

# Technology as a Partner in School Reform

Dr Ralph Saubern for the Elevo Institute and the Institute for Educational Reform November, 2025



## **The growing crisis of disengagement in the middle years of schooling**

Research is confirming what schools already know: that far too many students in Years 7 to 9 are bored, anxious and disconnected, with a growing sense that school is irrelevant to their lives. Literacy and numeracy growth plateaus, attendance falls, and the gap between high and low achievers widens. The middle years, sometimes described as the “lost years”, have become a critical period when curiosity and confidence too often give way to disconnection and decline.

Schools have long understood this problem and the consequences of disengagement for students, the school and the wider community. Many schools and systems have designed and implemented approaches focused on building and maintaining student engagement.

While often initially successful, these have proven difficult to sustain or scale. Innovative and responsive approaches attuned to the needs of middle years learners have often faded in the face of mandated curricula, compliance focused assessment systems and heavy teacher workload.

Now advances in technology are providing valuable support for reform efforts, making it possible to see learning more clearly, personalise challenge and support, and implement middle years programs that are both engaging and sustainable. Used well, technology gives schools the support needed to connect evidence, teaching and learner agency to turn the lost years into years of growth and purpose.

### **What the research tells us**

The decline in cognitive engagement—an unwillingness to persist, seek challenge or invest effort in learning—in the middle years undermines motivation, weakens progress and widens inequities between students. Evidence shows that disengagement in the middle years is not simply about attitude and is not an inevitable result of adolescent development. It reflects deeper structural issues: curricula that assume uniform progress, assessments designed for institutions not learners and workloads that leave teachers and leaders too stretched to engage in human-centred pedagogy. The result is a generation of students experiencing declining wellbeing, motivation and belonging at school, alongside educators whose capacity to respond is stretched thin. Too many young people are disengaged from learning at the very stage when curiosity, confidence and identity should be expanding, widening the gap between what schools provide and what young people need to thrive.

### **What can be done?**

Successful middle years programs share key features: they ensure that every learner is engaged, motivated and challenged; make learning progress visible; use assessment as feedback for growth; provide teachers with the time and space to focus on learning and learners. Successful programs build students’ sense of purpose, self-efficacy and progress, the strongest drivers of persistence and effort. Teachers shift from content delivery to diagnosis and coaching, supporting students to become self-directed learners who set goals,

monitor progress and reflect on their learning. Professional teams collaborate around evidence, continuously refining practice to sustain engagement and growth. Leaders enable these practices by prioritising structures, time and tools that make deep learning sustainable.

### How can technology help?

Technology is now providing an essential support system that makes these evidence-based approaches possible and sustainable. Smart data tools such as dashboards, adaptive assessment tools and intelligent analytics, help teachers pinpoint where each learner is in their learning progress and the feedback, support and stretch they need next. Adaptive and generative tools make differentiation achievable at scale, tailoring content to student interests and needs while staying aligned to curriculum intent and reporting requirements. Immersive and collaborative tools create authentic, engaging learning opportunities that encourage curiosity, agency and self-directed learning. Automation and integrated digital systems reduce administrative effort and provide much needed bandwidth for innovation, flexibility and learner focused practice.

When selecting and implementing technology, schools should stay sharply focused on solving the most pressing problems of practice in the middle years. In particular, the priority is to invest in technologies that support teachers, leaders and learners to:

- **Collect, analyse and apply data**, to understand and address individual learner needs.
- **Personalise learning**, so that every student experiences challenge, progress and success.
- **Reduce workload**, so teachers and leaders can focus on the highest value work and sustain innovative practices.

### From Lost Years to Learning Futures

As part of its broader efforts to establish the evidence needed to support transformational change in school education in the middle years, the Elevo Institute has commissioned two papers examining the potential for technology to support schools to address the challenge of cognitive disengagement:

- **Re-engaging the Middle Years:** Evidence on cognitive engagement, educational technology and learning system reform reviews the research evidence on the current state of cognitive engagement in the middle years, key issues in curriculum, pedagogy and assessment reform, and the potential of educational technologies to personalise learning and strengthen cognitive engagement.
- **From Lost Years to Learning Futures:** Technology and a new vision for middle years education sets out a vision for a transformed middle years schooling that emphasises cognitive engagement, supported by a technology infrastructure that enables and sustains that vision.

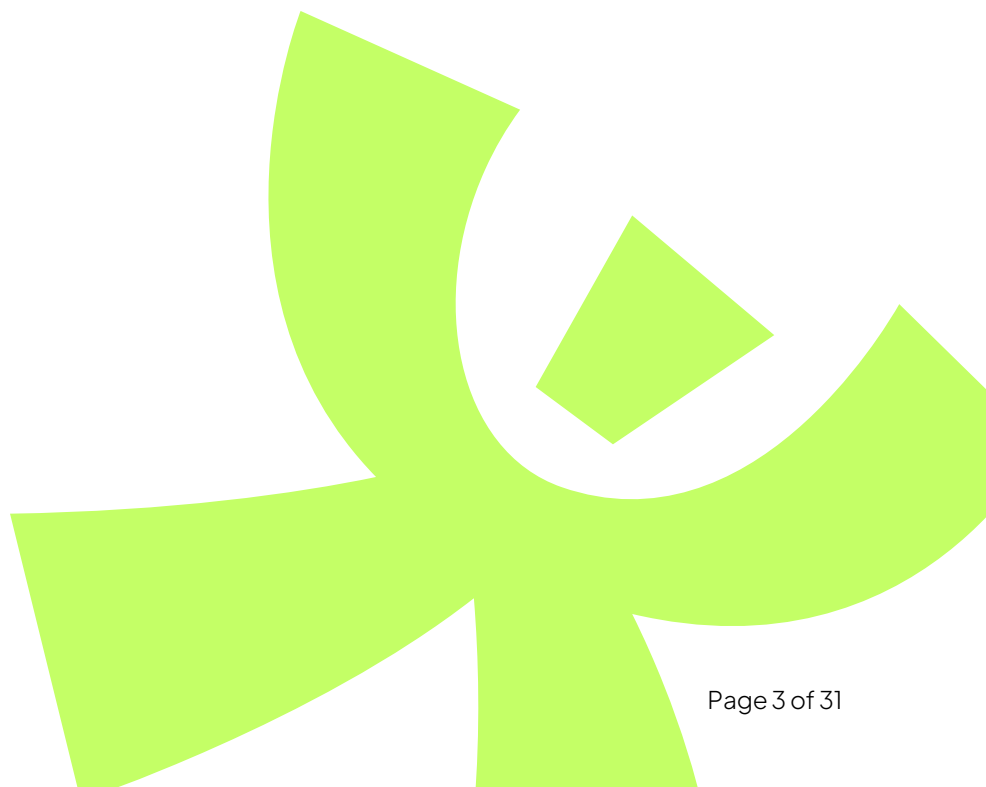
Together they provide a transformation blueprint for middle years learning systems that are learner-focused, evidence-driven and sustainable.

Now is the moment for leadership. Schools know that change in the middle years is no longer optional. The evidence is clear, the tools exist, and the cost of inaction is mounting. Existing and emerging technologies are providing the essential platforms to support schools to design, implement and sustain engaging and productive middle years learning environments. Schools that act can reverse the loss of engagement and ignite a culture of deep learning that carries through to senior schooling and beyond. The challenge is real, but so is the possibility: to turn the lost years into a foundation for learning futures.



