A class of their own: How data makes a student more than a number

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Building a better working world

THE OPPORTUNITY IS NOW

As it has done in every sector of our economy and society, COVID-19 dramatically upended Australia's schools in a few short weeks.

Students moved to remote learning via devices within days. School leaders rolled out technology incredibly quickly. Exceptional efforts to address access to devices happened across the country. The rapid increase in digital competency gained by teaching and administrative staff was remarkable.

We proved that schools can move faster than anyone previously thought possible. It also proved that we can have a different expectation of what digital transformation can mean in practice for schools.

Now we must take hold of the opportunity.

We know there is a big difference between "doing digital" and "being digital". There's a big difference in enabling students to learn online from home versus having an education system that unleashes the art of the possible when it comes to all the benefits that technology can bring. We have moved from thinking technology-enabled teaching and learning was simply about tablets and laptops to a glimmer of understanding about what the real potential is.

We believe this extraordinary period of transformation in Australia's schools, both culturally and digitally, represents a unique chance to rapidly shift to student-centric, digital learning channels based on a student's own aptitudes, competencies and strengths.

It gives us a chance to imagine new ways of classroom delivery and analysis of student progress. Through sophisticated learner analytics, students can work in a communal setting, enjoying all the benefits of social interaction while having teaching and learning experiences tailored to them. They can be supported through areas of the curriculum that they find challenging but also stretched by intensive teacher interaction.

Data insights and digital learning technologies also give us a chance to start addressing a real inequity in teaching and learning across the whole country.

There are many elements to the future of schooling, from embedding purpose and humanity to moving beyond batch-processed testing and ranking, but we simply cannot waste this window for change that will shape our education system for the next 20 to 50 years.

If we step back, it will be when many other countries are stepping forward. Now is time for everyone to step into this together.

Why we need to go beyond online

Our K-12 school system has its roots in a 19th century education model, with a teacher at the front of the class imparting knowledge based on reading, writing and arithmetic. Learning in this traditional system was by-and-large "batch processed" and standardised for students who would grow up to work in a profession or an industrial job, with few changes of career.

But faced with rapidly evolving workplaces and a far more competitive global marketplace, we need to revitalise an education system primarily designed for knowledge transfer and standardised aptitude testing.

Students now need to master higher order knowledge and skills. It is no longer what students know, but what they do with what they know. We are shifting to Education 4.0, where 21st century skills – creativity, critical thinking, collaboration, communication and leadership – need to be the lodestars for our students and our teachers.

What the current situation has shown is that it's possible to make important, lasting changes to a system that has traditionally found it difficult to change.

Students learn at different paces, have different aptitudes and enter classes with different experiences and background knowledge.

Maximising the potential of each student then relies on a differentiated, customised learning approach. In the past, even the most dedicated educator, especially in a secondary school scenario, found this challenging.

While some efforts to create a customised approach have been made, this has mostly been at an individual school level, rather than as a system or sector-wide approach.

Wendy Johnson, Principal of Glenunga International High School (see case study below) started ten years ago by adapting a data solution built for business and has begun to reap the benefits.

"[The data solution] has enabled teachers to personalise their programs rather than teaching to this mythical middle," Johnson says. "The system pulls all the data together, summarises it, shows us the comparisons and any areas that might need to be focused on. All our teachers see the benefits from doing what they normally would have done on paper. Now, it's the technology that does the work, not our teachers."

Today there is bespoke learner analytics technology that allows educators to tailor content and teaching methods, shift from point-in-time assessments like NAPLAN to real-time feedback, and move to a world in which education is adapted to each student's individual needs.

