Discovering how data can transform the learner experience

Connecting technology ecosystems to improve learner outcomes

A comprehensive view of activities and processes within an institution empowers decision-makers to identify factors that influence student success

A CONNECTED TECHNOLOGY ECOSYSTEM empowers students, faculty and institutions to improve student outcomes through evidence-based, actionable insights, say experts at education technology company Anthology. "Increasingly, decision-makers and those who work on the front lines with students to define the contours of their experience and to help them be successful are using data to make decisions," says Justin Rose, senior director of product management at Anthology.

Data is the foundation or basic currency that allows institutions to gain insight into and transform the learner experience, Rose says. In today's connected, technology-driven world, there are numerous sources of student data, including basic academic data, co-curricular activities and qualitative data about the student experience. However, this data is often trapped in silos. Breaking down these silos is one of the major challenges facing institutions that want to leverage their wealth of data to support learner success.

"What's possible is that with a connected ecosystem of data, you get a much clearer picture of what's working well, what could be better, where the gaps are and where the areas of strength and opportunity are," says Chris Husser, vice-president of product management at Anthology. "It is about informed decision-making and informed action-taking. That is what the power of analytics and data should really be giving institutions."

Nicolaas Matthijs, vice-president of product management at Anthology, views data in a six-layer model. The first three layers are about the data itself: harmonisation, access and reporting. The next three are about experiences: information, context and intelligence. "The very first step is always around harmonisation and bringing the data and information from all those various places and silos together into a single place. Otherwise, it is difficult to get insights or ask questions of the data," he says. This is where many institutions struggle.

Strong foundations

Before Rose joined Anthology, he worked at a university. "We had a different student information system provider with a different learning management system provider, with a different financial aid system provider," he recalls. "I cannot count the number of times I wished that all our data sat on the same system, that these different solutions spoke to each other, that the data were accessible across that ecosystem."

Breaking down silos is one of the major challenges facing institutions

This is where education technology partners can play a crucial role, says Rose. "They can provide integrated platforms that connect these disparate systems, which enables a more holistic view of a student's experience." To be able to harness data to improve student outcomes, institutions must coordinate their systems so data can be compared – this is the foundation of any intelligent data system, Matthijs says. The next layers relate to access and reporting so that students, faculty, or decision-makers can act on the insights. For example, an institution may have a policy around grading and feedback time, which is a metric that has been linked to student success, Matthijs says. By harmonising data from various silos and enabling access, faculty, departments or the institution itself can report on trends and track progress on this policy.

The fourth, fifth and sixth layers pertain to student and faculty experiences, Matthijs says. These layers include an information layer, in which raw or summarised data is presented to students, advisers or faculty so they can use this information to make decisions. "This is where there is so much opportunity," Matthijs says. Such information could include, for example, how close to the deadline a student began working on an assignment, so the faculty member can identify who may need assistance.

The fifth layer is the context layer, says Matthijs. "Sometimes presenting the data by itself isn't quite enough to understand whether it is a good or bad thing, or whether you need to take action," he says. In the assignment example, it could be important to know whether other students have begun their assignment or the average time it takes to complete. "Context can help you make a more informed decision." Matthijs believes that education technology companies and institutions often neglect these two layers – information and context. "There's so much opportunity to just make information available in the context which is useful in a way that is actionable," he says.

A testing ground

Many organisations gather data and then sift through it in search of patterns. Husser suggests that a more scientific and effective approach is to ask what the most important problem for you to solve is. For many institutions, the most critical issue is student retention. "Analytics and the value of this big data set are that, ultimately, it should be a testing ground with which institutions can test concepts about where they can improve programmes and services," Husser says. That way, decision-makers can have robust evidence to support larger interventions.

The final layer – intelligence – is gaining increasing attention as artificial intelligence tools become more popular and widespread. "The top layer is the intelligence layer, and that's where we start to do intelligent things with the data, such as making automated recommendations and providing alerts," says Matthijs. For those using machine learning and artificial intelligence, it is "just another technology tool, something that can help us do our jobs better", says Husser. Artificial intelligence could, for example, help educators design courses, improve the learner's educational journey, and help students pick courses. "But unlike a lot of other tools, it comes with its own dangers and challenges."