Ralph Saubern, PhD, GAICD Education Consultant  
<https://www.linkedin.com/in/saubern>

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# From Lost Years to Learning Futures: Technology and a new vision for middle years education

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Imagine a Year 8 classroom. Students are working in small groups and individually on a range of tasks, activities and projects, engaged deeply in learning. Their teacher moves across the class, sometimes working with individual students, sometimes with groups. Every student has a clear set of goals, short and long term. Every student is cognitively engaged, motivated to learn, persistent. Advanced technology is fully integrated in the classroom, employed to underpin and facilitate learning diagnostics, supporting individualised learning needs and teacher planning, but does not dominate the physical environment. There are no rows of desks with computers; students are not 'attached' to devices. Instead, the classroom is consciously human-centred, prioritising relationships, communication and collaboration between students and with teachers. In this Year 8 classroom, no students are left behind as the curriculum marches on irrespective of their interests or learning needs. No students are treading water as the teacher struggles to maintain discipline, waiting for 'real' school to begin once they endure the middle years. Instead, technology supports the teacher to understand the learning needs of every learner and ensure that every learner is engaged with genuine learning that is challenging, engaging and productive. Self-motivated students are directing their own learning, using technology to access what they need, when they need it, and to connect and engage with peers to collaborate, co-create and challenge. Some of the students are working on developing basic skills and knowledge needed to complete a homework task. Others are already planning their Year 9 experience, a student-led and designed capstone project, thinking about how 'big' they can go and evaluating what skills, knowledge and attributes they need to build to get there.

## Introduction

Australia is facing a crisis of confidence in education. Signs that the system is struggling to meet the needs of today's learners are becoming clearer. Achievement, wellbeing and engagement have declined or flatlined, and public trust is eroding. For many young people, the promise of education as a pathway to opportunity is faltering.

Evidence from national and international assessments points to a persistent and troubling pattern: student engagement and progress tend to decline sharply in the middle years of schooling. Many students report boredom, anxiety and a growing sense that school is irrelevant to their lives. Literacy and numeracy growth plateaus, attendance falls, and the gap between high and low achievers widens. The middle years, sometimes described as the "lost years", have become a critical period when curiosity and confidence too often give way to disconnection and decline.

Educators, educational leaders and policymakers have recognised this challenge for decades. Australia has a long history of middle-years reform initiatives aimed at turning these lost years of schooling into an engaging and meaningful platform for future educational success. Key design features that appear in effective middle years programs are long term conceptualisation of learning, flexible and integrated curricula and centering student voice, agency and wellbeing. Evidence of success is seen in improved engagement, skill development, and school climate. Despite some success, many middle years initiatives faded once seed funding ended or when they clashed with mandated curricula, assessment regimes and reporting systems. Heavy teacher workload, reliance on exceptional leadership, variable implementation quality and limited sustained professional learning also constrained scale-up.

A return to "back-to-basics" approaches, with rigid curricula and narrow accountability measures, has not resolved the engagement problem and has left many young adolescents further disconnected from learning. Research is revealing the human and educational cost of increasing levels of disengagement and the long-term impact on individual wellbeing and educational outcomes. Exhausted school leaders, teachers and parents are crying for more resources, for more support, for a circuit breaker, anything that can address the urgent need of the current generation of students and ensure that future generations are better served.

The response to this growing sense of emergency needs to be more than piecemeal and stop-gap. The knowledge and evidence for how to transform middle years schooling from lost years to a foundation for future learning success exists. Current and emerging technologies present new possibilities to support the kinds of learner-centred, authentic, and collaborative experiences that past reforms aspired to create but struggled to sustain. With the right design and implementation, digital tools and AI systems can provide the platform for the wider success of middle years approaches. The coming transformation will require careful alignment to educational goals, investment in teacher capability, focus on sustainable teacher workload and a deliberate and unerring focus on the learner. However, with technologies already available and emerging, the challenge of transforming the middle years is now a real possibility.

The following vision for a transformed middle years schooling is intended primarily to address the key challenge of sustaining cognitive engagement. It draws on three interconnected streams of evidence detailed in the accompanying evidence guide—evidence of the impact of cognitive disengagement among students in the middle years; of curriculum, assessment and pedagogy reform; of the potential of technology to support and sustain these practices—and builds on the lessons of previous attempts at middle years reform.

This vision starts with people and purpose and the effective, evidence-based educational foundations that underpin it. It then identifies the essential technologies needed to support implementation, enabling teachers, students and leadership teams to enact and sustain the practices needed to transform middle years schooling. Above all this is a human-centred vision: learners and learning first; technology in support. It is a vision for a new kind of schooling that will fundamentally change the experience of young adolescents and restore confidence in the value of education.

### **A vision for cognitive engagement in the middle years**

A human-centred vision for a transformed middle years schooling that emphasises and leverages cognitive engagement starts with a focus on people and purpose: What are our aspirations and goals? What does learning look like in this new, cognitively-engaged middle years schooling? What capability, culture, relationships and resources are needed to empower learners and teachers? What are the evidence-based, educational foundations that are needed to underpin the vision of effective learning and cognitive engagement? These elements provide a set of interrelated transformation goals, each valuable in itself and each amplifying overall efforts to transform middle years schooling into an engaging and meaningful platform for future educational success.

### **People, purpose, and the culture of Learning**

At the heart of reimagined middle years schooling are the people and the culture they create together. The core purpose of this model is to strengthen cognitive engagement: students' sustained effort, deep thinking, and willingness to persist with challenging tasks. Schooling designed for cognitive engagement treats every student as an active learner, supported by teachers who create the conditions for persistence, curiosity, and intellectual risk-taking. When students experience a culture that prizes thought, reflection, and growth, the middle years become not a time of attrition but of accelerated development.

Students are positioned as active co-creators of knowledge. They set goals, monitor progress, and develop metacognitive strategies to sustain attention and effort over time. The emphasis is on productive struggle, working with complex ideas, drawing connections, and persisting through difficulty. Collaborative tasks and projects allow students to learn from one another, exposing them to diverse perspectives and reasoning strategies. This is a culture in which students engage deeply, regulate their own learning, and take intellectual risks.

Teachers evolve from content deliverers to diagnosticians of learning and coaches of thinking. They identify where students sit along developmental continua, diagnose misconceptions,

and design personalised learning experiences that push students just beyond their comfort zones. Expertise in cognitive challenge, structuring tasks that require analysis, synthesis, and creativity, is essential. Teachers build learner self-efficacy by framing errors as opportunities for learning and modelling curiosity and persistence themselves. Working collaboratively, they share insights and coordinate strategies to ensure that every learner is intellectually stretched.

Sustained engagement requires professional development embedded in teachers' daily work. Teachers need opportunities to build confidence in using evidence to pinpoint learning needs, differentiate instruction, and balance explicit teaching with inquiry. Professional learning communities provide time for reflection, analysis of student work, and collective refinement of tasks. Leadership reinforces this by articulating a clear vision that places deep learning at the centre, allocating time for collaborative planning, and resourcing ongoing professional learning. Schools thrive when leaders promote a culture where experimentation is valued, data is used constructively, and professional collaboration is the norm.

### **Curriculum, pedagogy and assessment**

Research has pinpointed the variability of student achievement as a key driver of cognitive disengagement and poor academic performance in the context of an increasingly narrow and rigid, accountability driven education system. Fixed, age-based curricula assume a level of homogeneity that simply does not exist, leading to boredom for advanced learners and discouragement and ongoing barriers to learning for those not yet ready. New curricula based on learning progressions provide a more powerful alternative: empirically based maps of how understanding develops within key domains over time. Rather than treating learning as a series of age-based steps, progressions define long-term pathways of growth, making visible the cognitive processes and conceptual shifts that mark progress. This allows curriculum to be organised around core ideas and developmental continuities rather than arbitrary year-level expectations, giving teachers a shared framework for targeting instruction to diverse learners.

