CLASSVR®

# A Pivotal Decade:

## New Thinking and Technologies Reshaping Education

# Introduction

## "You can't stop the waves, but you can learn to surf."

### Jon Kabat-Zinn

As we approach the halfway point of the decade, it's clear that we're in the midst of a globally transformative era in education. Schools need to keep pace, or risk falling behind. Decisions made today will shape education for years to come. In turn, this will forever influence the trajectory of millions of students' lives.

This pivotal decade is being shaped by the confluence of two potent educational forces: firstly, the continuous enhancement of our pedagogical practice in daily classrooms; and secondly, the rapidly shifting contours of the tech-laden world they are poised to enter.

Contemporary pedagogy is vital in these rapidly changing times. Today's teachers develop rich and varied learning experiences that are designed to consistently engage students. In this post-Covid era, where too many students have been unbalanced by their lonely pandemic experiences, this is becoming an imperative. High quality teaching preparation and implementation is more critical than ever.

When it comes to the present and pending technology, educators are only just beginning to get to grips with first-wave AI, and its impact on classrooms and students' future careers. But it's already time to consider what's coming next: the arrival of artificial general intelligence (AGI) – i.e. AI that can truly 'think', and at superhuman speeds and scales.

Just a couple of years ago, computing experts predicted that AGI would be with us by 2050 at the earliest. Thanks to recent advances in AI development, however, AGI's arrival date has been slashed: 2023 research by the University of Oxford found that AGI now has an "earliest possible arrival date of 2028" – i.e. before the end of the decade.

What the arrival of AGI will mean for today's students – tomorrow's workers – is hard to predict. All we can say for certain is that we need to prepare them for it, as thoughtfully and strategically as we can. We can't stop the waves, but we can learn to surf.

Thankfully, students are already laying the groundwork. The children of today are digital natives, born into a world where information flows freely and unceasingly. Traditional modes of teaching are currently being reshaped by students' unprecedented aptitude for technology, and by the ways in which technology is strengthening their relationship with learning.

For today's pupils, teachers and textbooks no longer represent their sole gateways to knowledge. Almost all have ready access to devices that can instantly connect them to pretty much the sum total of all human knowledge – wherever and whenever they like.

Granted, today's school children aren't using technology purely for studious reasons. But they do view technology as an integral and invaluable part of their day-to-day learning – as do their parents.

A 2021 paper from the Australian Government e-Safety commissioner found that 90% of parents see benefit from their children being online. 73% of these parents nominate school work as an important part of online connection. Finding information appealed to 63% of parents, while 50% claimed that entertainment was a worthwhile reason for using the internet.

It doesn't stop there. Children are independently using their household technology to learn everything from music production to animation; from cookery to strength training. The majority of children enjoy learning new things. If educators can marry this willingness to learn with technology's potency as a teaching tool, the next generation's future looks bright.

All of this may require making adjustments – minor and major – to current pedagogical thinking. These adjustments could relate not only to the implementation of new technologies, but to any and every aspect of students' school lives, from homework to mental wellbeing. The rapidfire innovations of the 2020s are transforming society, and schools need to react holistically in order to keep pace.

In this whitepaper, we embark on an exploratory journey, delving into the myriad ways that global schools are embracing novel methodologies and cutting-edge technologies. You will probably already be familiar with some of the new educational approaches highlighted in this report; others may be new to you. Whatever your level of familiarity with these topics, we've sought to provide fresh insights and perspectives on them all.

We'll explore the potentially profound impacts of these emerging approaches and technologies, all of them intended to pave the way for a more socioculturally attuned and forward-thinking education system.

# Meet the experts

We've asked six educational experts to share their thoughts on the emerging approaches and technologies highlighted in this report. Each of them brings a career's worth of knowledge and experience, alongside their own unique personal perspective.

**Dr Rupert Rawnsley**
**Chief Science Officer**
**Avantis Education**
*View LinkedIn profile*

Based in Gloucester, England, Dr Rawnsley is an expert in computing and telecommunications, with decades of experience bringing successful solutions to market. He currently leads software and hardware development for Avantis Education.

**Simon Luxford-Moore**
**Head of eLearning**
**ESMS independent schools**
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An edtech pioneer with a career-long focus on accessibility and differentiation, Luxford-Moore oversees eLearning at the acclaimed ESMS family of independent schools. He is based in Edinburgh, Scotland.

**Dominic Broad**
**Director of Education**
**Thrive Education Partnership**
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Currently Director of Education for a multi-academy trust in the Midlands, Broad is also a former headteacher; a contributor to government advisory panels; a member of Pearson's Digital Round Table; and host of the hugely popular Olympic Mindset Podcast.

**Luke Knightly-Jones**
**Education researcher and private tutor**
**Royal Tutors**
*View LinkedIn profile*

Knightly-Jones is the Royal Tutor to principal members of the ruling families in Saudi Arabia and Qatar, and an educational advisor to a number of globally affluent families. He is currently completing PhD research into educational VR and AR.

**Dr Louah Sirri**
**Senior Lecturer in Educational Psychology**
**Manchester Metropolitan University**
*View profile*

A lecturer at Manchester Metropolitan University in the UK, Dr Sirri's recent published work includes the editorial piece 'Neurobehavioral changes in language learning' in Frontiers in Communication, and the chapter 'Cognitive development' in the 2022 textbook 'Psychology of Education: Theory, Research and Evidence-Based Practice'.