"It is incumbent on institutions to understand the mechanics of [artificial intelligence decision-making], what is going into it, what is coming out of it, what are the things happening inside the black box. That is important to appropriately and ethically use this, especially if we are going to use it to inform high-stakes decision-making," Husser says. Education technology companies can guide institutions on the ethical use of artificial intelligence and the areas in which it can help them promote student outcomes. They can also assist in protecting student data and privacy, ensuring that an institution's technology implementation aligns with the relevant laws, says Rose. "When an institution attempts to engineer data privacy and security on their own without the help of an edtech partner, then they're really facing a supremely daunting challenge."

But the benefits of creating a holistic technology ecosystem outweigh the potential dangers. "When we have a comprehensive view of all activities and processes within an institution, by virtue of capturing and curating data across the entire ecosystem, then we can better understand how those factors interplay and influence a student's success," says Rose.

Using labour market data to shape the learner's journey

Access to real-time labour market data gives institutions a competitive advantage when driving enrolment numbers

I N TODAY'S FAST-changing labour market, prospective and current students need near-real-time information to guide their paths through higher education, while institutions need this information to inform their programme offerings and meet student needs.

"We should be infusing labour market data into the entire learner lifecycle, empowering students with market trends for jobs and skills in such a way that it makes it easy for them to always understand how their experiences, both curricular and co-curricular, can be leveraged in the real world," says Tony Parachini, a senior product manager at Anthology.

Career outlook was one of the major drivers in helping students determine which university to attend, according to Anthology's 2022 study of student admissions and enrolment. In fact, 69 per cent of survey respondents indicated that their career outlooks and career options were important in their choice of university. Moreover, seven out of 10 respondents indicated that they were concerned about finding jobs after graduation. "Those who were extremely or very concerned were uncertain about their level of preparation and whether they were being taught the right things," says Parachini.

In the global education market, institutions can leverage labour market data to make themselves more competitive, says Andy Miller, director of product management at Anthology. The focus on employability and attractive skill sets shows prospective students that the institution is preparing its graduates for the labour market. As a result, they can see higher education as an investment rather than a cost. "Similarly, institutions can take that feedback and consider ways to better position their programmes to meet labour market needs," Miller says.

Connecting the dots

However, data silos within institutions can stand in the way of harnessing the power of labour market information, and learners often suffer the consequences, says Parachini. "They do not have straightforward ways of connecting the dots between what they are learning and the needs of the market. Often, many pieces of data about a learner are spread across multiple solutions, such as student information systems, learning management systems and others. There's often no clear means of aggregating that information as it relates to career readiness," he says. "We need to tear down the barriers and make it easier for educators and learners to align their activities to market demand."

Parachini has seen numerous examples of institutions including such data in their curricula and programmes, with remarkable success. "I've seen institutions infuse labour-market data into coursework and at multiple points throughout their programmes," he says. "It can be a way of keeping learners engaged and motivated. It really helps the learner understand how the skills they are learning in class are preparing them for the market."

Institutions that take an integrated approach to incorporating labour market data into their entire learner lifecycles have been the most successful, says Parachini.

70%
of survey respondents indicated that they were concerned about finding jobs after graduation

"When the entire institution is committed to helping learners achieve their career goals, that's when we see really impactful and sustainable benefits start to emerge." Additionally, students are often drawn to institutions that can offer them some level of career preparation and counselling, says Parachini.

But there is a difference between skills and a job, and institutions need to ensure that their graduates are skills-literate, with competencies that transfer between jobs in a fast-changing labour market, says Miller. With such literacy, they are empowered to know what skills align with the jobs they want after graduation and if their skill set can apply to another market. Some careers, such as pharmacists, require specific discipline knowledge, but many skills are highly transferable, he says.