In a progression-based system, assessment ceases to be a judgement of whether students have "kept up" with year-level standards and instead becomes a diagnostic tool for guiding learning. Teachers use evidence from assessments to place learners on the progression, to understand their learning needs, to report on learning progress and to design next steps that stretch and engage learners in their next learning challenge. This approach supports cognitive engagement by making improvement visible and achievable: students can see where they are, where they are going, and how their effort contributes to growth. Growth-focused reporting shifts the conversation away from pass/fail or top/bottom and toward a narrative of development. Students and families receive feedback that recognises persistence, identifies strategies for improvement, and celebrates progress over time. Such reporting not only motivates learners but also builds resilience and self-efficacy, two essential drivers of cognitive engagement.

## **School structures that facilitate and support cognitive engagement**

To support multi-track, individualised learning, schools must reconfigure structures that currently lock students into rigid year-level curriculum delivery approaches. Timetables need to allow flexible grouping, enabling teachers to bring students together for targeted workshops, small-group interventions, or extended inquiry projects that cut across year levels and subjects. Staffing models should prioritise teams of teachers working with cohorts over multiple years, deepening relationships and strengthening collective diagnostic capacity. Advisory systems, in which teachers stay with the same students for several years, can provide the continuity that fosters trust and enables teachers to know learners' trajectories intimately. These structures make it possible to operationalise mixed-level learning in ways that are sustainable, not reliant on exceptional effort by individual teachers.

This vision for transformation is not new. It is based on decades of research and practice in effective middle years schooling. When school leaders, teachers and students share a growth-oriented and developmental mindset in which every learner's learning needs are understood and valued, and use evidence-based pedagogies to support individual learner needs, within collaborative and flexible school structures, cognitive engagement becomes the norm. The challenge is to sustain and scale these practices. In the next section, I outline the opportunities of how powerful new and emerging technologies can support and sustain the much needed transformation.

## **Technology in the service of learning**

Evidence is demonstrating how new and emerging technologies can provide the essential capabilities to support, amplify and sustain a vision of a transformed middle years schooling. The technology infrastructure that enables and facilitates these aspirations follows the purpose and vision and is underpinned and guided by the evidence-based learning foundations. Technology is not the centrepiece of this vision but a powerful support system.

It supports teachers to understand, monitor and report on student learning progress, diagnose individual learner needs, review and evaluate teaching and learning opportunities, and generate personalised learning pathways. It supports learners with the personalised and contextualised learning resources, challenges and feedback that extend their thinking and facilitate increasing self-directed learning. It automates and simplifies routine and administrative tasks, allowing teachers, school leaders and administrators to focus on providing the best environment for learning. These technologies do not seek to replace teachers but facilitate and enable high quality teaching and learning; this is technology in the service of learning.

Technology to support student agency, self-efficacy and independent learning A key driver for cognitive engagement is the transformation of students into active, self-directed learners. A range of existing and emerging technologies have significant potential to support this transformation. Data-driven learner dashboards provide the scaffolding for that agency, helping students understand their learning, set goals, monitor progress and reflect on effort while maintaining autonomy and connection. Personalised in partnership with their teacher,

dashboards make short- and long-term learning goals visible and help students interact actively with their progress, considering what they accomplished, what challenged them and what they will do next, while a generative AI mentor prompts deeper metacognition through reflective questioning. Over time, students internalise habits of planning, time management and self-assessment that strengthen persistence and self-efficacy. Technology supports this by visualising progress, connecting immediate goals to broader learning, encouraging collaboration with peers and teachers, and providing timely advice and feedback. At the start of each unit or project, students use technology to set personal learning goals mapped to curriculum progressions and their own interests. As they engage with tasks, technology provides continuous, responsive feedback that focuses not only on the current work but on overall progress, showing what has been mastered and what comes next. Seeing this growth fosters motivation and resilience, helping students view effort as development and setbacks as valuable information. These personalised feedback loops build a growth mindset and sustain high levels of cognitive engagement.

Intelligent tutoring systems are another key technology geared toward fostering student agency and ownership of learning. Technology is harnessed to give learners greater control and voice. Within the boundaries of curriculum goals, students have meaningful choices in what and how they learn. They choose which skills, knowledge and aptitudes to focus on and the context and topics through to which to explore them. This doesn't devolve into unguided, free-for-all. Rather, students are given structured freedom, supported by adaptive technology that allows them to pursue their individual goals and interests while at the same time making visible progress against the curriculum. Students learn to articulate their needs and preferences and to advocate for how they learn best. Technology supports this agency by offering multiple pathways to learn and create and by nudging reflection at key moments, which helps students see themselves as drivers of their own improvement. The result is that learners feel a strong sense of ownership over their education. They become partners with their teachers, rather than passive recipients. Bold ideas and intellectual risk-taking are encouraged, with AI providing a safety net so students can stretch beyond what they thought they could do.

### **Technology to support authentic and experiential learning**

A growing range of technologies now enables students to engage in learning that is authentic, applied and connected to real-world contexts. Immersive tools such as augmented and virtual reality allow learners to explore complex systems and environments that would otherwise be inaccessible. They can visualise scientific phenomena, historical settings, art and design in rich, interactive ways. These experiences strengthen conceptual understanding and situate learning within meaningful contexts that connect knowledge with curiosity and imagination. Professional-grade software and platforms now accessible in classroom settings support students to apply and extend their knowledge, skills and interests in design, creation and modelling. From data visualisation and coding environments to engineering, media and creative production tools, students can use the same technologies as professionals with support from AI assistants to analyse problems, design solutions and communicate ideas.

These tools foster the development of transferable capabilities such as creativity, collaboration, critical thinking and digital fluency while fostering a sense of purpose and accomplishment that reinforces self-efficacy and engagement.

Communications and collaboration platforms further enhance student self-efficacy and agency by providing integrated opportunities for interaction, feedback and shared problem-solving. Through shared digital workspaces, discussion boards and collaborative project tools, students learn to negotiate meaning, exchange ideas and take collective responsibility for outcomes. Structured peer feedback processes, supported by AI-assisted moderation and guidance, help students develop critical reflection and evaluative judgement while reinforcing the social dimensions of learning. Technology facilitates equitable participation by allowing quieter voices to contribute and by supporting multilingual or multimodal communication. These experiences strengthen learners' confidence in expressing ideas, giving and receiving feedback and working interdependently towards common goals. In this way, technology not only amplifies individual agency but also builds the collaborative dispositions that underpin lifelong learning.

### **Technology to support diagnostic assessment, differentiation and personalised feedback**

Adaptive and generative technologies support teachers to move from delivering content to diagnosing learning and coaching growth. They enhance teachers' ability to identify each learner's current level of understanding, determine next steps and design differentiated pathways for progress. These tools translate assessment data into evidence for learning, keeping instruction, feedback and reporting closely aligned with each student's needs and goals.

AI-driven dashboards provide teachers with continuous, comprehensive insight into student understanding, misconceptions, progress and engagement across tasks, assessments and classroom interactions. By integrating evidence from multiple sources, these systems identify each learner's readiness, gaps and strengths, freeing teachers from the administrative burden of collecting, analysing and interpreting data. With this information, teachers can focus on targeted intervention, adjusting the level of challenge, grouping students flexibly and selecting resources that match different learning trajectories. Each learner receives the appropriate prompt, explanation or extension at the right time, maintaining engagement and confidence.