**Tony Ryan**
**Australian Education Futurist**
*View profile*

Tony Ryan is a former teacher and award-winning educator. He specialises in processes that best prepare students for a dramatically changing future. He has provided support for educational institutions in 12 different countries

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# The flipped classroom

## Turning teaching on it's head

The flipped classroom model inverts the standard pedagogical approach of having students consume educational resources in class, and then produce work based on those resources at home.

In a flipped classroom, students instead learn new material independently, outside of class – most often through videos or other online resources – and then come to class to discuss, apply and collaborate on what they've learned. In the classroom, the focus moves away from the teacher and onto the students. Flipped-classroom proponents view this as a more effective and efficient use of both the educator and the students' time.

The definitive origination of the flipped classroom isn't clear, but the approach was most famously pioneered in the 1990s by Harvard University physics educator Dr Eric Mazur. In 2006, Colorado-based chemistry teachers Jonathan Bergmann and Aaron Sams introduced the concept to US high schools when they began distributing pre-recorded lectures to their students. Bergmann and Sams went on to become evangelists for flipped learning, and eventually published a widely cited book on the subject, 2012's Flip Your Classroom: Reach Every Student in Every Class Every Day.

The pandemic drove adoption of flipped classrooms, as the nation's educators found themselves distanced from their students and newly reliant on digital resources. Impressed with the results of their enforced rethink of teaching methods, some chose, post-pandemic, not to return to 'traditional' pedagogy.

"Flipped learning requires a role reversal," according to Australian education futurist Tony Ryan. "Students – at least, those who are self-motivated – engage in their learning outside the classroom, and this involves the teacher preparing that material for them. Soon after, the students then consolidate and finetune on that learning with the classroom teacher. This concept has existed for decades, although contemporary learning technologies can encourage students to engage while away from the teacher."

As effective as the flipped classroom can be, it has its potential disadvantages. For one thing, it relies on students being motivated enough – and having the necessary cognitive capabilities to consume the learning materials given to them. If a student arrives in a practical-driven biology class having failed to watch the teacher's pre-recorded lecture, they're going to be immediately lost.

"We know from neuroscientific research that students' individual differences are a really important factor in learning," says educational psychologist Dr Louah Sirri. "Everyone has a different style of learning; everyone has different cognitive capacities. And so the independent learning of the flipped classroom might work well for some, but not for others."

Another potential issue is the need for teachers to produce high-quality digital content that will engage and educate students outside of the class environment – particularly where that content takes the form of a video lesson.

"It's challenging for some teachers to adjust to the flipped classroom, because it is a very different type of teaching," says edtech expert, Dr Rupert Rawnsley. "And they're sometimes reluctant to record themselves teaching on camera."

There are also digital divide issues to consider. For underprivileged students who don't have ready access to screens and/or an internet connection, the consumption of digital learning content at home will be an issue.

In 2022, over 900,000 households had no internet access, according to research by the Unfortunately, there are correlations with lower learning outcomes for the students in many of those households. According to research by the Australian Communications Consumer Action Network (ACCAN). The financial impact on schools in struggling communities is also significant, given that they make every effort to support those students in whatever way possible.

"The question is, how do we bring some sort of parity to the table?" asks Dominic Broad, Director of Education at the Thrive Education Partnership. "Yes, technology provides equity for students from all backgrounds, because ultimately, technology can provide them with almost anything. But if those students don't have access to the technology they need to gain that equity, then we're simply creating a divide that is only going to grow over time."

For younger children, or children with special educational needs, the flipped-learning model may also prove unsuitable. Parents usually need to offer some time and effort to a flipped classroom process, and they may not always have that time or inclination.

The pandemic created the need for a flipped classroom approach, which required parents to give that support. The onus for the direct learning partly moved from teachers, to parents. Unfortunately, that sometimes resulted in some children not receiving the support they needed.

Most global education systems offer tacit support to the Flipped Classroom model. A large minority of schools and universities have experimented with the process, and have achieved note-worthy results from their students.

Implementing the Flipped Classroom approach can still lead to risks of struggling students not engaging in their learning. It can therefore be exclusionary for poorly achieving students.

## Further reading

AITSL. The Flipped Classroom Model

https://www.aitsl.edu.au/tools-resources/resource/the-flipped-classroom-model-illustration-of-practice#tab-panel-2

"Flipping does have its benefits. Flipped learning as active learning increases students' levels of participation and engagement in learning and there are **students who genuinely like learning using technological devices.** So I, too, employ the tech and techniques, but the message should be that it cannot become the only delivery method in a classroom and must be considered more carefully."

**Dr Nicole Brown**
Director of Social Research & Practice and Education Ltd.,
University College London

# AI-generated teaching materials

## The cutting edge meets the classroom

Artificial intelligence – AI – is fast establishing itself as the defining technological tool of the decade. It's a transformative force, impacting every aspect of society, including the ways in which we learn and teach.

One of the most promising applications of AI in education is the creation of teaching materials that are not only engaging and effective, but also adaptive and endlessly iterative.

Traditionally, the development of teaching materials has been a labour-intensive and time-consuming endeavour. Using generative AI, however, teachers can create highly polished assets – slide decks, quizzes, subject summaries, even full lesson plans – in minutes.