However, institutions need to be "data-informed" instead of "data-driven," warns Miller. A major challenge is ensuring that people understand that labour market data is not a guarantee. "Data is not going to give you a perfect prediction – it is giving you a general sense to inform decision-making. It is helpful to guide people, but they need to make sure that it is not used as a guarantee." This is particularly crucial when institutions use labour market data in advertising campaigns and admissions recruitment.

In addition, the world of work is changing. Twenty years ago, jobs that are currently in demand – such as machine-learning specialists and data scientists – were not on any recruiter's radar. Consequently, the education sector is increasingly looking to skills proficiency, which gives its graduates the flexibility and agility to progress in an evolving labour market. "Many of the [job] opportunities now did not exist before. We are continually evolving as a society in terms of job descriptions, job titles and what society needs. The common thread is continuing to look at those skill sets," Miller says.

Anthology partners with Lightcast, a global leader in labour market analytics. "They curate all of our labour market data and have algorithms that scour the likes of LinkedIn, Indeed and other job boards to make sure that the job-posting information that we showcase through our product Occupation Insight is available almost in real time," Miller says. "Within 24 hours of being posted, it's in the system and then we pass it on to the institution, which is pretty cool."

"To truly have a pulse on emerging career fields, you have to look beyond the more traditional elements of the labour market," says Parachini. Traditionally, data sources such as government employment data are not nimble enough to capture emerging changes fast enough. "We need to be assessing employer needs in real time: what job openings are employers attempting to fill? Are new jobs emerging in a specific region? What degrees and skills are employers seeking from those applicants?" he says.

Through leveraging such rich labour market data, it is possible to give students information throughout their education journey, so that when they graduate, they have the knowledge and skills to enter the workplace.

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Focusing recruitment efforts with data

Institutions are turning to data to guide their recruitment and enrolment strategies, leading to lower dropout rates and more successful students

DATA CAN SIGNIFICANTLY improve recruitment efficiency and ensure that universities are using their resources to attract students who are likely to enrol. "It's no longer about casting a wide net," says Jason Smith, vice-president of global solution services at Anthology. "Institutions are tailoring not only the messaging for the type of programme a student is interested in but also the communications to the student type." For example, prospective students straight out of school need different information from that required by an adult student who is enrolling in higher education for the first time.

Once prospective students have applied, data can also guide admissions officers as they decide which individuals to focus on. "Institutions are using data more widely to look at various factors when evaluating potential applicants," says Mirko Widenhorn, senior director of engagement strategy at Anthology. "Admissions officers can't reach out to every single one of them on a regular basis, and that's where data has become increasingly important."

Widenhorn splits applicants into three categories: those who already plan to attend the institution, those who are uncertain, and those who selected the institution as a back-up. There are many data points that can help institutions decide which category an applicant falls into, such as whether they have engaged with the institution before and, if so, when and how; whether their name was on a purchased list; and whether they have visited the campus.

Another key element is that data allows institutions to broaden their applicant pools, Widenhorn says. "Data creates a broader understanding of what an institution's student body looks like, how diverse it is, where the recruitment gaps are and if there are parts of the country from which they are not getting applicants," he says. Such questions can be asked and recruitment interventions implemented by institutions leveraging data.

One system for all

Incorporating data from current students can also help focus recruitment efforts. "How are alumni from those areas or with similar test scores doing? What majors are they successful in? Are they graduating on time? Are there gaps there? That might help to identify additional groups of students to approach from a recruitment perspective," Widenhorn says.

Institutions have access to a vast reservoir of data that they can use to target prospective students. "Demographic information available on social media platforms can allow institutions to push specific content out to specific groups based on their profiles," says Smith. Such data can enhance institutions' targeted marketing and improve student engagement and communication. Admissions applications

can also be a valuable way to gain insight into prospective students, although Smith cautions that the process should not be too lengthy. A recent Anthology study of 1,400 students found that two-thirds of respondents expect that an admissions application should take no longer than one hour to complete.