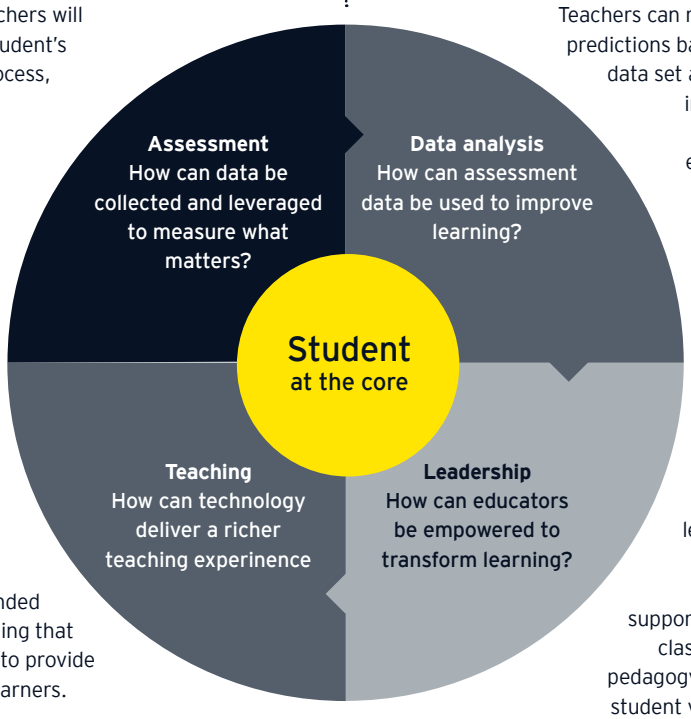
In the personalised learning system, student performance is tracked in order to identify students who are at risk and need extra attention. It means teachers can more effectively monitor a student's performance, and take timely steps to address any performance problems.

Assessment in this model is geared towards a student-centric approach that is not just focussed on a singular assessment method, but integrates emotional, cognitive and behavioural competencies such as social skills and wellbeing. This means that educators can clearly grasp a student's ability, interests and willingness to learn, and then decide the right approach for each individual. This is key in enhancing learning effectiveness.

How technology is the key to student-centred education

Continued advances in technology will expand the use of ongoing, formative, diagnostic and embedded assessments that are more useful for improving learning. Through the use of embedded assessments, teachers will see real time evidence of the student's thinking during the learning process, and provide feedback through learning dashboards, ensuring students have the best opportunity to demonstrate their knowledge and skills.

As technology provides the capability to improve assessment approaches, educators can use the information collected during assessment to have the greatest impact on learning. Teachers can make instructional decisions and predictions based on a diverse easy-to-access data set and utilised learning dashboards integrated with information from assessments, learning tools, educator observations and other sources to provide comprehensive visual representations of student progress in real time.



Educators will be supported by technology that connects them to people, data, content, resources and expertise, to create learning experiences such as authentic learning, blended learning and personalised learning that can empower and inspire them to provide more tailored teaching for all learners.