Teachers can achieve this by using AIs such as ChatGPT (from OpenAI/Microsoft) or Bard (from Google) to generate text that provides information or ideas around virtually any subject, using just a simple, conversational prompt – e.g. 'Outline how photosynthesis works, in bullet-point form'.

AIs can also analyse or repurpose existing content. They can provide analytical feedback on student essays, for example. They can convert a dry and lengthy passage of text into snappy discussion points, or a multiple-choice quiz, or a script for a video lesson.

AIs can even rewrite a lesson plan aimed at a specific grade level to make it better suited to younger or older students.

All-purpose generative AIs such as ChatGPT and Bard can be used in conjunction with other types of generative AI to further boost teachers' capabilities, and save them serious amounts of prep time.

For example: text generated in ChatGPT can be instantly converted into a slick-looking slide deck using the Google Slides add-on SlidesAI.io. This deck could then be rounded out with data charts created by Chart-GTP and made visually appealing with professional-quality illustrations generated by Midjourney. What would otherwise be hours of painstaking work can instead be performed during a single recess period.

"There's enormous potential power in AI," says edtech expert Dr Rupert Rawnsley. "It's an amplifier for our intellectual abilities, in the same way that earlier computing paradigms have been. But if you're using AI in an educational context, there are a number of considerations to be made, and potential risks that need to be factored in.

"Firstly, you've got to make sure that the AI's factual output is accurate. AI can be prone to what's known as 'hallucination', whereby it will randomly extrapolate some spurious fact. So fact-checking is vital.

"Then you've got to ensure that AI-generated content meets educational standards of decency. That's a slightly nebulous concept, but it's usually a case of 'you know it when you see it'.

"Next, you have to make sure you're not infringing someone else's IP [intellectual property]. So this would be relevant to, for example, a teacher generating a slide deck, and the AI draws heavy inspiration from another slide deck that's been posted to, say, TeachersPayTeachers.com. And then, unbeknownst to that teacher, that AI-generated slide deck they're now using in the classroom is actually infringing someone else's IP.

"Finally, there's a need to ensure that any information you feed into an AI is going to remain private. So for instance, one of the great strengths of AI is that it allows for greater

personalisation. You no longer have to teach a one-size-fits-all approach. You can potentially offer automatically individualised lessons to every student, because the AI will learn what their strengths and weaknesses are, and will respond by focusing on certain areas.

"So, just as a teacher would know that 'Student A' always struggles with abstract concepts, but responds well to practical examples, an AI will learn that too, and will generate tailored learning materials for 'Student A' in response. The risk is, you're telling the AI algorithm – and the owner of the algorithm – an awful lot about the students in your classroom. Very deep and personal data. So you've got to be careful about what you share with an AI."

However, Dr Rawnsley stresses that while there is some apprehension around AI right now, it presents too great of an opportunity to educators to be dismissed out-of-hand. "AI-generated teaching resources are just like any other resources: there are certain caveats to be aware of. Everything that comes out of an AI needs to be reviewed, and everything that gets put into an AI should be carefully considered."

We're not yet at the stage of having generative AIs create strategically individualised teaching materials for every student in a primary or secondary class. But considering how fast both the evolution and adoption of AI has been in the last year, it's hardly a fantastical or far-off possibility. Getting past educators' concerns around student privacy and factual inaccuracies, however, may require the establishment of an AI tool specifically designed to serve and safeguard schools.

"I think the likelihood is that for education, specifically, there will be a private AI cloud system," says Dr Rawnsley. "The underlying hardware – and perhaps the AI 'engine' itself – will be provided by a big tech company such as Google or Microsoft, in the same way that we now use Amazon to host websites. But the data going in and out of this AI will remain private, in its own safe corner."

Even if (or when) this educator-friendly AI comes online, K-12 teachers needn't worry that they've been rendered superfluous to requirements by technology. "The promise of AI is that it can be an extremely useful classroom assistant for teachers. But it's not going to do away with teachers, because somebody has to be responsible for information that gets put in front of students, and that's always going to be a human being – no matter where they got that information from."

It's likely that, in the future, AI won't just be used to generate content, but also to oversee access to that content. According to Dominic Broad, Director of Education, Thrive Education Partnership, "There are discussions taking place around the potential for an AI-powered 'exam station' that allows children with a range of needs – including children with autism or anxiety – to access traditional exams.

"When students with additional needs are placed into the traditional exam environment – a huge hall with rows of desks – it can sometimes be overwhelming. Okay, you could argue that it's 'fair'. But what we're ideally aiming for isn't fairness, but equity.

"With exam stations, students can take their exams entirely online, monitored by exam invigilators via video, remotely. Trials for these are going really well. But they pose the question: could AI be used to reduce the strain on the invigilators?"

AI is still in its infancy, and it's likely to be several years before we can accurately measure its impact on education. But if these early applications of AI offer any indication, that impact is likely to be nothing short of seismic.

"What if all the children of the world had an AI tutor? An AI tutor that could engage a student and really help them 'get' concepts. **If I'd had an AI tutor I would've been a better student: more engaged, more curious.** Because the fear of learning goes away."

**Satya Nadella**
CEO, Microsoft

# Data-driven learning analytics

## Deep-diving to find hidden educational insights

There are myriad ways that data analytics can be put to use in schools. Firstly, analytics can be used to closely monitor students' performance, and identify those who are struggling to keep up. This proactive approach helps prevent students from falling behind, failing exams or dropping out, as educators can provide them with early intervention and extra support before they reach crisis point.