However, to harness the power of data in recruitment and enrolment, the data needs to sit in one system. "When all of these different pieces of data live in different systems, it can be very challenging to understand what the data is telling you," Widenhorn says. Smith agrees: "Centralising all of this rich data provides a holistic, intelligent approach to what institutions collect and know about students."

A key point is to identify all the ways that prospective students interact with the institution, as this can inform recruitment and enrolment strategies and interventions. For instance, when someone reaches out to a faculty member via email to discuss a study programme, Widenhorn queries whether such interactions are recorded and incorporated into recruitment data.

Conducting market research is also a powerful tool and a way to generate useful data, says Smith. He cautions against assuming knowledge about a specific group of prospective students. "Utilise surveys, focus groups and interviews to gather data on the preferences, interests, and aspirations of the target student population. This research can provide valuable insights into their motivations, career goals, and the factors that influence their decision-making processes when it comes to education," he says. Institutions can communicate with potential students in an authentic and personal way by taking this approach to outreach.

The data and analytics that allow institutions to effectively recruit students can also help organisations retain them, says Richa Batra, a vice-president of student success at Anthology. Anthology's student success business focuses on helping institutions recruit and retain students.

"Your biggest dropout rates are in the first year, first semester," she says. But institutions could improve their student retention by identifying the students who are most likely to struggle before they even enrol, developing intervention plans and "onboarding" them like companies do in the private sector. In companies, a new employee's first three months are critical, Batra says. "It's very similar for the student population."

Many institutions have support and information available for students, but the students do not know how to access the assistance. "If you're enrolling them, make sure that they understand what services are available," she says. Counselling, advising and coaching students from groups or geographies that have historically had high dropout rates before they even enter higher education could help institutions improve their learner outcomes. Such pre-emptive, targeted support can also encourage prospective students to enrol in an institution, and create a sense of belonging, Batra adds.

Personalisation is becoming increasingly important, says Widenhorn. "As institutions are building relationships with applicants, the more they can personalise the connection through email, communications and other vehicles, the better the applicant will feel about the institution," he says. Advanced data analytics tools such as artificial intelligence (AI) will enhance institutions' abilities to identify prospective students, as well as those who might need more support. Using such tools to analyse substantial amounts of data will help to identify trends and patterns, says Smith.

He envisions AI chatbots playing a key role in recruitment and student communication more generally. Already, Anthology offers an AI chatbot with some of its products. "It allows students to have access to simple questions at all hours, but it remains to be seen whether students prefer this kind of interaction," says Smith.

> **Data can enhance institutions' targeted marketing and improve student engagement**

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How data-informed career guidance benefits students

Student information systems are making it easier for universities to proactively prepare graduates for the workforce

A STUDENT INFORMATION SYSTEM (SIS) is the backbone of any academic institution. It collates all the data about a student, from their biographical and billing information to their academic record. "It's a transactional record of the student's experience at an institution that can also be used to foster more meaningful experiences for that student while they're in the school," explains Raymond Blackwood, a system builder and vice president for product management at Anthology.

The right SIS can promote student success by helping learners plot their educational pathway and keep them engaged. "It's overwhelming for students when they go to college and they don't know what courses or electives to pick. They feel alone and unsupported," says Blackwood. Such feelings of confusion contribute to student dropout and dissatisfaction with the educational experience. By utilising the pathway tool within their SIS, institutions can remove these stressors.

Blackwood argues that pathway tools are a more effective approach than relying on degree audits to guide students' educational journeys, as universities have done previously. "A degree audit is a piece of paper that had your degree, all the courses, categories and electives that you needed to take to graduate," he says. "For a long time, that was the main piece of information for advising students."

By contrast, pathway tools are designed to be reactive, showing students and their advisors how different courses alter the trajectory of an educational journey. They also offer students a range of course options from which to choose. For example, at the beginning of a semester, a student may have to choose three courses from 15 options, but their choice will determine the programmes that they will be eligible for further down the road. "This forward-looking tool really helps a student feel like they're more in control and have some way of steering their way through their journey," says Blackwood. In addition, it reinforces accountability, since students are equipped with information and are aware of the results of their choices.