Generative AI curriculum tools further strengthen differentiation by supporting teachers to tailor content, examples and learning sequences to each learner's goals, context and interests. Technology analyses a student's current position within curriculum progressions and recommends tasks, materials and questions that connect directly to their next step in learning. Teachers refine and extend these suggestions to create coherent, personalised pathways without the need to develop multiple versions of lessons or assessments. In this way, technology becomes an essential partner in ensuring that every learner is appropriately challenged, supported and recognised.

## **Technology to support professional collaboration, reflective practice and continuous teacher professional learning**

A school community's professional learning and leadership culture thrives when teachers have shared, evidence-rich spaces to learn, collaborate and reflect together. Technology supports and facilitates this, aggregating learning analytics across classes and connecting educators across time, place and context. Digital platforms enable teachers to engage in collective inquiry, share evidence of practice, moderate assessment and participate in ongoing cycles of reflection and improvement that keep professional growth and collective responsibility at the heart of school culture.

Teachers operate as members of collaborative, data-informed teams. The same technologies that provide teachers with insight into their students also generate school-wide evidence that supports team-based planning and intervention. AI-driven dashboards help identify trends and patterns in student progress, allowing teachers to see where groups of learners are excelling or struggling and to co-design targeted responses. These insights allow teams to generate shared understandings of learning progress, plan collective strategies, reallocate resources and adjust instruction in ways that are both timely and precise. Generative AI systems assist by surfacing relevant research and suggesting evidence-based strategies linked to curriculum progressions. Technology supports, rather than replaces, professional judgement: teachers interpret the data, refine the approaches and hold shared accountability for every student's growth.

Technology also supports and extends teachers' ongoing professional learning and reflective practice. Digital professional learning environments enable teachers to connect with colleagues within and beyond their school, sharing lesson designs, reflections and examples of student work. AI-driven adaptive professional learning platforms recommend modules and resources matched to teachers' experience, interests and identified areas for growth, ensuring that development is continuous, personalised and embedded in everyday practice. These systems also integrate compliance training and reporting requirements, automatically tracking completion and aligning mandatory training to each teacher's role and level, minimising time demands and administrative burden. AI-supported feedback and virtual communities of practice provide structured opportunities for teachers to analyse their own teaching and learn from peers. In combination, these technologies help to build a self-improving profession, where collaboration, inquiry and evidence are woven into the everyday fabric of teaching.

## **Technology to reduce workload and enable flexible structures**

Beyond the classroom, a new generation of digital infrastructure underpins the flexible, responsive and sustainable operation of schools. Integrated administration and management systems use automation and AI to coordinate timetabling, resource allocation and reporting, reducing duplication and manual data entry. Smart scheduling tools optimise room use, staffing patterns and supervision, automatically adjusting for student groupings, teacher availability and individual learning plans. Compliance and accountability processes are

similarly streamlined through automated data collection and reporting, ensuring that schools meet regulatory and system requirements with far less manual effort. Real-time dashboards provide school leaders with an overview of attendance, wellbeing indicators and learning progress, supporting timely decision-making and targeted support for staff and students.

Communication and community engagement technologies extend these efficiencies into the relational life of the school. Centralised communication platforms unify messaging between teachers, students and families, integrating notices, events, permissions and progress updates in one accessible interface. Translation and accessibility features ensure that every family can stay informed and connected, regardless of language or circumstance. Digital event management tools simplify planning and coordination of school activities, from assemblies and performances to excursions and parent-teacher conferences, freeing staff from repetitive logistical tasks. Secure portals provide parents with continuous, transparent access to their child’s learning and wellbeing information, fostering a sense of partnership and shared responsibility.

Together, these technologies strengthen the organisational backbone of schools, making complex systems more coherent and sustainable. They free teachers and leaders to concentrate on the human work of education, building relationships, supporting learners and engaging deeply with their communities, while ensuring that administrative and compliance requirements are met with precision and efficiency. In doing so, technology becomes not a burden but an enabler of the professional autonomy, creativity and collaboration essential to transforming the middle years.

Figure 1 – Mapping vision, problems of practice and technology supports

Vision	Problem of Practice	Supporting Technologies	Outcomes
<p><b>Students as active, self-directed learners</b></p>	<p>Students cognitively disengage because learning is not personalised to their needs, developmental stage or interests. Feedback is infrequent, disconnected from learning goals and limited to narrow measures of success.</p>	<p>AI-driven learner dashboards, adaptive learning platforms and intelligent tutoring systems that visualise progress, prompt reflection and offer tailored next steps. Immersive and creative technologies, including AR/VR and professional-grade design and modelling tools, that enable authentic, collaborative and experiential learning. Communication and collaboration platforms that support shared inquiry, peer feedback and teamwork across digital environments.</p>	<p>Students set goals, monitor progress and reflect on their learning with growing independence. They engage actively in meaningful, authentic learning experiences driven by curiosity, human connection and personal interest. Persistence, agency and self-efficacy increase as students experience success through visible growth, collaboration and purposeful application of their learning.</p>

<b>Teachers as diagnosticians and coaches of thinking</b>	Teachers struggle to interpret complex learning evidence quickly and adjust instruction in real time. Assessment data often arrives too late to inform teaching.	AI-powered analytics dashboards and diagnostic assessment tools that aggregate and interpret data from multiple sources and provide timely insights into student progress and misconceptions.	Teachers use evidence to understand student learning needs and make immediate, informed adjustments. Diagnostic expertise becomes routine practice, leading to more precise and responsive teaching.
<b>Differentiation and personalised learning at scale</b>	Differentiation often increases workload, requiring multiple plans and resources. Teachers cannot feasibly personalise learning for every student.	Generative AI curriculum tools and adaptive content engines that suggest tasks, materials and pathways aligned to curriculum progressions and individual learning profiles.	Every learner experiences appropriate cognitive challenge and support. Differentiation becomes sustainable and consistent, with technology handling the complexity and teachers focusing on dialogue and feedback.
<b>Professional collaboration and continuous teacher learning</b>	Professional learning is fragmented, compliance-driven and disconnected from daily practice. Teachers lack time and structures for collaborative inquiry.	Digital professional learning platforms, AI-assisted reflection tools, analytics shared across teacher teams, and virtual communities of practice integrated with compliance training and reporting.	Teachers collaborate as data-informed teams, engaging in ongoing professional inquiry and targeted development. Compliance and learning are streamlined, fostering a culture of continuous improvement.
<b>Efficient, flexible school structures and operations</b>	Administrative tasks, timetabling, reporting and compliance consume excessive time and inhibit flexibility. Communication with families is fragmented.	Integrated school management systems, AI scheduling and reporting tools, communication and event management platforms with translation and accessibility functions.	Workload is reduced and organisational coherence strengthened. Teachers and leaders focus on high-value work within flexible and sustainable structures.

### Learning in action: Vignettes from a transformed middle years schooling

The following vignettes illustrate the principles of this vision applied in classrooms supported by the effective use of technology. Each shows a simple example of how enabling technology can support schools, teachers and students to implement and sustain rich and cognitively engaging approaches to learning in the middle years. Adaptive and diagnostic systems make differentiation sustainable and scalable, ensuring every learner is challenged appropriately while supporting teachers with the task of planning, implementing, monitoring and reporting separately for multiple levels. By giving teachers and students clear visibility of each learner's progress in key learning domains, data analytics systems help teachers to target interventions, provide effective feedback and track growth. Teachers and students use data driven insights to plan next steps, identify where additional support or stretch is needed, and ensure that every learner continues to progress. By reducing administrative load and strengthening insight into learning, technology helps schools make human-centred, individualised and cognitively engaging practice feasible and sustainable at scale. These examples demonstrate how pedagogy and technology integrate to support deep, purposeful and enduring learning, where students take greater ownership of their growth, teachers collaborate around evidence

and feedback, and schools operate as coherent, responsive systems that keep learning at the centre.

