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IN THIS ISSUE

AI IN BUSINESS STUDIES

FUTURE SKILLS THROUGH CREATIVE PEDAGOGY

THE 2025 AI IN EDUCATION ALMANAC

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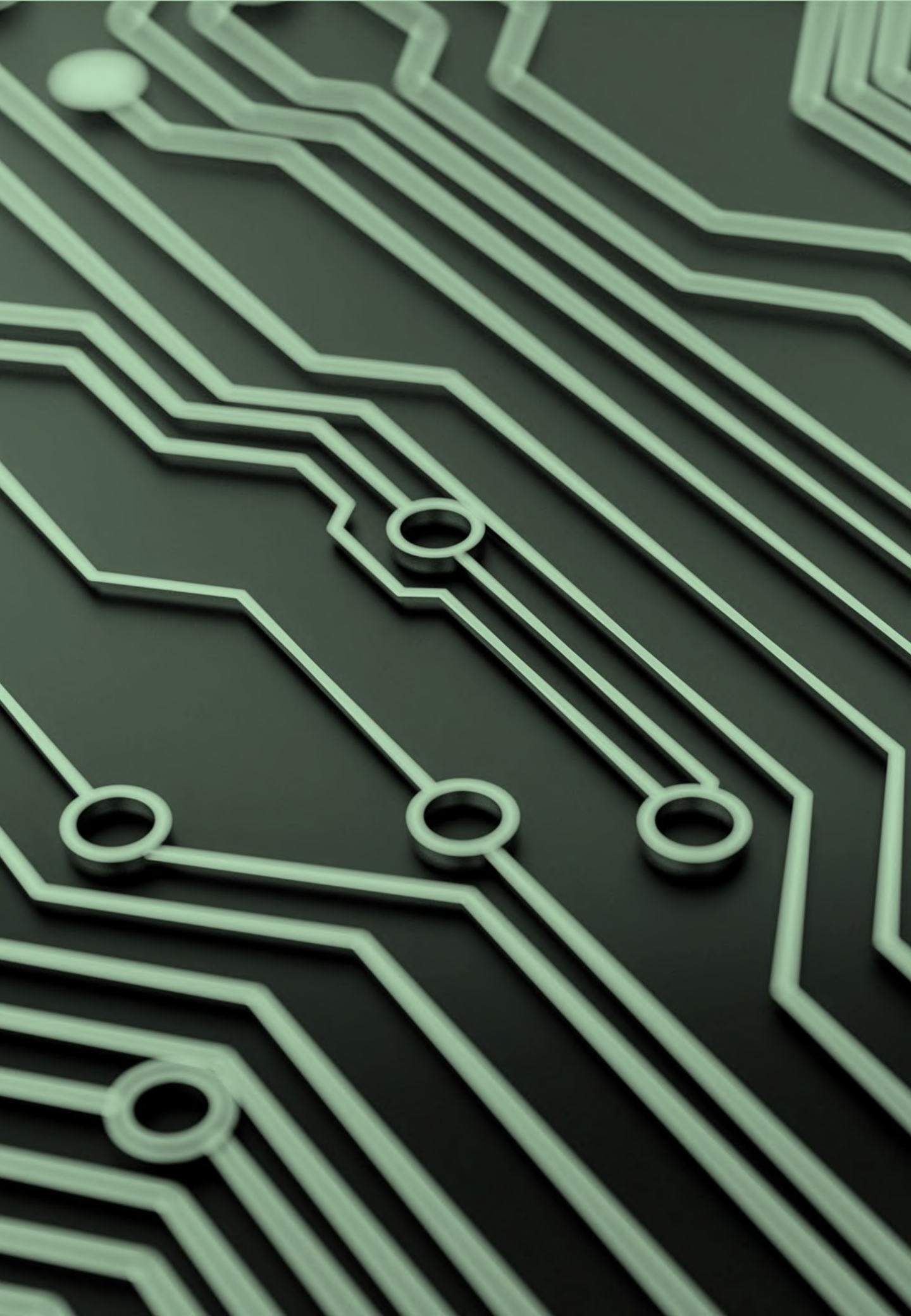

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EXPLORING EDTECH #12
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Editorial

Welcome to **Exploring EdTech #12**.

In this issue we examine the continued evolution of artificial intelligence in education, a topic which has undergone remarkable development since our AI-focused issue in January 2023.

Over the past two years, we've witnessed not just incremental improvements but transformative changes in how AI technologies are being integrated into educational settings across Ireland and globally. The release of increasingly sophisticated tools has moved discussions from theoretical possibilities to practical implementations that are reshaping classrooms today.