Increasingly, institutions must demonstrate to employers that they are preparing their graduates for a competitive workplace. A graduate's skill set goes beyond their knowledge of a discipline in a rapidly changing labour market. Pathway tools can also include skills education to assist learners in understanding the capabilities and skills that their programmes provide. For example, Anthology's Occupation Insight product surveys job boards and labour market data, gathering information about the skills that employers are looking for.

"That data flows into the SIS and institutions can now have access to that skills taxonomy and associate skills to courses," says Blackwood. "If there are any skills tied to courses, they get added to the learner's record. When they are looking at the future and trying to decide what electives to take – in accounting, mathematics, chemistry or professional growth – they can see the careers they are eligible for, the kind of jobs that are available, who is hiring and what skills are they are looking for."

With this information, learners can choose the electives that best suit their ambitions and needs. "They start thinking about their future career and are more confident because they have that information," Blackwood adds. "That learner is going to be more ready than someone who graduates and says, 'I guess I've got to find a job now'."

Despite these advances, a persistent challenge that institutions face is the sheer breadth of functions that an SIS offers and tailoring those functions to their specific needs, says Blackwood. "The SIS is a very large enterprise resource planning system. It has hundreds of different functions, ranging from helping students with disabilities to setting up your programme to take advantage of degree pathways, billing flexibility and reporting analytics."

Although an SIS is a large investment, most institutions do not take advantage of the full scope of these functions. "Regardless of what SIS the institution chooses to implement, they really should lean into all the capabilities that have been developed over the decades and use them," he explains. This entails developing a culture of staying current on new features and reflecting on how such developments can help the institution achieve its goals.

According to Blackwood, Anthology has discovered that a multi-pronged approach is the best way to overcome this challenge. He recommends incorporating these strategies:

- Hire customer experience managers who understand an institution's strategy and support their goals
- Offer free and paid-for products that assist organisations with complex departmental management
- Run webinars that share knowledge and promote best practice
- Create a community where users can voice their concerns and provide feedback on proposed enhancements and new features

While the advantages of fully utilising an SIS are becoming more apparent, there are also inherent risks associated with storing student data in them. Blackwood, who has been working with and developing SISs since the 1990s, says that today's educational technology systems are often much safer than they were in the past. For example, many of Anthology's core systems are cloud-based. "That allows for a certain level of protection," he explains. "We are serverless now, so there is not some IT guy patching servers and making sure that they are up to date. We have been able to minimise those tedious tasks, deliver faster access to innovative capabilities and enhance the overall security of the solutions from the agility of the cloud."

Also, it is important to have a multi-level security approach. Anthology uses a segregated access model, ensuring that students and administrators have different security domains and models. "We can, on an individual-user level, control what data they're allowed to see, and even what operations they can perform," he says. "There are many different levels of security at the infrastructure level designed to help protect that data."

Going forward, the student experience of SISs will become even more important, he says. "Students at college do not wake up in the morning and say, 'I really want to log into my university student portal'." To counter this, Blackwood says Anthology wants to "meet the students where they are" and reduce the "moments of friction" that force them to bounce between digital systems to achieve their goals.

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Finding and using the right data to help staff and students

New platforms and policies are already creating more responsive and impactful learning experiences

Students should have more granular control over their data

LEARNING MANAGEMENT SYSTEMS (LMSs), the software applications that govern the administration of courses and programmes, are increasingly providing real-time data to university teaching staff to inform interventions, identify students at risk of dropping out and improve the learner experience.

"If you're just looking at data from your student information system (SIS), that's telling you what has already happened," says Steve Bailey, director of product management, data and analytics at Anthology. Bailey notes that SISs store student information and details about their performance, but if a user is viewing LMS data they are seeing learning in process.