Analytics can also offer insights into student engagement, by tracking the time spent on course materials and interactions with multimedia resources. This data helps educators gauge the effectiveness of content, and the degree to which students are genuinely engaging with it.

Thirdly, teachers – recognising that each student has a unique learning pace – can use analytics to tailor lesson plans. By utilising data to understand individual learning patterns and weaknesses, educators can recommend additional resources and support to enhance comprehension.

Data can also be used to improve communication between schools and parents. By providing parents with clear, detailed insights into their child's academic progress, schools can foster a stronger partnership and improve the chances of student success.
On a more big-picture level, schools can optimise resource allocation based on data-driven insights. This includes decisions about staffing, budget allocation, and the deployment of educational technology to maximise the impact on student achievement. Data can also be used to identify areas where teachers may benefit from additional training or support. This ensures that educators have the necessary skills and resources to facilitate effective learning experiences.

Education consultant, Tony Ryan, has worked with 1,000 schools in 12 countries and maintains that data analysis is ushering in a transformative period in education. He believes that it also can support teachers who feel overwhelmed with their work.

"In ages past," he says, "teachers struggled to support 25 to 35 students with markedly different abilities and understandings. As a consequence, the teacher sometimes resorted to adopting a one-size-fits-all approach, in the hope that most students would learn most of the curriculum.

However, with data analysis, it is possible to measure student capability accurately, and with the aid of various technologies, to provide a personalised support for each child.

Luke Knightly-Jones, education researcher (and sought-after private tutor), is similarly enthusiastic about the potential of data analytics. "By analysing the information we gather on students, we can adapt and streamline their lessons from week to week.

"This reduces the chance of any surprises, because we're no longer waiting until students take a high-stakes, summative exam to understand how they're doing in a subject. Issues will be flagged in good time, and educators and parents can exercise their agency to deal with them."

However, while data analytics allow teachers to better identify individual students' strengths and weaknesses, time constraints may make it difficult to act on those insights. Manually creating 30 variations of every exam, quiz or teaching asset simply isn't viable for most teachers.

But by combining data analytics with generative AI, such an individualised approach becomes more achievable. Data analytics learns what a student needs from teaching materials; generative AI responds by creating exactly those teaching materials.

Dr Rupert Rawnsley, edtech expert, explains how this can work: "So, for example: I identify that one student requires graphical representation when completing a quiz. So I want to create a quiz for him that looks a little different from his classmate's, which in turn looks a little different from another classmate's.

"If I can create one version of this quiz, and then have AI adapt that quiz to the differing needs of these students, then that's hugely beneficial. I will need to vet the quizzes beforehand, but the AI has done the lion's share of the work for me, saving me a great deal of time. And now I have 30 quizzes perfectly tailored to the strengths of each student."

Department for Education

# Case study

*In 2016, the DfE asked the Independent Teacher Workload Review Group to investigate the collection and usage of data within England's schools.*

Effective data can have a profound and positive impact. It can help teachers to teach, and school leaders to focus on the most effective issues. One concern is that the collation of the data becomes an end in itself, and is separated from the core purpose of improving student outcomes. It can increase the workload of educators without any worthwhile benefit.

Common sense needs to prevail with the data collection. In the UK, a working report in 2016 from their Department for Education focused on eliminating unnecessary workload. Some of their key guidelines included:

- Be streamlined: eliminate duplication – 'collect once, use many times'.
- Be ruthless: only collect what is needed to support outcomes for children. The amount of data collected should be proportionate to its usefulness. Always ask why the data is needed.
- Be prepared to stop activity: do not assume that collection or analysis must continue just because it always has.
- Be aware of workload issues: consider not just how long it will take, but whether that time could be better spent on other tasks."

AITSL (Australian Institute for Teaching and School Leadership) offer some critical tips on collecting and using student data. These include:

- Consider what you are trying to change in your practice, and what data might show the eventual impact of a new teaching practice.
- Start to gather the data as soon as possible.
- Collect the data regularly over a period of time.
- Avoid collecting more data than you need.

# STEM/STEAM labs

## Getting hands-on to build formative experiences

Evolving from the 'maker movement' of the early 2000s, maker learning is a dynamic educational approach that places students at the centre of their learning experience, transforming them from passive recipients of information into active creators and problem solvers. Hands-on, experiential learning is encouraged through the creation of tangible projects, often within a dedicated learning area known either as a makerspace, or a STEAM lab – with STEAM standing for Science, Technology, Engineering, Arts, and Mathematics. (A STEM lab is essentially the same, but minus the Arts component.)

Student-centred exploration is a key component of makerspaces and maker learning. The focus is shifted away from prescribed curriculum and towards student-driven inquiry. This empowers students to explore their interests, passions, and curiosities, leading to a deeper, more engaged learning process.

STEM labs will often host combinations of technologies, tools, and materials, with students coming together to design, build, and iterate on their physical and digital creations.

Maker learning transcends traditional subject boundaries: it encourages students to draw from various disciplines, integrating science, technology, engineering, arts and mathematics to solve complex, real-world problems.

A maker-learning project might involve robotics, coding or even chemistry alongside traditional trade skills such as carpentry or metalwork. Through this cross-pollination of abilities, tools and interests, maker learning celebrates diversity and inclusivity. It accommodates different learning styles and backgrounds, making projects widely accessible. Students learn essential 21st-century skills, including creativity, adaptability, critical thinking, communication, collaboration and digital literacy.