### **Year 7 Science Inquiry: Investigating Our Local Creek**

Students investigate the health of a local creek. Working in teams, they collect water samples, record measurements of turbidity and pH, and analyse their findings to draw conclusions about environmental quality. The project builds practical data skills and applies curriculum concepts in an authentic context, culminating in a community presentation that connects scientific evidence with environmental action.

Prior to the start of the project, students have access to an intelligent tutoring system which provides structured opportunities to explore the skills and knowledge base needed to undertake the project. The integrated learning analytics system provides real-time insight into each student's progress in data representation, measurement and reasoning. The teacher uses these insights to design interventions that address individual learning needs and ensure every student is making appropriate progress and is able to contribute meaningfully to the investigation. Some receive additional scaffolding in basic data analysis, while others are challenged to model relationships or test hypotheses. Flexible grouping enables targeted support and appropriate peer collaboration, while progress summaries informed by student reflection help learners, teachers and families to see improvement and maintain enthusiasm. Technology makes visible the evidence teachers need to support growth and participation for every learner.

### **Year 8 Mathematics–Art Design Challenge: Patterns of Country**

Students explore tessellation, symmetry and pattern through the lens of Indigenous art traditions. They investigate how geometric ideas can express stories of place and culture, creating digital and physical artworks that demonstrate mathematical, artistic and cultural understanding. The project culminates in a curated exhibition that celebrates creativity, precision and cultural meaning.

Technology supports cross-curriculum collaboration by connecting teachers in mathematics, art and cultural studies through a shared view of learning progress. The analytics platform visualises how students develop mathematical and design concepts and intercultural understandings, while collaborative planning tools help teachers co-design lessons and assessment rubrics. Shared dashboards reveal the impact of instruction across disciplines and identify opportunities for co-teaching or joint workshops. Automated scheduling and resource management simplify logistics, enabling flexible interdisciplinary sessions. Digital portfolios and reporting tools capture each student's creative and conceptual growth, giving both teachers and students a holistic view of learning across subjects.

### **Year 9 History Investigation: Migration Stories**

Students undertake individual inquiries into Australian migration stories, analysing historical sources to understand the experiences of different communities. They evaluate primary

evidence, construct interpretations and present their findings through written, oral or multimedia formats. The task develops historical reasoning, literacy and empathy while connecting learning to real human stories.

AI-enabled research tools and adaptive project dashboards ensure that every inquiry remains aligned with curriculum expectations while allowing for personalisation and choice. Teachers use AI tools to map each student's project to relevant learning goals, prompting them to set targets and track their progress. Automated marking systems provide realtime feedback to students on drafts and components, and provide teachers with real-time data to diagnose needs in reasoning, writing and source analysis. Reporting tools draw from the same evidence base, providing consistent progress updates for students and teachers, reinforcing the connection between individual effort and learning progress.

### **Year 9 Capstone Project: Future Communities**

In their final Year 9 capstone project, students work individually and in groups to design and implement a major project that uses and extends the skills, knowledge and aptitudes they have developed over the last three school years. Some students choose to work in teams to design solutions for a sustainable future. They identify local challenges such as renewable energy, waste management or social inclusion, conduct research, develop prototypes and present proposals to community stakeholders. The project draws together design thinking, scientific inquiry and social understanding, giving students authentic responsibility and purpose.

AI-enabled planning and monitoring systems connect the work of teachers and students across disciplines. Shared analytics show progress against curriculum outcomes while allowing for individual variation and personal pathways. Teachers use these insights to coordinate workshops, moderate student work and report on achievement collaboratively. Generative feedback tools prompt reflection and metacognition, encouraging students to justify design choices and evaluate the impact of their work. Technology supports autonomy and collaboration equally, enabling students to pursue ambitious projects within a framework of clear expectations and shared accountability.

### **Enablers and safeguards for sustainable reform**

Past efforts to transform the middle years show that improvement is possible. Many initiatives succeeded in lifting engagement, achievement, wellbeing and school culture, yet few achieved lasting or system-wide change. When funding ended, leadership changed or priorities shifted, progress often stalled. High teacher workload, reliance on exceptional individuals and a lack of system coherence made sustainable improvement difficult. This vision argues that technology has the potential to be a powerful enabler, connecting evidence, practice and feedback, reducing administrative burden and helping teachers and learners work in more effective and sustainable ways. But more is required. Sustained transformation will require change in systems, schools and communities.

At the system level, alignment of curriculum, assessment, and reporting is essential. A

progression-based model of learning will not flourish while age-graded curricula and standardised testing dominate. System frameworks must legitimise growth-based reporting, embed learning progressions in curriculum design, and replace narrow summative judgements with diagnostic feedback that informs teaching. These policy settings signal to schools that differentiation and cognitive engagement are not optional add-ons but central to what counts as success.

At the school level, workload and professional learning remain critical barriers. Personalised and evidence-rich practice demands time, collaboration, and confidence with data. Without systemic redesign, these expectations risk intensifying teacher stress. Sustainable reform depends on staffing and scheduling models that free teachers for teamwork and reflection, embedded professional learning communities that build diagnostic expertise, and leadership cultures that reward experimentation and learning from evidence rather than compliance with routine.

At the community level, cultural expectations must evolve. Many parents equate rigour with traditional grading and age-based progress, making innovation seem risky or untested. Schools and systems need deliberate communication strategies to show what growth-focused learning looks like, how persistence and self-regulation drive achievement, and why cognitive engagement matters more than “back to basics”.

Finally, the integration of AI driven technologies demands clear ethical and equity safeguards. Powerful digital tools offer new forms of personalisation but carry risks of bias, surveillance, and commercial exploitation of student data. Governments must set enforceable national standards for data ownership, algorithmic transparency, environmental responsibility, and equitable access. Schools, in turn, should model ethical use, engage students and parents in open dialogue about consent and privacy, and ensure that technology supplements but never replaces human judgement. Sustainable reform will depend not only on what technology can do but on the collective choices of systems, schools, and communities to use it responsibly, ethically, and always in the service of human-centred learning.

### **A call to action**

Australia has spent decades trying to reimagine the middle years to address the growing problem of the lost years of schooling. Some initiatives lifted engagement and strengthened school culture, yet few endured. Back-to-basics, accountability-driven systems have narrowed the curriculum and intensified teacher workload and burnout, while cognitive disengagement among young adolescents has continued to grow. The result is a generation of students experiencing declining wellbeing, motivation and sense of belonging at school, alongside educators whose capacity to respond is stretched thin. Too many young people are disengaged from learning at the very stage when curiosity, confidence and identity should be expanding, creating a widening gap between what schools provide and what young people need to thrive.

The conditions for lasting transformation in the middle years now exist. Advances in adaptive and generative technologies, combined with an increasingly rich evidence base on learning

progressions, formative assessment and cognitive engagement, mean that the long-envisioned model of schooling designed around learners and learning, supported intelligently by technology, is finally within reach.

The vision is clear: classrooms that are learner-focused and intellectually ambitious, where technology helps teachers see every learner clearly, differentiate effectively and sustain curiosity and effort. Progress is demonstrated as growth and persistence, not as static grades. Teachers collaborate across disciplines; students design, inquire and communicate with purpose; parents and communities see authentic evidence of learning and progress.

Transforming the so-called lost years into the most powerful stage of learning will not happen by chance. It will take collective will, coordinated effort and moral clarity. The evidence is strong, the tools are ready and the moment is now: to place learning first, technology in support, and the learner at the centre of a purposeful and enduring new future for the middle years.