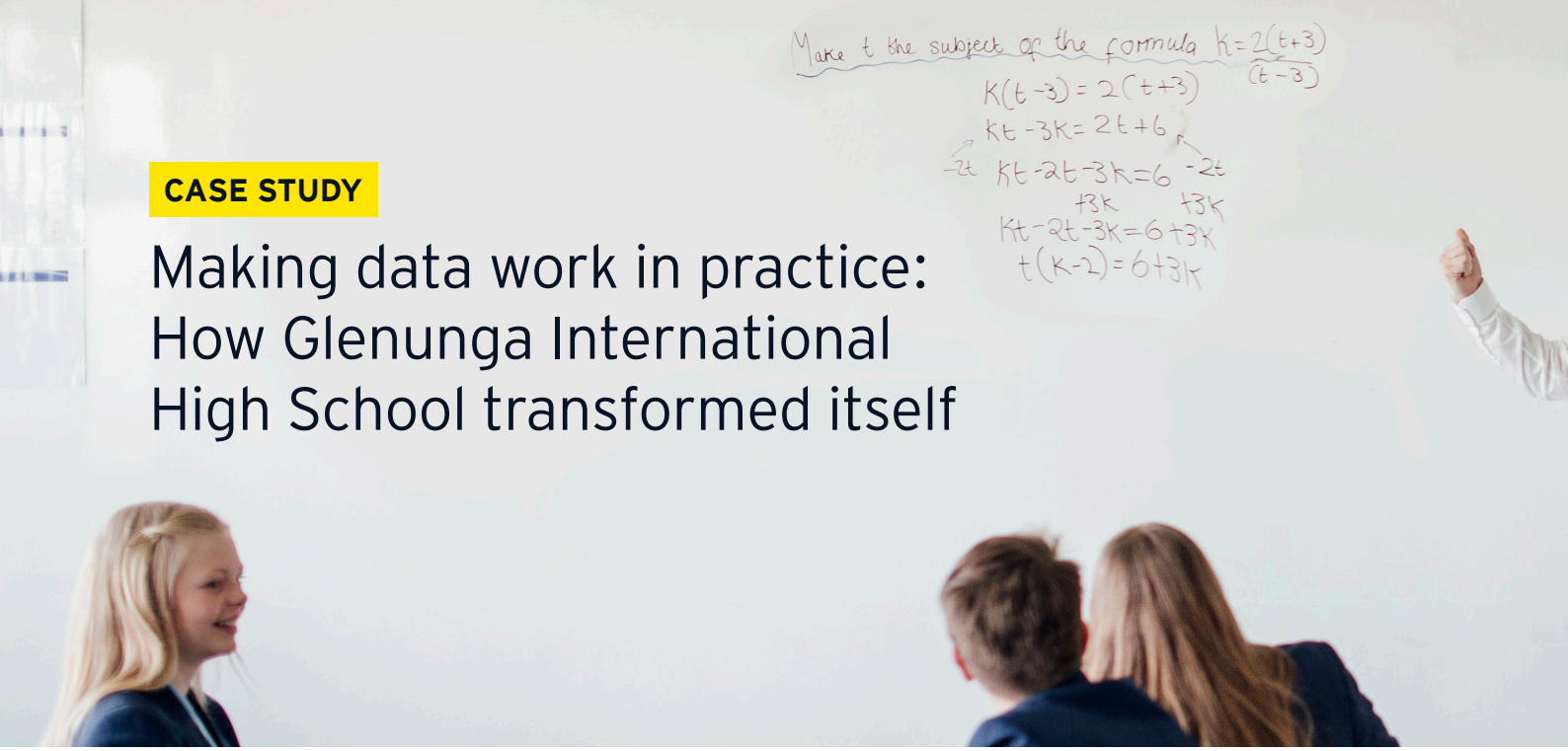
As technology continues to be embedded in classrooms, leaders must ensure that policies and resources equip teachers with the right tools and ongoing support to personalise learning in their classrooms, and that these policies, pedagogy and teaching methods support student voice and choice in the design of learning activities.

It is important to encourage participation from parents by providing explicit feedback and involving students in goal setting and through data transparency.

Implemented properly, digital learning also reduces the administration load on teachers, and helps identify high-performance within teaching cohorts to deliver better learning outcomes.

Digital learning also has the capacity to address gaps in access to high-quality learning. Equity in schools means that every student, without exception, is welcomed, retained and excels in learning and progresses into training, education or employment as an active participant in local community life, and as a promoter of humanity and the planet.

Historically, a lack of understanding about how to achieve change at scale, lack of sight on the individual and an unwillingness to authentically challenge have hindered major gains in closing the equity gap. However, personalised student programs and smarter assessment of progress that digital learning enables will help address those equity gaps. We recognise of course that digital learning merely augments and assists the strong personal relationship and close connection between teacher and student that cannot be replaced.



CASE STUDY

Making data work in practice: How Glenunga International High School transformed itself

Glenunga International High School is a publicly-funded high school in Adelaide. Under the guidance of the principal, Wendy Johnson, and Deputy Principal, Jeremy Cogan, they are moving from being a "good 20th century school to a great 21st century school". There is a focus on 21st century skills: creativity, critical thinking, collaboration and communication. And a belief that it's not what students know, it's what they do with what they know.