When overseeing maker-learning projects, the teacher's role is that of facilitator, rather than lecturer. The teacher guides and supports their students, fostering a culture of curiosity and exploration, while ensuring safety, providing insights, and encouraging class-wide collaboration.

Why do maker learning and STEAM approaches work? According to education consultant Tony Ryan, it gives students a purpose for their education. "Experiential learning matters to students of all ages. Hands-on approaches generally lead to deeper understanding, as well as to an increased engagement in the subject matter."

In Australia, the CSIRO co-ordinates a program called STEM Professionals in Schools. It is the largest national skilled volunteering program for STEM professionals. The program facilitates continuous partnerships between STEM professionals and teachers in schools across Australia. There are over 3,000 STEM volunteers who regularly work with schools. The projects are many and varied. Indigenous students in WA connect culture with science at the University of WA. Covering topics such as physics, earth science, human biology and coding.

Specialists as diverse as air traffic controllers and fisheries scientists offer their wealth of knowledge to students all over the country. The focus is invariably on practical projects that lead to an exciting outcome for the students.

## Further reading

Makerspaces in Education by Caroline Keep (TES New Teacher of the Year 2018), Penketh High School, Warrington

*Published by the Independent Schools Council, 2020*

# Post-pandemic expansion of SEL

## Prioritising students' mental wellbeing

The global pandemic profoundly impacted the educational landscape, prompting schools to prioritise and expand their Social and Emotional Learning (SEL) lessons.

The reasons for schools' newly energised focus on SEL are manifold. First and foremost is the fact that the pandemic greatly exacerbated mental health issues – including anxiety, stress, and isolation – among students. A 2022 report from the Centre for Community Child Health in Australia outlined the many issues on children's physical and emotional well-being. These included the lack of simple playtime with classmates, and the non-access to green spaces for sport and other games.

Children whose parents' employment changed as a result of the pandemic too often lived in stress-filled households (or tiny apartments). These conditions led to poor development of social and emotional skills. Expanded SEL programs help address these challenges by providing students with the emotional tools and coping strategies they need to navigate difficult times.

SEL equips students with resilience skills, helping them bounce back from setbacks and adapt to changing circumstances. The importance of these skills came into sharp focus during the pandemic, as students faced disruptions to their learning routines and daily lives.

The pandemic also gave rise to prolonged periods of remote, isolated learning, which impacted students' social skills and emotional wellbeing. Expanded SEL programs aid the social reintegration process by fostering healthy relationships and stronger social connections. SEL also promotes equity by addressing the unique needs of diverse student populations, creating more inclusive learning environments.

Educational psychologist Dr Louah Sirri says that, as with every shift in educational policy, there's a careful balance to be struck: a need to ensure that expanded SEL programs don't over-protect students from the natural stresses and strains of life.

"It's definitely good to teach young people how to regulate their emotions and develop their social skills," she says. "But it's also important to challenge them. I'm not suggesting we traumatise them, obviously! But the more we focus on protecting their social and emotional wellbeing, we're spending less time helping them directly face up to some of their challenges.

"For me, education and life go hand-in-hand. So if you're unable to face some of the challenges that arise during your educational journey, you will lose some of these abilities outside the education system, too.

"We need to give young people the foundation for emotional self-regulation and social skills. Then you want them to keep building on top of that foundation on their own. But what sometimes happens now is that we provide them with the foundation, but then we also hold their hands while they're building on top of it. And so we lose the social cognitive skills that you'd otherwise expect them to develop independently.

"If you give a child the right environment from the beginning, and you teach them how to self regulate, to be aware of others, to communicate with others, if you give them those basics, they should be able to carry on developing these skills on their own."

SEL isn't solely being used to tackle social and emotional issues that came to the fore during the pandemic. Advocates say that SEL not only improves students' wellbeing, but also enhances academic performance. Schools are increasingly drawing a link between students' mental-health needs and optimised learning outcomes.

Edtech company Branching Minds' Cumulative Impact Report 2022 revealed a significant positive correlation between students' social-emotional skills and their reading and math performance.

The study conducted an analysis of data from nearly 4,000 US students (aged 13 or 14) during the 2021–22 school year, utilising screening assessments for social-emotional skills (DESSA- Mini) and measuring reading and maths performance.

The research found that students with strong SEL skills tend to achieve higher levels of proficiency in reading and math, whereas those with weaker SEL skills often exhibit lower academic performance.

The data revealed a substantial overlap between students in need of additional SEL support and those requiring extra academic assistance. Approximately 65 percent of students identified as needing more support in their SEL development were also identified as requiring supplementary academic support. These findings underscore the interconnectedness of SEL and academic outcomes, highlighting the importance of addressing both for holistic student development.

# VR and AR

## Engaging students with 'impossible' experiences

It was 1990s movies such as 'The Lawnmower Man' and 'The Matrix' that first introduced the concept of virtual reality to mainstream audiences. The technology itself, however, was to remain inaccessible to the public until the mid-2010s, when Oculus and Galaxy Gear headsets first hit shelves. Although aimed squarely at gamers, this first wave of mass-market VR technologies opened up an exciting new avenue for technology in the classroom.