According to Bailey, a wide range of data can be tracked, including student activity, performance, course design and the assessment process. These datasets provide valuable insights that allow for real-time adjustments in teaching and learning, eliminating the need to rely solely on post-analysis and lamenting failed outcomes. With data integrated into learning management systems, educators and policymakers can proactively address issues as they arise.

In addition to increasing the quality of pedagogy and pastoral care, the data can help institutions achieve their overarching goals. For example, a university or college

may want to reduce its attrition rate and boost student performance. To do that, it will need to identify which students are the most at risk of dropping out.

"The LMS is clearly one of the places where we have the information to tell us if a student is starting to fall behind, and it's one of the places where we have the most up-to-date information," Bailey says. Data such as whether a student has accessed the LMS in the last three weeks, if they are submitting assignments on time and if they are engaging with the course material could be included. Bailey asserts that institutions can enhance their existing intervention and improvement processes by leveraging data from their learning management systems, eliminating the need to develop entirely new processes.

According to Nicolaas Matthijs, vice-president for product management at Anthology, having robust and holistic data in institutions opens a plethora of possibilities. To meet the needs of institutions, Matthijs emphasises the importance of iterative product development that includes and engages the user. The goal is to ensure that the products effectively meet institutions' requirements by co-creating products and use cases with institutions based on genuine feedback and usage patterns.

Within the LMS, there are bespoke tools that can be critically important to managing the student journey and outcomes.
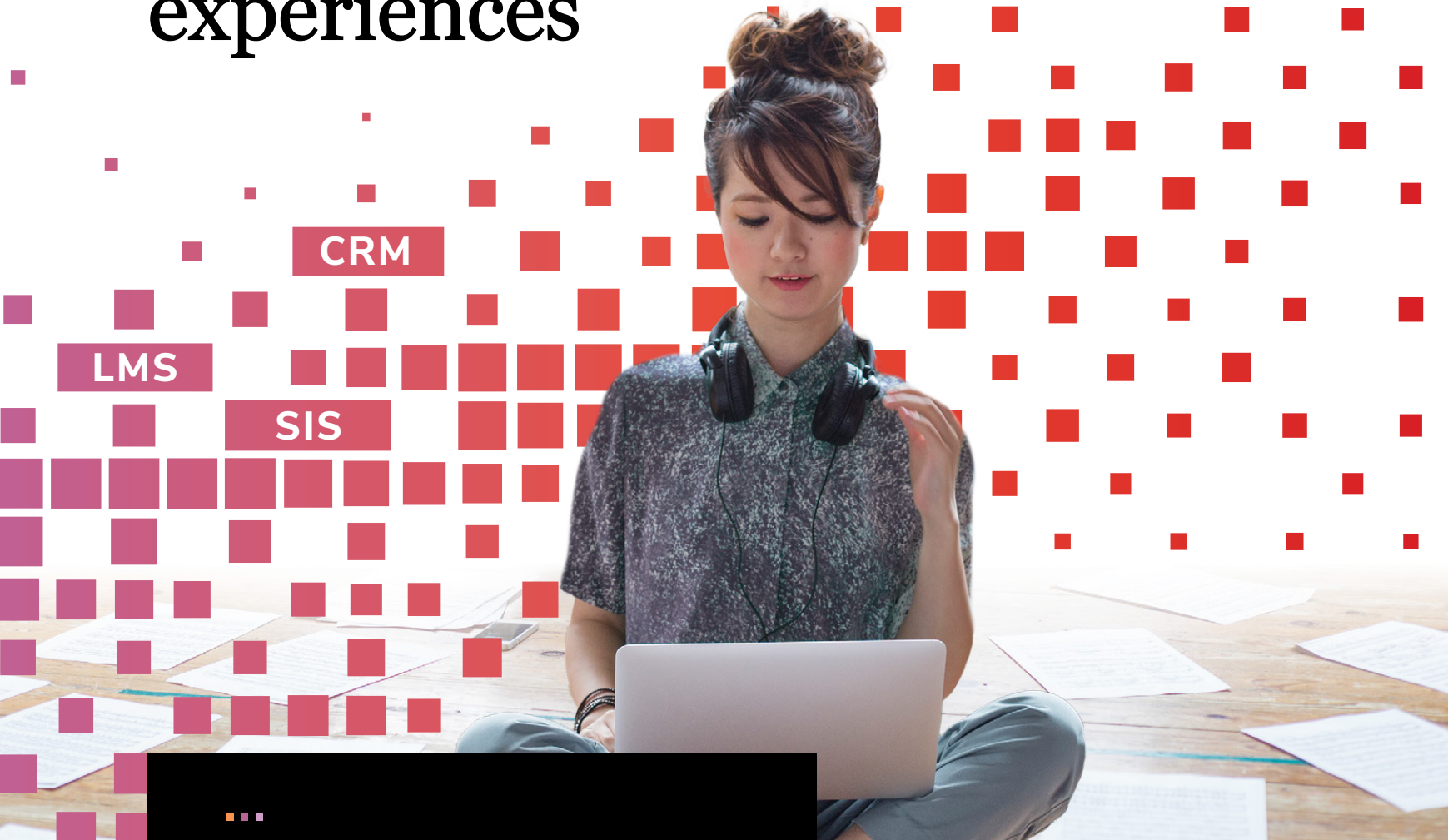
"Within these environments, you have the concept of progress tracking. It used to be particularly challenging for learners to understand how far they had progressed within a particular course," Matthijs explains. "Our progress tracker helps them to understand where they left off and where they need to go next. It was heavily informed by real student needs."