"When I arrived, 20 percent of our final grades were failing grades," says Johnson, "So for me the opening focus was very simple: every student should aim for a C grade or better. Even if they're students with disabilities or difficulties, we can modify courses so that they can attain a C grade. A decade later, we have less than one percent failing grades and last year's Year 12 achieved the best results in my time here."

Johnson says that in order to deliver that transformation, the school began ten years ago by examining the characteristics of their most effective teachers in the school. They also looked at how those characteristics were reinforced by research on highly effective teaching. "Then we asked: why can't everybody be like this?" She says the aim was to change how their teachers were equipped to teach, in order for them to be able to do what the best practitioners did."

"We started off looking at the year 12 results in every subject and then at differences between classes at the school, as well as comparing them across the state and like schools. Then we asked why that class or cohort got those results and the others didn't. That forensic examination went back through all other years, at the end of each term and the end of each semester."

> "We have transformed our school in two ways. One, in terms of the way we measure and deliver our teaching and learning. And two, we have worked on student wellbeing, their role as partners in learning, and their role as local citizens and global citizens. It hasn't just been a focus on their academics.
>
> **Wendy Johnson**
> **Principal, Glenunga International High School**

At the time there was no education-specific data analysis program, so the school simply set up their own tracking and measurement systems in the same way businesses track and measure customers and performance. The measurements are "really specific", she says, and very regular. And visible to the entire staff and parents.

"Having the data means that every one of our teachers has at their fingertips in real time all of their kids' results. And they can also see any behaviour notes, absences, grades across all classes. On the parent portal, parents can see their kids' absences and grades in real time."

Johnson says that often when you talk about data systems in education, it's about systems for finance, attendance and suspensions, rather than what will actually support teachers to teach more effectively.

To give teachers time to hone their tech skills, as well as to review and analyse the data they're gathering, classes start later in the morning each Wednesday. "It has enabled them to personalise their programs rather than teaching to this mythical middle," Johnson says. "The system pulls all the data together, summarises it, shows us the comparisons and any areas that might need to be focused on. All our teachers see the benefits from doing what they normally would have done on paper. Now, it's the technology that does the work, not our teachers."

And while the impact of COVID-19 has put virtual classrooms on the front page of every newspaper, Glenunga has had virtual learning environments for the past decade. If a student is unable to attend class in person, they can go into the virtual learning environment, where their work is submitted digitally, automatically checked for plagiarism and other anomalies and then reviewed by the teacher in that virtual environment.

One of the really exciting things the team is developing is a 'flightpath' for students. "It will mean we're able to say to students in year eight or nine: if this is what your results now look like, this is what they're likely to translate into in terms of your Year 12 achievement. And is that what you want? And if it is what you want, then you can keep doing it. But if it's not what you want, then what do you need to do differently?"

Johnson said the transition over the past ten years has not been without its challenges.

One of the biggest challenges has not just been changing the way teachers teach, but changing the expectations of students about what they would receive as part of their schooling. "We actually empowered our consumers – our students – to know what they should be getting and why, and we used a lot of processes to do that," Johnson says.

The result? Students began asking why teachers were teaching in what they perceived to be "old, 20th century ways", rather than the new ways of teaching which students have come to expect to give them the skills and knowledge to help them get jobs in a changing world. "You had that pressure to change from kids, and from colleagues as well," says Johnson.

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For the teachers, the proliferation of data invoked some really powerful questions around fundamentals such as their reason for coming into teaching in the first place. "One of the important things is challenging experienced teachers to come off automatic pilot, and in to that actual moment of teaching and learning," Johnson says. "It goes to their moral purpose, and then you can ask, 'are you delivering on that moral purpose?'"