It was Google's education-focused Expeditions app – launched September 2015 – that initially seemed destined to introduce VR to schools, en masse. Polished and educationally sound, Expeditions content was accessed using Google Cardboard – inexpensive cardboard or plastic headsets that held compatible mobile devices.

Expeditions was, however, to be discontinued by Google in 2021. For all its admirable ambition, the platform proved incompatible with users' real-world needs. The app's phone-screen interface could be awkward to use; a classroom's worth of headsets could not be managed centrally and simultaneously; and each headset required a smartphone, which were inappropriate and potentially unsafe devices for classroom use.

Furthermore, Expeditions content – while well-made – was somewhat limited in scope, and didn't cover every aspect of the curriculum. It didn't harness the evocative interactivity of AR, and teachers were unable to upload their own self-made content to the platform. Google Expeditions, then, was a case of 'right concept, wrong execution'. Launched in 2020, Meta's Quest 2 initially seemed destined to succeed where Google had fallen short. Unfortunately, the headset – and the surrounding Metaverse concept – remains too squarely aimed at gamers and social- media users to be of practical use to educators.

Elsewhere, the launch of Apple's Vision Pro – released through 2024 – will certainly help to elevate VR's place in the public consciousness, thereby bolstering acceptance of VR as a key element of modern schooling. But with Apple's marketing and retail pricing of $3,499 currently positioning the Vision Pro as aspirational tech for 'early adopter' types, the system's appeal as a mass-market educational tool appears limited.

In the meantime, ClassVR has emerged as the global frontrunner in educational VR and AR. Affordable, adaptable and easy to use, ClassVR headsets are now deployed in more than 200,000 classrooms worldwide. The VR edtech revolution, so nearly delivered by Meta and Google, is now truly underway.

Dr Rupert Rawnsley is one of the principal architects of the technology underpinning ClassVR. "The principal benefit that we see with students is around engagement," he says. "Utilising ClassVR headsets allows teachers to pierce through students' apathy, or their reticence to engage with a certain topic. There's an instant and powerful emotional response to the content, and that leads to measurably improved learning outcomes.

"Today's students have grown up with YouTube, with TikTok, and so traditional presentation methods or videos don't really make a huge dent in terms of getting their attention and imparting information. But with ClassVR content, they're exploring and engaging with this 3D world. And that's very stimulating and very impactful, educationally."

One of the key reasons for ClassVR's success is the fact that every element of it was designed, from the ground up, with education in mind. Devised by teachers for teachers, ClassVR is purpose-built to engender positive learning outcomes in busy classroom environments. ClassVR technicians set up and configure the headsets for teachers, and an educational-support team provides guidance on usage.

ClassVR provides educators with curriculum-aligned content; ease of implementation, storage

and charging; and total control over students' VR experiences, via the ClassVR portal. The latter point is of particular importance, as it means students stay on-track and undistracted throughout their VR experiences.

These are experiences that would otherwise be unattainable, whether for practical or financial reasons. Choosing from thousands of instantly accessible content options, teachers can bolster their lessons with intensely engaging VR and AR experiences: walking with dinosaurs, flying across Saturn's rings, experiencing an earthquake, stepping into Florence Nightingale's shoes – the possibilities are expansive, and ever-growing. Through immersive visualisation, students can swiftly grasp even the most complex, alien or abstract of topics.

With students firmly focused on the subject at hand, and the teacher steering the experience throughout, a ClassVR headset session may only last a handful of minutes. But this rapid immersion into a topic helps the teacher to get to the heart of their lesson plan, faster.

"Think about when students are first coming back into class after recess," says Dr Rawnsley. "We all remember what that was like: you're still in that 'lunch mode', talking with friends, not really focusing for those first 10 minutes. But if the teacher starts off the lesson with some VR content, then once that headset is on, the students' peers are no longer a distraction to them. They're experiencing exactly what the teacher wants them to experience. And in five minutes, when the headsets come off, then the students are enthused, they're excited, they're on-message. And the teacher can segue into the pedagogy they have planned. So, it's certainly not intended to replace existing lesson plans. ClassVR is supplemental. But it's high-impact supplemental."

The bank of research into the effectiveness of VR as an edtech tool is growing all the time. In 'Effects of virtual reality on learning outcomes: A meta-analysis' – published in Educational Research Review, 2022 – 21 standalone scientific-journal papers on educational VR were analysed to identify common findings.

The paper concluded that, "Virtual reality has a medium-to-large positive effect on students' learning gains," and, "Immersive virtual reality promotes larger gains than semi- and non-immersive systems."

And in its 'What does virtual reality and the metaverse mean for training?' report, PwC a leader in the world of professional services found that learners using VR were four times more focused than those consuming other electronic content; were 3.75 times more emotionally connected to lessons than purely- classroom learners; retained the necessary knowledge four times faster; and were 275% more confident in applying what they'd learned through VR.

Beyond bringing subjects to life, VR is also increasingly being used in the context of students' emotional wellbeing. "We've been using ClassVR headsets for six years, to support and enhance learning," says Simon Luxford-Moore, a head of eLearning. "But in the last year, we've realised we can offer more than curricular content through VR. We're now using headsets to support children with regards to anxiety, autism and aspects of ADHD.

"When they need a timeout, we have QR codes that a child can quickly and easily scan using the headset, and it will bring up their bespoke playlist of content that helps them cope with big emotions.