As Matthijs points out, since this data provides insightful information about students' development, instructors may also benefit from it. They can gain knowledge about the activities students have participated in, the questions they might have missed and where they left off. Such information has proved extremely helpful to teachers, especially during the pandemic when face-to-face interactions were scarce.

Another benefit of Anthology's Blackboard Learn LMS is that it gives institutions an overview of every student, according to Matthijs. Using this tool, instructors can click on a student's name to see a comprehensive summary of what that student is doing, when they last accessed a particular course, their current grade, what feedback they received and whether the system has any recommendations. It presents the information in a way that is meaningful to the instructor, and then allows them to act on it.

Bailey refers to the data as a "conversation starter" that helps institutions identify which students need interventions

or assistance. "It's really the conversation that's the important thing," he says. "The data is helping you to work out who you need to speak to, but then once you get in a room with that person or on the phone, that is the real opportunity to make an impact." Institutions have a handful of advisers and many thousands of students. "They can't have a half-an-hour conversation with each student, so it is very useful to have a tool that helps you to pinpoint which students to speak to, based on who may be most at risk of dropping out," says Bailey. "This gives you the ability to take those finite resources and have the maximum impact with them."

While it has many applications, collecting and using student data poses security and privacy concerns. Matthijs stresses that universities should ensure that their technology vendors have the necessary security accreditation and certifications. Attempting to independently connect the ecosystem can escalate the risks of exposure or data leakage, making it a time-consuming process for institutions. Consequently, it becomes crucial for policies to transparently inform students about the use of their data, prioritising privacy in data collection and utilisation. Bailey emphasises the necessity of demonstrating to individuals how data is employed to enhance their overall experience.

As artificial intelligence tools become more widely available, consent and student inclusion in the data-crunching process will become increasingly important. Bailey believes that students should have more granular control over their data and how it can be used. However, while students must be informed of the consequences of opting in, they must also be informed of the consequences of opting out, such as advisors being unable to proactively reach out to them and an increased risk of missing vital communication.

Data-driven decision making is essential for meeting the ever-changing needs of institutions and the students they serve. The ability to personalise student learning experiences and collect detailed information at every stage of the student journey makes data from an LMS valuable. In addition to providing governance of this data, institutions and vendors have a duty of care to be open with students about the nature and purpose of this data, as well as the positive impact it can have on their learning.

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