Tracing the global shift

The return on investment in better learning systems is undeniable. Research done for the OECD noted the vast improvements and economic uplift that better education outcomes can provide. The OECD estimated that long-run Australian GDP growth would rise by 0.35 percentage points if student learning outcomes were raised to the highest international standard levels. Making progress in learning is therefore not only good for students, it's good for the country.

And digital is the key enabler in driving changes to how we learn and work, especially in the K-12 sector.

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Andreas Schleicher
Director, Education and Skills at the OECD

Andreas Schleicher, Director of Education and Skills at the OECD says that the results of their global teaching survey TALIS show that technology should have a much greater role in the classroom. "Technology cannot just change methods of teaching and learning, it can also elevate the role of teachers from imparting received knowledge towards working as co-creators of knowledge," he said.

"I meet many people who say we cannot give teachers and education leaders greater autonomy because they lack the capacity and expertise to deliver on it," added Schleicher. "But those asked only to reheat pre-cooked hamburgers are unlikely to become master chefs.

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According to the article, the teachers surveyed said that "a shortage of digital technology in the classroom was hindering learning." Just over half of teachers were able to let their students use computers for projects or classwork.

"Only 60% of teachers had received professional development training in the use of technology and almost 20% said they had an urgent need for development in this area. But with the coronavirus pandemic giving us a glimpse of how education could evolve, this could change."

Digital learning systems

Adoption of digital technology platforms enables schools to put students at the centre of learning in three key ways.

1

Digital platforms give us the data to measure performance in real time and to get a more holistic view of the students and the facets we can control that will help us to apply the right interventions to predict and therefore improve performance.

+ New digital tools coupled with advanced analytics and cognitive systems allows education providers to collect in-depth knowledge on students' behaviour, interests and capabilities to provide a broader diagnostic of a student's performance at the individual level. Beyond grades it is about piecing multiple data sets together including attendance, behaviour, extracurricular activity and human skills development

+ Use of technology that makes learning content easier for students with special needs such as dyslexia or hyperlexia

2

If we harness that data, the technology now exists to start to personalise interventions to improve the outcomes for that student.

+ Competency based learning model rather than fixed learning structure: students are architects of their own learning path allowing us to drive better engagement in learning

3

We can start to see where interventions are working by showing learning improvement, learning what is working and via technology scaling it beyond the classroom of the educator who is showing better performance.

+ Emergence of the life-long learner and non-traditional students

+ Proactive approach to learning due to high levels of exposure and guidance available across different platforms