"The results are phenomenal. Now, instead of these children requiring an average time of 20 to 40 minutes before they could overcome dysregulation, find a quiet place, calm down, and eventually return to class, they're now able to reach that point through using VR within just five minutes."

ClassVR also enables educators to create and upload their own content: panoramic photographs taken during class field-trips, for example, or 3D models designed by children in CAD software. This content can then be shared with other educators, via a huge global repository of independently- produced assets, curated, managed and supported by the ClassVR team.

This content-sharing capability has given rise to a global community of ClassVR- using enthusiasts, eager to help and inspire others with engaging new ways to harness the technology. And with ClassVR gaining hundreds of new converts every day – thanks to its accessibility, adaptability and educational prowess – that thriving community is growing stronger all the time.

## The power of VR learning

Compared to learners taught with more traditional teaching methods, VR learners are:

**x4** more focused

**x3.75** more emotionally connected to lessons

**x4** quicker to retain knowledge

**275%** more confident in applying learnings

Source: PwC

# Case study

## *ClassVR use at St Mark's Anglican Community School*

**Located in Perth's northern suburb of Hillarys, St Mark's Anglican Community School has grown from humble beginnings as the first ASC school in 1986, to become a thriving educational community of approximately 1,800 students from Kindergarten to Year 12.**

As an independent, co-educational K-12 private school, St Mark's has given deep thought to campus design. Adopting a holistic approach, St Mark's maximises the student experience by considering physical, emotional, and social development, in addition to academic needs. This ethos underpinned the introduction of ClassVR, with the school pioneering its use both inside, and outside of the classroom.

### SEEING IS BELIEVING

Having worked hard to establish first-class facilities, St Mark's strives for continuous improvement and innovation. When longstanding technology partner, Solutions IT, introduced ClassVR to the school, its potential to enhance education delivery and give students rich experiences was immediately clear.

"As soon as I put a headset on, I saw for myself how ClassVR could enhance and transform learning," explains Kelly Curran, Head of Digital Learning at the school. "Right before my eyes I could see exciting and multimodal experiences that would ultimately increase student engagement."

***"Without exception, ClassVR can be used in every subject"***

It wasn't just experiencing the student perspective that convinced Kelly ClassVR would be an ideal solution for the school. "During the initial demonstration, I saw how quick and easy it was to prepare, deliver, and manage lessons. There are literally thousands of resources curated for you, plus the ClassVR Portal is so easy to use and puts the teacher in complete control," continues Kelly.

Based on the ClassVR demonstration, Kelly introduced 16 headsets with charging case and found this set-up to be an incredibly practical solution: "Our vision was to make ClassVR accessible throughout the school. It's super practical having a storage case that makes the headsets easy to move between classrooms and charges them at the same time – they are always ready to go!"

### IMMERSING STUDENTS IN LEARNING

By sharing ClassVR across the school, all teachers have access to its powerful AR and VR capabilities. Its flexibility for cross-curricular use has also proven a valuable benefit: "Without exception, ClassVR can be used in every subject throughout the school," says Kelly. "French. Mandarin. History. Science. There are ClassVR resources for everything! We can use AR or VR

content as a stimulus in any lesson, then create class quizzes about what is viewed."

While using the headsets naturally sparks student excitement, Kelly believes ClassVR fundamentally supports most steps in the guided inquiry process: "When using content from the ClassVR content library it's great for open and immerse, explore and gather visual information. But if you bring student content creation into the mix, you can also cover 'present'. For example, students can take and upload their own 360 photos and videos, or create content to demonstrate learning in CoSpaces."

ClassVR is also proving an excellent resource for teaching topics. "We often use ClassVR to introduce students to a topic. VR gets them interested, wondering and excited about it, in a way that no other method can. We then go ahead with teaching the topic as normal, and bring ClassVR back in towards the end," explains Kelly. "It's valuable for students to see as connecting learning content to the VR scenes reinforces their learning."

## GLOBAL VR COMMUNITY, LOCAL SUPPORT

ClassVR is used in more than 90 countries and in over 200,000 classrooms around the world.

As one of the teachers forming part of this global community, Kelly shares why St Mark's wouldn't be without ClassVR now: "Students love it! They are just so positive about the learning experiences ClassVR brings. From my perspective as a teacher, ClassVR gives students deeper understanding of so many things – especially ones they cannot visit. Take the solar system. We can't go on a trip to space, but we can take them there with ClassVR." Designed specifically for education, ClassVR has been developed to meet the needs of local education systems. This includes access

to training and support from a local partner, and more recently ClassVR content has been mapped to the Australian curriculum.

"When you use ClassVR, it's abundantly clear that it's been made for the classroom. Headsets get dropped, but they don't break. Content is created for the curriculum. And above all, you feel like the teacher has been thought about. Minimal training and you're good to go. Although having access to a local partner for any questions and support does give you peace of mind!"

# Case study

## *ClassVR use at Bader Intermediate School*

**Based in Māngere, Auckland, Bader Intermediate is a middle school that has long embraced a student-centred approach to learning. Prioritising individual growth and development, the school has small tutor groups to provide personalised support and students have the opportunity to learn alongside peers and teachers from diverse backgrounds.**

Bader 'empowers innovative education' by designing its curriculum around six themes: Technology, The Sciences, English, PE & Health, The Arts and Mathematics. Developing broad technological design skills is a key focus in Technology, and students are given access to cutting-edge solutions to bring their ideas to life. ClassVR is the latest addition to Bader's suite of modern equipment and has fast become the perfect platform to teach students to become creators instead of consumers.