# Re-engaging the Middle Years: Evidence on cognitive engagement, educational technology and learning system reform

Dr Ralph Saubern for the Elevo Institute and the Institute for Educational Reform November, 2025

The middle years of schooling, Years 7 to 9, are a period where many students' motivation, confidence, and sense of purpose decline. Recent evidence, including the ACER rapid review of disengagement in Victoria (van der Kleij et al., 2025), underscores the scale of the challenge: at least one in three students in these year levels are disengaged, with declining motivation, fragile learner dispositions, and weak connections between classroom activity and perceived purpose all contributing to a widening gulf between potential and achievement. This disengagement is not simply a matter of student attitude, but reflects deeper systemic issues in the way curriculum and learning opportunities are designed and delivered.

This review of evidence focuses on one aspect of disengagement: students' cognitive engagement. Cognitive engagement encompasses the willingness to persist, to seek challenge, and to invest effort when learning becomes difficult. The three sections of this review examine, in turn, the evidence on (i) the current state of cognitive engagement in the middle years as documented in the ACER review; (ii) key issues in curriculum, pedagogy, and assessment reform; and (iii) the potential of educational technologies in personalising learning and shaping persistence, autonomy, and metacognition. Together, these insights provide a foundation for identifying strategies, both structural and technological, that can reconnect students with meaningful learning and lay the groundwork for re-engagement and renewed success in the middle years.

## **The current state of middle years cognitive engagement**

A recent rapid review of student disengagement in Years 7 to 9 in Victoria, conducted by researchers at the Australian Council for Educational Research (van der Kleij, et al., 2025), synthesised literature and data addressing the extent and drivers of disengagement among middle years students. The review identifies disengagement as a multifaceted phenomenon encompassing cognitive, behavioural and emotional dimensions, each shaped by individual and systemic influences. Drawing on data from surveys such as PISA 2022 and the Attitudes to School Survey (AtoSS), it finds that at least one in three students in these year levels are disengaged. Key challenges include declining motivation, weak student-teacher relationships, poor classroom climate, digital distractions and difficulties associated with school transitions.

The review concludes that despite some modest improvements in cognitive engagement metrics in recent years, particularly around teacher expectations and some instructional practices, it remains a substantial factor in student disengagement during the middle years. Students who are not progressing academically, particularly when faced with challenging tasks, are more likely to disengage cognitively. Barriers include insufficient relational support, weak task persistence strategies and low perseverance. The review recommends more targeted, evidence-informed approaches that foster self-efficacy and motivation, strengthen pedagogical relationships, and embed cognitive engagement in school-wide practices. Enhancing cognitive engagement is presented as essential not only for learning outcomes but also for student wellbeing and lifelong success.

### **Defining cognitive engagement and key findings**

In the review, cognitive engagement refers to students' motivation to learn, resilience, persistence, and self-regulation. While the review notes some improvement in this domain in Victoria, significant challenges persist. Students not making adequate academic progress were nearly twice as likely to be disengaged, and fewer than 30 percent of Year 8 and 9 students reported completing difficult tasks (van der Kleij, 2025). This paints a concerning picture of students' willingness or ability to persist with challenging learning experiences, particularly when compounded by weak motivation and low confidence.

### **Effective teaching and teacher support**

Quality teaching is identified as central to supporting cognitive engagement. Findings from the AtoSS and PISA 2022 highlight that students respond positively when teachers set high expectations and provide meaningful support. Around 77 percent of Year 8 and 9 students reported their maths teachers help them with learning. However, only 49.3 percent felt teachers made learning interesting. Further, while teacher support correlated with better performance, perceived support did not always translate into stronger cognitive engagement, as shown in Quin et al. (2017). These insights suggest that while teacher behaviours influence emotional and behavioural engagement, cognitive investment may require more subject-specific strategies and differentiated teaching approaches.

### **Student-teacher relationships**

The strength of student-teacher relationships significantly impacts students' academic motivation and sense of belonging. PISA 2022 data reveal substantial achievement gaps, up to 60 points in mathematics, in Victoria between students reporting strong versus weak relationships with teachers. Only 57 percent of Year 8 and 9 students agreed that teachers are respectful, and nearly 14 percent reported feeling intimidated by teachers. The AtoSS data show marginal improvements, yet a notable portion of students still feel unseen or unsupported. This relational deficit can undermine students' cognitive willingness to engage deeply with learning.

## **Classroom climate and distractions**

Disruptive classroom environments hinder students' concentration and learning capacity. Although Victoria fared better than some jurisdictions, 34 percent of students reported noise and disorder in most classes. Furthermore, digital distractions, both personal and peer-related, were cited by over a quarter of students, with little improvement across year levels. These disruptions compromise students' capacity to focus and persevere through complex cognitive tasks, contributing to disengagement and underachievement.

## **Learner disposition: motivation, self-belief and perseverance**

Students face internal challenges that further impede engagement. According to the Youth Survey (2024), 39 percent of Victorian students cited motivation as a barrier to achieving their goals, alongside mental health and low confidence. In the PISA 2022 data, less than 30 percent of students reported consistently applying effort when tasks became difficult. About 14 percent admitted they gave up when work was too hard. These patterns reflect a widespread struggle with perseverance and self-regulation, core elements of cognitive engagement. Burridge et al. (2016) reinforced this with evidence that many students actively sabotaged their own learning, suggesting deep-rooted motivational issues and low academic self-concept.

## **Structural reforms: curriculum, pedagogy and assessment**

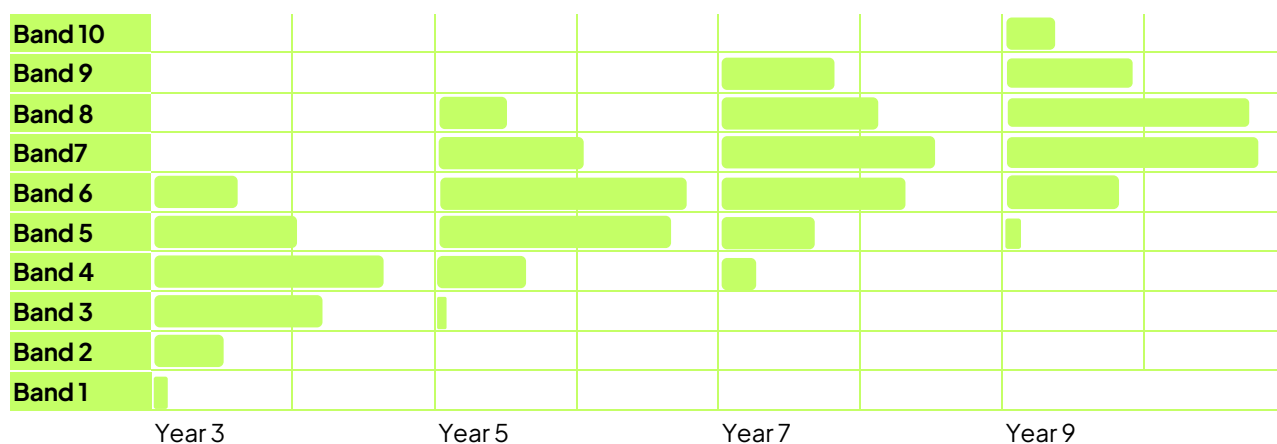
In recent decades, there has been strong evidence in Australian schooling of both declining academic performance and low wellbeing and engagement. Over this same period, Australian education policymakers have increasingly adopted accountability based approaches which demand improvements in increasingly narrowly defined success criteria. This has put pressure on systems, schools and teachers to narrow their focus and conceptualisation of education and learning. The long term failure of such policy to drive improvement has resulted not in a rethink from policymakers but rather a doubling down, with increasing focus on "back to basics" approaches, standardised curriculum resources and even scripted lessons.

