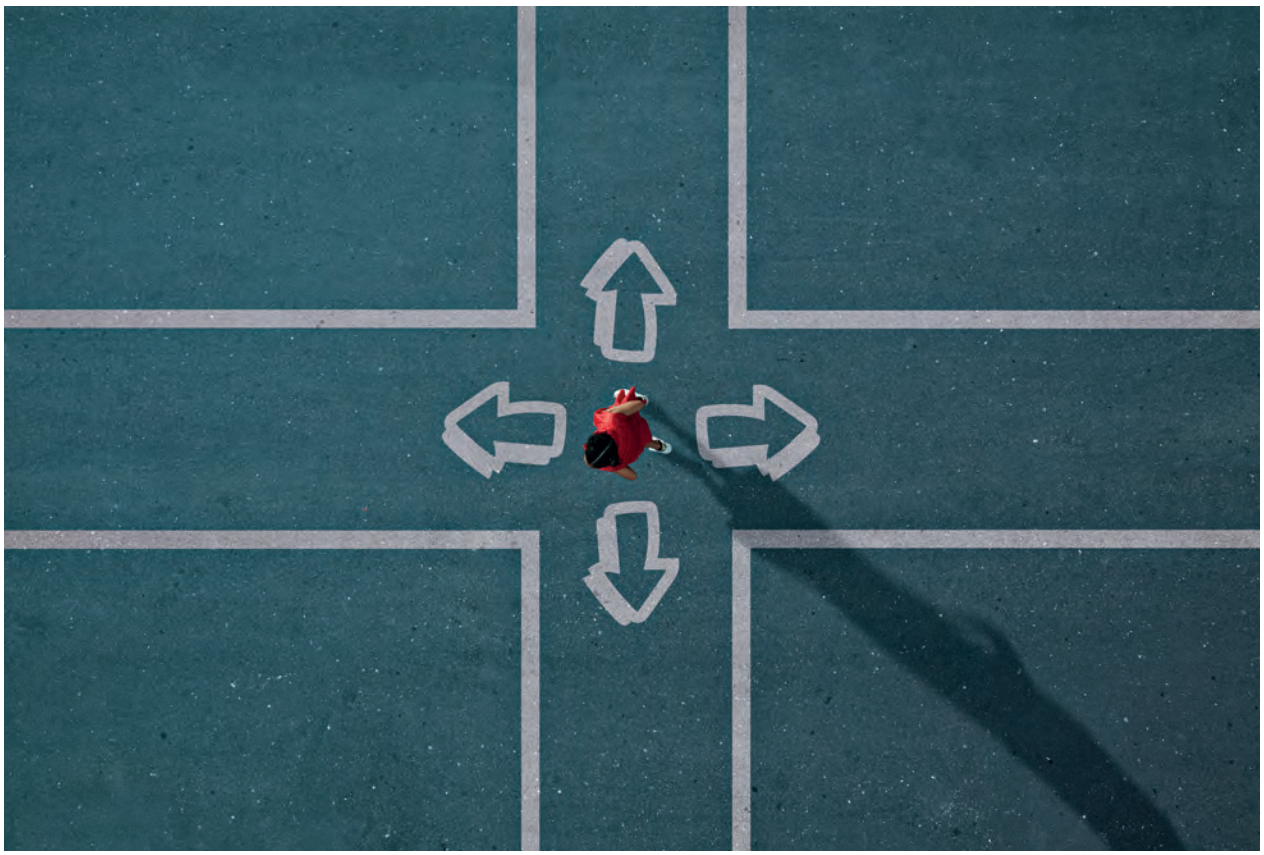
To encourage lifelong learning goals, institutions are providing alumni with access to learning and social platforms. Based on career aspirations, alumni

can upskill and reskill to advance in their current industry or switch to other sectors. Nanodegrees and microcredentials offered by the university not only help in achieving the alumnus's career goals but also showcase the institution's success.

Advancement teams connect with alumni for gifts and sponsorships. And alumni can also choose to sponsor specific students, or the system can recommend specific students based on criteria such as common interests or location. Alumni can choose multiple ways to contribute to college donations, such as funding classes for low-income students or helping them find off-campus jobs.

Some of the other trending technologies that are used in community, alumni, and donor engagement include:

- **Personalized learning recommendations, skills recommendations (adjacent skills)**
- **Sentiment, trend, and predictive analysis**
- **Video analytics – improving conversation, interview, and presentation skills**
- **Improving the discoverability of content, AI in search (learning to rank)**
- **Profile synthesis for recruitment and expert matching**



GOVERNANCE, RISK, AND COMPLIANCE

Governance, risk, and compliance (GRC) — as well as privacy — are some of the most complex and important issues facing higher education institutions. Information security threats are ubiquitous. The privacy concerns of end users, especially students, are growing. And the parameters of regulations and laws are ever shifting.

Considering reduced enrollments and shrinking budgets, higher education institutions are contemplating how they can identify efficiencies, reduce redundancies, and digitally transform their approaches to risk, privacy, and compliance.

By taking an enterprise approach to risk management, institutions are more proactive and prepared. They can thus avoid, accept, mitigate, share, or exploit risk where possible, or respond to issues and challenges more effectively when they arise.

Enterprise governance and risk management

Trend 9: Live institution

The ongoing expansion of IoT — combined with the steady rise of 5G — will greatly increase the number of devices and applications that security teams need to protect. Institutions' integrated risk management programs enable digital innovation through the establishment of comprehensive planning and governance groups. To protect student information, these groups need to address security, privacy, and risk issues simultaneously.

Institutions are building capabilities like live insights of their performance data and resource utilization

accompanied by timely alerts and notifications. This allows institutions to be more predictable and responsive.

Institutions are adopting live enterprise principles to become relevant, current, and capable. These principles include event-driven actions; self-service business processes; seamless collaboration; anytime, any device accessible information; and guided practices. These help institutions not only operate optimally but also predict outcomes.

Program and change management

Trend 10: Advanced project and program management

The higher education community is under significant pressure to change in all sorts of ways. Initiatives include efforts to become more operationally efficient and effective, improve student outcomes, increase access to higher education, control costs, recruit and retain top faculty and researchers, and many more.

Effective transformation takes an institutionwide approach to improve and enhance organizational and talent models, operating processes, technology, and leadership. Institutions are adopting lean and agile methodologies to ensure quick return on investment by incrementally improving the stakeholder experience. Institutions are adopting industry best practices in project management and office governance and to deliver on schedule and on budget.

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