### FROM CONSUMPTION TO CREATION

"We visited EduTech in Melbourne to find a VR solution for education," says Brent Julius, Technology Head of Department at Bader Intermediate. "There was no shortage of AR and VR on offer, but after lots of demonstrations, it was clear that ClassVR was the only solution designed specifically for education – which made it the best choice for us."

With a strong focus on the 'design process', Bader wanted a VR solution that would not just boost learning experiences through immersive opportunities. Instead, Bader wanted to empower its students to consume curriculum-aligned content and create their own VR content. With the support of Principal Jerry Leaupepe and the school's Board of Trustees, Bader realised this curriculum vision with ClassVR.

Milly Murphy, a school Dean and Media Design Lead, managed the implementation of ClassVR and is pioneering its use with learners. "Our aim was to enable students and staff to 'consume' information using VR, and then use the learning to 'design and create' their own products," she explains. "ClassVR is ideal for this as it comes with thousands of curriculum-aligned resources and allows the uploading of your own AR or VR content."

Like many schools around the world, Bader uses CoSpaces to help teach coding and facilitate students' STEM development. ClassVR has a tight integration with CoSpaces, which has been a game changer for Bader: "Students are more regularly living in virtual spaces. Being able to create our own VR content, then test and explore it in ClassVR, has been phenomenal," explains Brent.

"Students are using ClassVR to create animated stories, design rollercoasters and build parkour games. ClassVR has really opened up the learning potential with technology, giving students the tools that make the impossible, possible!"

After an initial investment in 16 ClassVR headsets, Bader's VR strategy has focused on the Media Design specialist classroom. Used alongside Photoshop, laser cutting, 3D printers and other cutting-edge technologies, ClassVR is helping students to develop advanced technological skills and building confidence to create their own content.

"Our vision is to teach students these skills in the specialist class, then take those understandings to apply in the core subjects," says Brent. "We're already experimenting how to use them in literacy to enhance students' descriptive writing."

***"ClassVR has really opened up the learning potential with technology, giving students the tools that make the impossible, possible!"***

## SUPPORTING SEND STUDENTS

ClassVR has also made a positive impact on the learning experience for SEND students. Two students at the extreme end of autism often refuse to go into other classes, but in Media Design their attendance is high, and they are both fully engaged throughout the entire session. Viewing their own CoSpaces content through ClassVR headsets gives them an opportunity to participate in class activities alongside their peers in a safe environment.

"My key focus is to help our students explore, discover, and master their talents and creativity," explains Milly. "The ClassVR headsets and design processes we use have had a profound effect on our neuro-diverse learners, in particular their increased levels of engagement."

## A VISION FOR THE FUTURE

Bader knows their ClassVR journey has only just started but is already looking to the future. One vision is to use the AR merge cube, enabling students to view 3D objects via the headsets and then examine them further with their own hands using the cube.

Milly is particularly excited to see how the school can push the boundaries of what can be achieved with the technology: "We are blown away by our progress in such a short space of time. Next step is for us to engage with the additional professional development that's available locally. We know that ClassVR has so many more capabilities and we're excited to explore and use these to empower our students even further. ClassVR offers so many benefits to all our learners, which is why our aim is to bring the technology into all curriculum areas."

# Conclusion

## A bright, bold future

"Many people view the pandemic as having been disastrous for education, but I view it as a phoenix-from-the-flames moment," says Simon Luxford-Moore, a head of eLearning. "Yes, there was a lot of disruption, but I think we've come out of it all the better. I know our schools have taken a great many lessons from it. It's forced us to look, creatively, at what we can provide students. And so I view the current moment as an amazing opportunity."

If the enforced 'hard reset' of the pandemic has created an opportunity for radical change, then the 2020s' dramatic technological and societal shifts – the rapid evolution of AI; the increased focus on mental wellbeing – has made that change feel essential.

As we've seen from the research and expert viewpoints outlined in this whitepaper, there exists real momentum for a once-in-a-generation evolution of education. There's a hunger for bold, exciting new thinking among frontline teachers and policy-makers alike. This newfound willingness to rethink and rebuild looks set to make the 2020s a defining decade for the profession.

Australian education futurist Tony Ryan conjectures on the dramatic lives that our children will lead in the 2030s and 2040s. He maintains that working with robots will be commonplace; AI will revolutionize every profession. The concept of work will undergo some massive changes, and will need our young people to develop capabilities such as digital literacies, initiative, and critical thinking. He says that children will need to master what robots cannot (yet) do.

There's little doubt that some of the emerging approaches covered in this whitepaper are destined to be adopted more rapidly and readily than others. Few forward-thinking educators would question the importance of SEL, the potency of VR, or the inherent value of STEAM labs. Other methodologies, however, are more divisive: the blanket adoption of flipped learning, for example, seems unlikely to happen on a grand scale in the near future.

At the heart of all these evolutions in learning, of course, are the students. How will they look back at their 2020s school years, decades from now? Which current methodologies and technologies will they recall fondly – and which will they shudder at the very mention of? We can make educated guesses, of course, but only time will truly tell.


# Want to see ClassVR in action?

*Book a free, no-obligation, demo.*