In the face of this, educational thinkers and researchers have continued to pursue evidence based approaches focused on maximising opportunities to address learning at the point of learner need. A crucial starting point is the consistent and strong evidence of the substantial variability in student achievement within grade level cohorts (Masters, 2013). These large differences in proficiency, which are evident both at a system and classroom level, provide a dramatic explanation for why current approaches are failing to improve outcomes, failing to close gaps in performance for the lowest performing students, and failing to engage learners during the crucial middle years. Work to reform and redesign learning systems in the service of individual learner needs has involved rethinking traditional approaches to curriculum, assessment and pedagogy.

## Evidence of variability in student achievement

Over the last two decades, there has been consistent evidence showing significant variability of student achievement within grades. Evidence from programs such as NAPLAN consistently report gaps of around 6 years of achievement between the lowest and highest 10% of students in key learning areas such as reading, numeracy and writing, both at the system level and within schools. The implications for this variability can be seen in figure 1, in which the achievement data for numeracy for students in Victoria in 2022 are arranged by band for each of Years 3, 5, 7 and 9. Not only are students spread over a wide range of levels in each year level, but there is substantial overlap between year levels such that there are students in year 9 who are operating at the level of some students in year 3 and vice versa. Any curriculum that is based on the assumption that students in the same grade are at a similar stage of learning and able to move through a single year-level curriculum in the same time frame comes up against this hard reality.

Figure 2 - Percentage of students by achievement band in Victoria, NAPLAN Numeracy 2022



## Curriculum design which is responsive to variability in student achievement

Traditional curricula are structured around fixed, year-based standards, where teachers are expected to deliver a common set of content to all students in the same class year. This assumes, against the evidence, that students of the same age are at roughly the same readiness level (Masters, 2013). Such an assembly-line approach that moves learners from one year to the next regardless of their individual progress, risks leaving behind students who are not yet ready for the material and failing to challenge those ahead of expected standards (Masters, 2013). Research suggests that organising curriculum around empirically based learning domains that map long-term progressions across subjects, focusing on developmental pathways and vertical structures of learning rather than fixed year-level expectations offers significant advantages for student learning (Masters, 2013; OECD, 2018). Learning progressions focus on cognitive processes and provide sequences of learning enabling teachers to target instruction more effectively (Masters, 2013; Callingham et al., 2021). This approach contrasts with traditional methods by organising units around core concepts carried across grades rather than discrete, age/grade-based topics, building

knowledge over time instead of creating self-contained modules (Wiser et al., 2009). Curricula based on learning progressions integrate research on student difficulties with domain-general principles, organising beliefs around core ideas and specifying how to revisit concepts within and across grades to develop genuine understanding (Wiser et al., 2012).

### **The role of assessment in targeted learning**

Effective assessment practices which provide continuous feedback on learner progression is crucial to the success of learning systems designed to maximise learner development (Masters, 2013; Bennetts, 2005). The role of assessment in a progression-based model is fundamentally redefined. Instead of judging whether students have mastered fixed year-level content, assessment is used to locate learners along a continuum of development and to monitor how their knowledge, skills, and understandings grow over time. The focus shifts from “judging success in just learning specific content, towards judging how students are developing in understanding” (Masters, 2013, p. iv). In such a model, assessment is a key pedagogical practice. Teachers use assessment as part of teaching and learning, not separate from it, to guide instruction, set personal goals, and support differentiated pathways. Assessment is used to establish where students are in their learning at any point, independent of age or grade, through evidence-based maps of learning progress. Teachers use this evidence of student learning to provide developmental feedback, helping students understand what improvement looks like, reflect on their own work, and monitor their progress over time.

### **Pedagogical strategies that support differentiated learning**

Evidence suggests that middle years programs with explicit pedagogical frameworks designed to meet the developmental needs of students show promise in addressing diverse student learning needs, though implementation approaches vary in effectiveness (Luke et al., 2002; Tytler, 2004; Pendergast & Bahr, 2006; Nagel, 2010). Pedagogical differentiation is a key strategy for supporting students at different learning levels. Differentiation involves the adaptation of content, methodology, and assessment according to individual student learning needs (Eustáchio et al., 2024). Vertical differentiation strategies provide layers of challenge through tools that promote deep inquiry, critical thinking, and real-world problem solving, ensuring all students remain engaged regardless of their starting point (Masters, 2013; Mofield, 2022). High intellectual challenge characterised by higher-order thinking, deep understanding, and substantive conversation improves academic performance for both diverse backgrounds and low prior achievement students (Hammond, 2008). Curricula that emphasise long term development in deep learning, coupled with effective formative assessment and feedback practices, are key to effective pedagogical differentiation (Masters, 2013; Eustáchio et al., 2024).

### **Technological supports for engagement**

A growing body of research has explored how educational technologies influence cognitive engagement, particularly through tools designed to personalise learning, scaffold autonomy,

and promote reflective thinking. Intelligent tutoring systems (ITSs), gamified flipped classrooms (GFCs), adaptive learning platforms, and AI-supported writing tools feature prominently in recent systematic reviews. These technologies aim to align instructional delivery with students' individual needs while also encouraging them to take greater responsibility for managing and sustaining their own learning.

Several recent systematic reviews and meta-analyses have concluded that when well-designed and appropriately integrated, these technologies can positively influence cognitive engagement in three key ways. First, they can support learners with a wide spread of ability through adaptive feedback and differentiated pacing. Second, they can promote persistence and autonomy through challenge-rich environments that include real-time support and gamified motivation. Third, they have the potential to enhance metacognition and learner agency by prompting reflection and supporting self-monitoring. Reviews also emphasise that poorly designed or misaligned technologies can lead to shallow engagement, over-reliance on automation, and cognitive overload, particularly for students with lower digital literacy or limited self-regulation. These concerns have become even more acute with the rapid rise of generative AI systems, which, while capable of providing rich and personalised support, also risk encouraging dependency if students use them as substitutes rather than complements to their own thinking. Overall, the impact of educational technologies on cognitive engagement depends less on the presence of technology itself and more on how it is implemented, scaffolded, and aligned with learners' cognitive and motivational readiness.

### **Supporting learning across a wide proficiency spread**

The use of adaptive and AI-driven educational technologies has shown considerable potential to support learners across a broad range of proficiencies. Intelligent tutoring systems (ITSs), in particular, offer tailored feedback and task adaptation, enabling students of varying abilities to progress at their own pace (Létourneau et al., 2025). These systems dynamically adjust difficulty levels and provide individualised scaffolds, which can help lower-performing students catch up while keeping high achievers challenged and engaged. Similarly, gamified flipped classrooms (GFCs) offer diverse entry points to learning by allowing students to review foundational material outside of class and engage in higher-order tasks in class time (Sancar-Tokmak & Dagli, 2025; Yu & Yu, 2024). While the evidence suggests that digital tools can successfully support a wide range of learners, their benefits are most consistently realised when implemented alongside strategies that address learner variability, digital access, and sustained teacher involvement (Semwaiko et al., 2024; Kundu & Bej, 2024).

Deep learning-focused tools in writing instruction have also been found to offer differentiated support, improving student engagement and literacy outcomes by enabling ongoing, individualised practice and revision (Bal & Öztürk, 2025). However, the effectiveness of these tools is often moderated by students' digital literacy and self-regulatory skills. Learners with lower proficiency or limited digital fluency may experience cognitive overload,

particularly in settings with insufficient scaffolding or teacher guidance (Faza & Lestari, 2025; Yaseen et al., 2025). Discrepancies in access to high-quality digital resources can exacerbate

existing educational inequalities, limiting the intended inclusive potential of these technologies (Topali et al., 2025).