Not just about reforming, but transforming

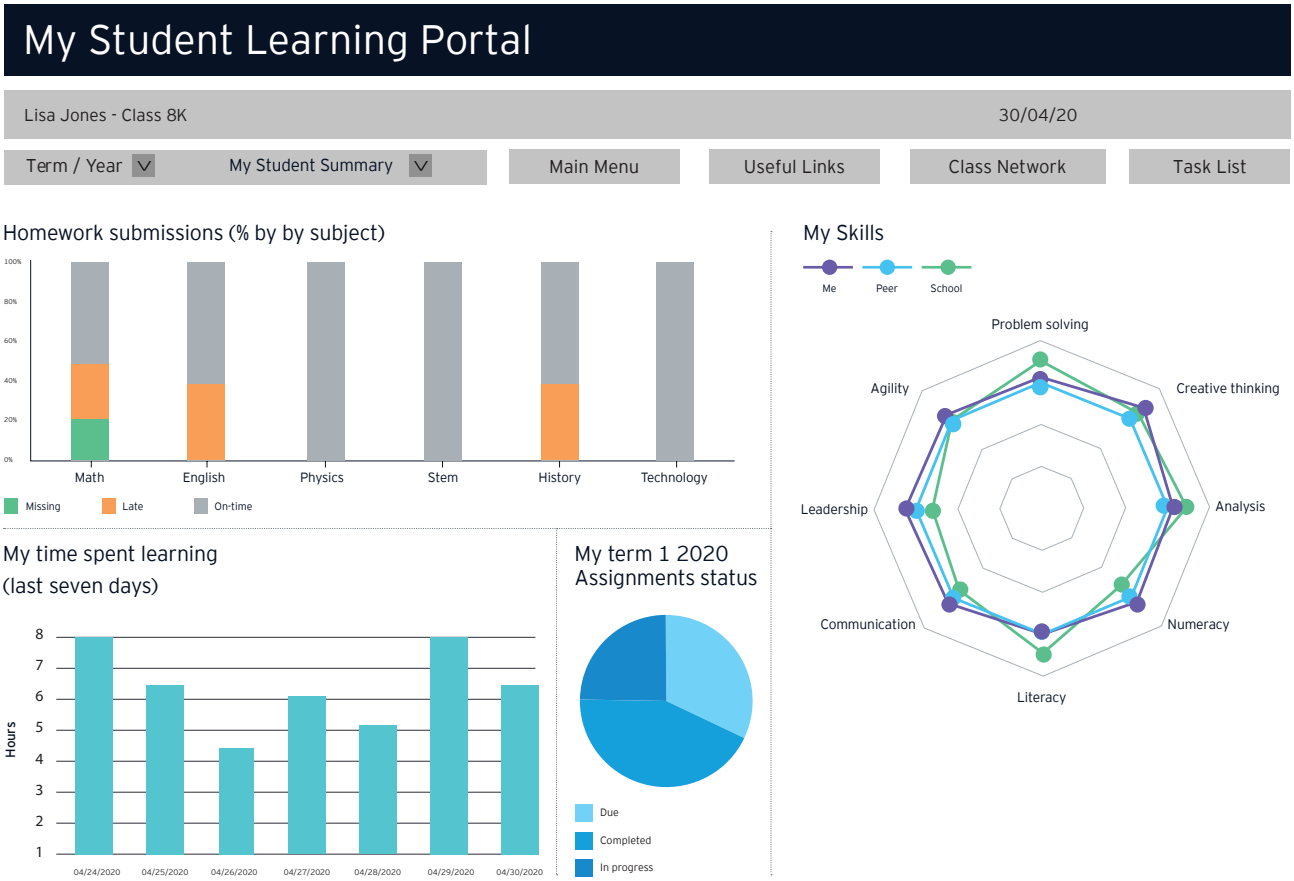

FIGURE 1: An example dashboard showing a student's real time performance across a range of subjects and timeframes.

One of the most important and powerful ingredients in a digital learning approach is the way in which data and analytics are used to create real-time insight and support the transition to a personalised learning model (see figure 1).

Learner analytics can make intelligent use of big data obtained from the teaching and learning process to allow educators to personalise custom learning experiences for each of their students.

For instance, if learner analytics are showing that a student is struggling to absorb and understand content, then teachers can take appropriate measures by offering customised learning pathways and course resources to students.

In the same way that learner analytics allows educators to make proactive decisions about student academics, artificial intelligence (AI) programs can help learn and predict what the optimal work and subject load is for individual students, progressively feeding them customised learning paths depending on their responses and teacher guidance.

For instance, based on progress reports, an AI program can reasonably predict if a student is more arts or mathematically inclined and design lessons or entire curricula that can help each student develop their unique abilities.

Through personalised, adaptive learning, each and every student is given the opportunity to flourish and realise their own strengths and potential in a way that has never before been possible.

Schools and Education Departments are of course, not technology companies. They will need help designing flexible and sustainable ICT architectures that maximise learning outcomes while being adaptable for future change.

Cloud computing will be a big part of the future solution, providing low-cost access to computing power and applications required for personalised learning. Importantly, cloud strategies can help avoid large-scale capital investments, oversized IT management teams and technology obsolescence.

Security of data and IT infrastructure is another pressing issue for most schools and is addressable with the right partners.