### **Persistence, Challenge-Seeking, and Autonomy**

Technology-enhanced learning environments have been demonstrated to foster learner persistence and autonomy through features like real-time feedback, progress tracking, and self-paced learning. ITSs promote sustained engagement by allowing students to take multiple paths to mastery while receiving personalised scaffolding that reduces frustration and encourages risk-taking (Létourneau et al., 2025). Similarly, GFCs create opportunities for students to revisit content and attempt complex problems in a supportive setting, helping them build cognitive resilience (Yu & Yu, 2024; Sancar-Tokmak & Dagli, 2025). These environments often incorporate gamified elements or adaptive challenges that foster curiosity and enhance intrinsic motivation (Yaseen et al., 2025).

However, the autonomy promoted by these tools is not always experienced as beneficial. Without sufficient structure, some students, particularly younger or less self-regulated learners, may experience decision fatigue, disengagement, or increased anxiety when navigating open-ended digital environments (Faza & Lestari, 2025). Reviews also caution that overuse of extrinsic motivators in gamified environments can diminish intrinsic interest over time, especially when students perceive tasks as arbitrary or competitive rather than meaningful (Yu & Yu, 2024; Topali et al., 2025).

The design of AI-powered systems may unintentionally reduce productive struggle by providing overly directive hints or prematurely solving problems, thereby reducing opportunities for learners to develop persistence through effort (Kundu & Bej, 2024; Létourneau et al., 2025). Deep learning is unlikely to occur when learners are nudged toward correct answers without reflection or sustained challenge (Wu, 2023). While educational technologies offer clear pathways for fostering challenge-seeking and autonomy, their impact depends on the balance between support and learner agency, and on how feedback and challenge are orchestrated over time.

### **Agency, Reflection, and Metacognition**

Systematic reviews highlight the potential for digital tools to support metacognitive development and learner agency. ITSs and personalised learning platforms often include visual dashboards and feedback loops that prompt learners to monitor their performance, reflect on learning strategies, and adjust behaviours (Létourneau et al., 2025; Yaseen et al., 2025). In writing contexts, deep learning models provide students with structured revision tools and iterative feedback that encourage ownership over the drafting process and facilitate deeper engagement with their own thinking (Bal & Öztürk, 2025). GFCs support agency by placing responsibility for content acquisition with learners, while enabling in-class collaborative inquiry and strategy refinement (Sancar-Tokmak & Dagli, 2025).

Evidence suggests that some students may treat system-generated feedback passively, following prompts without actively evaluating their own understanding or performance (Faza &

Lestari, 2025). In highly automated environments, learners may defer too readily to system suggestions, limiting opportunities for reflection-in-action or metacognitive reasoning (Kundu & Bej, 2024; Wu, 2023). Further, the visibility of performance data can lead to unproductive comparisons or overemphasis on scores, especially in competitive or gamified systems (Yu & Yu, 2024; Topali et al., 2025).

Digital tools also vary widely in how explicitly they support reflective practice. Some environments lack intentional prompts or metacognitive scaffolds, leading to shallow engagement despite sophisticated technical design (Semwaiko et al., 2024). Overall, the capacity for educational technologies to enhance metacognition and agency relies on the presence of thoughtful design features that make thinking visible, foster self-evaluation, and support reflection as an embedded part of the learning process.

### **A new challenge and opportunity: Generative AI**

Generative AI has rapidly emerged as a significant development in educational technology, marked by the release of OpenAI's ChatGPT in late 2022 and the subsequent introduction of similar tools. This development has prompted debate and experimentation across the education sector. UNESCO (2025) characterises generative AI as both a transformative opportunity to reimagine teaching and learning and a source of dilemmas that require careful governance. In Australia, policymakers have responded quickly, with a national framework endorsed in 2025 to guide the responsible and ethical use of generative AI in schools (Australian Government Department of Education, 2025). At the classroom level, educators are trialling tools such as ChatGPT, Google Gemini, and Canva's Magic Write for tasks ranging from lesson planning and content creation to providing on-demand tutoring. According to a recent Gallup study of 2,232 teachers working in public K-12 schools in the

US, six in 10 teachers have used an AI tool in the current school year and teachers who use AI weekly report saving 5.9 hours of time per week (Gallup, 2025). Most frequently reported uses of AI include planning lessons and reviewing instructional materials, making worksheets, assignments and project materials, modifying materials to meet student needs and to do administrative work (Gallup, 2025). These findings reflect a broader global trend towards embedding AI assistants in everyday teaching and learning activities (Holmes et al., 2023; Luckin et al., 2022; Luckin, 2025).

Generative AI presents both opportunities and risks for students' cognitive engagement. On the positive side, AI-driven assistants can deliver timely and individualised support that may enhance persistence and understanding. Generative AI systems are able to provide explanations, scaffold problem-solving, and generate personalised practice tasks with feedback, all of which may help students sustain effort and overcome difficulties (Luckin et al., 2022). Teachers can also leverage these tools to tailor content to students' levels and interests, which has the potential to promote autonomy and challenge-seeking (Luckin, 2025). Early findings suggest benefits such as improved confidence and engagement in learning tasks (UNESCO, 2025). However, significant concerns have also been raised about the potential for reduced self-regulation, over-reliance on automated assistance, and shallow

engagement. Studies have reported instances of what has been described as “metacognitive laziness”, where students defer too readily to AI-generated responses rather than actively reflecting on their work (Kosmyrna et al., 2025). Such dependency risks undermining the development of persistence and critical thinking. UNESCO (2025) calls for a human-centred approach that preserves learners’ agency and ensures generative AI is used as a complement to, rather than a replacement for, student thinking and creativity.

## Conclusion

Cognitive disengagement in the middle years remains a persistent and pressing challenge, with large numbers of students struggling to sustain motivation, perseverance, and deep involvement in their learning. Evidence shows that disengagement is not simply a matter of student attitude, but is shaped by structural features of curriculum and pedagogy that fail to meet students at their points of need. Traditional year-level, content-driven approaches overlook the substantial variability in student readiness, leaving some unchallenged and others unable to keep pace.

Progression-based approaches, grounded in learning continuums and supported by formative assessment, provide a more powerful response. By locating students along evidence-based pathways of development, these approaches allow for targeted teaching, personalised feedback, and differentiated learning experiences that foster resilience and self-efficacy. The literature consistently shows that when students see themselves making progress, and receive clear feedback on how to improve, their cognitive engagement and persistence increase.

Considering this challenge, educational technologies hold promise, particularly where they align with and amplify approaches that support engagement and learner need. Adaptive platforms, intelligent tutoring systems, and tools that support feedback and reflection can extend teachers’ capacity to personalise learning and sustain student engagement. Emerging generative AI tools can provide highly responsive support, personalised practice opportunities, and scaffolds for reflection, which may strengthen persistence and metacognitive development. Yet they also pose risks, including over-reliance, cognitive offloading, and shallow engagement if students substitute AI outputs for their own reasoning. These developments highlight the importance of careful design, teacher mediation, and system-level frameworks that ensure AI complements rather than undermines deep learning.

Integrated within clearly designed, evidence-based programs explicitly focused on student learning and informed by rigorous research, emerging technologies, including generative AI, may hold the key to effective re-engagement of students in the middle years. Their success will depend on whether they are harnessed to amplify human curiosity, agency, and resilience, rather than erode them.

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