CASE STUDY

Transforming through a systems approach to data

For more than a decade, Catholic Education Diocese of Parramatta (CEDP) has been utilising emerging technologies to transform existing classroom methods. Across its 80 primary and secondary schools in Greater Western Sydney and the Blue Mountains, their transformation agenda has been driven by a desire to move away from the "same chair, same classroom" to an "anytime, anywhere" model of schooling.

But innovation has never been about putting the students in front of tablets or laptops. Instead, CEDP has been taking an enterprise-wide approach when it comes to systems, tools and data. "My first job was to get data to see the light of the day," says Raju Varanasi, CEDP's Director Data Intelligence. "We used a 'six-lens' approach based on the priorities and vision of the CEDP leadership to decide what data we needed to collect, curate, and analyse. We now have 600 dashboards where you can access data on reading levels, attendance, results by subject, NAPLAN or HSC scores. We can look at a school level, system level, compare it with the state averages. Whatever you want. Now we don't have to wait two weeks for a school to compile their NAPLAN results over the past five years. We can do it in minutes."

Data is being used to explore how CEDP is able to better meet the needs of its students and teachers. "Real time data that we now have at our fingertips, powers insights and triggers a dialogue with our school leaders," says Varanasi.

CEDP's Executive Director, Greg Whitby has been advocating for a shift away from a one-size-fits all model to schooling towards a re-imagined model that is fit for today's world and today's learners using today's tools. One of those is machine learning. As Varanasi says, predictive analytics is very powerful; it can be used in classrooms to identify an issue long before it becomes a problem. While much of the initial work has been done, there are profound opportunities ahead. "If this is a 100-step process, we are probably at step 60 or 70," he says.

Much of the work is now focussed on building the data literacy of staff across the organisation to be able to collect, understand and generate insights from the data. According to Whitby, "We have always known that teachers are integral to transforming schooling. While we have lots of data sets in place, we need to develop skill sets while changing mindsets from a one-size-fits-all approach to schooling to a personalised one."


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Making the first steps for change

The role of the technology function in schools is often one that goes unnoticed until there is a major outage, or a failed technology rollout. Over the last months, many CIOs and CTOs have found their roles shifting from "keeping the trains running on time" to "building new train tracks and stations as quickly as possible" – and often from their own home kitchen tables.

However, it is inevitable that this will need to migrate from interim to long-term education platforms.

Schools will need to quickly shift focus and resources to shoring up the structures they rapidly put in place. Remote learning structures will need continual enhancement and support, infrastructure will need upgrading, and processes strained by remote staff will need adaptation.

This will be the time to assess how to adjust curricula and classes, and review resource allocation to ensure sufficient flexibility to support students returning to the classroom, those requiring additional remote learning or, most likely, a combination of both.

As attention now turns to the inevitable question of what comes next in the journey ahead, the table below highlights and sequences some of the actions that schools will need to take over the next six to nine months. While no means comprehensive, this table is intended to identify the most critical activities.

Now Ensuring continuity of education operations	**Next** Building resiliency	**Beyond** Reframing the future
+ Undertake a review of term 1 and 2 operations learnings	+ Plan to diagnose learning losses and remediate	+ Invest in personalised learning infrastructures
+ Establish blended learning delivery protocols	+ Prepare for long-term education platform	+ Integrate with education delivery
+ Select curricula to personalise		
+ Deploy professional development programs		

Every so often you get the opportunity to be part of a defining moment in an organisation.

For the country to properly take advantage of this moment, it needs to be a cross-sector, nation-wide effort driven by the State, Catholic and independent sectors.

The challenge in all of this is that schools can't do it themselves. Neither can departments. The willingness to change, to start the process of change, needs to come from a combination of those.

Challenging the status quo will take courage. It will take commitment. And it will take collaboration.

We will make some mistakes – no question. But that is no excuse for inaction. We have a special window for an accelerated transformation that will shape the education system for the coming decades.

Working together, with candour, courage, and commitment, the New Normal can be a wake-up call and a time to rethink how we invest in education for our nation's children.

Today is that opportunity – together we can shape a different future for Australia's Education system.

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