The history of AI in education continues to unfold rapidly before our eyes. When we published issue #6, ChatGPT had just emerged onto the scene, triggering both excitement and concern among educators. Today, as Patrick Crowley articulates in our lead article, we're seeing a shift toward viewing classrooms as modern "Athenian agoras" – spaces where AI tools support rather than diminish the crucial human elements of teaching and learning.

Dr. Eleanor Walsh's experience with Maker's Red Box at Mary Immaculate College demonstrates how creative pedagogy coupled with technology can develop both technical competencies and essential soft skills. Meanwhile, the remarkable achievements of students at competitions like the Analog Devices Robotics Competition and LEGO League Finals showcase how industry-education partnerships are fostering critical thinking and technical prowess among Ireland's youth.

The 2025 AI in Education Almanac by Mark Anderson provides educators with an accessible guide to the evolving terminology and concepts in this field – exactly the kind of resource many teachers requested after reading our previous AI-focused issue.

What strikes me most across these articles is how the conversation has matured. Rather than the "hysteria attached to the 'rise of AI'" that I noted in issue #6, we're now seeing more nuanced approaches that place human connection, creativity and critical thinking at the center, with technology serving our core educational mission.

My sincerest thanks to all our contributors for sharing their expertise and insights. As always, please feel free to contact me with ideas and suggestions for future issues.

Visit our website to subscribe to our News service, which will keep you updated throughout the year on all things EdTech. Together, we can ensure that technology serves our core educational mission while preparing students for the complex world they'll inherit. Please feel free to contact me with any ideas and suggestions for future issues.

Tim Lavery, Editor-in-Chief, April 2025

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Pupils from St Colman's NS, Offaly at the First Lego League All Ireland National Finals.
Pic: Fintan Clarke/Coalesce

AI in Business Studies

How Can AI Be Used To Enhance The Way Business Studies Is Taught In Schools?

Patrick Crowley

Ai in Business Studies

How can AI be used to enhance the way business studies is taught in schools?

Patrick Crowley

> *Public forums, such as the Athenian Agora, provided spaces for debates, where citizens could actively participate in discussions on political, ethical, and philosophical matters. It is this author's belief that modern classrooms need to become like modern day Athenian Agora's, ones facilitated by teachers to enable students to explore and develop their understanding of key concepts in Business, like marketing, finance, employee reward and engagement, but done in a truly modern way by embracing AI.*

Interest plays a crucial role in student learning by enhancing motivation and engagement. Research shows that when students are interested in a topic, they are more likely to invest effort and persist through challenges. According to Schiefel (1991), interest is closely linked to academic achievement, as it encourages deeper cognitive processing. Additionally, Hidi, S., & Renninger, K. A. (2006) found that interest promotes intrinsic motivation, making learning more enjoyable and meaningful.

Trying to teach modern Business, without accepting that the world of Business and Teaching are being completely revolutionised by Artificial Intelligence and by the impacts of such intelligences on young people's maturing brains, reminds this author a little of the famous Henry Ford quote, "If I had listened to my customers I would have given them faster horses". Students are being bombarded with more and more information and modern educational authorities need to realise that it is not just a change of methodology that is needed to somehow help them process ever more information. It is a change of direction completely. Clearly defined course content, the rote learning stuff, if you will, needs to be done away with. Student engagement, interest and imagination should be the be all and end all of a new curriculum.

How have AI systems themselves been built?

A simple example can hopefully expediate the point. Once upon a time it was assumed that artificial intelligences would be built by working from the bottom

up. A group of programmers would sit down and start writing millions upon millions of lines of code to teach artificial intelligences how to deal with any scenario as it might arise. As one can quickly appreciate, such an endeavour becomes increasingly impossible.

What we have instead landed on to build modern artificial intelligences, like any of the multitude of large language models already built, is to gather as much data as is available and to look for patterns and relationships. We teach our models to appreciate the way the world works as such, rather than trying to program them with rules and instructions to work in the world.

Why should education be any different. Why do we continue to insist on educating our young people by giving them all these basic rules and definitions and then ask them to somehow apply these things to real life. Why are modern students not being shown the real world of business, successes and failures, challenges and opportunities, and allowed explore and develop their critical knowledge and understanding by analysing and interpreting and creating their own patterns and relationships that define success or failure.

So how would this vision work?

First and foremost, Business should be taught through real life exploration. Students should be asked to immerse themselves in businesses that resonate with them, to encourage an interest in the subject first and foremost. They should develop a large portfolio of understanding as to what made their chosen businesses successful, what challenges have said businesses faced and overcome, what opportunities and threats are they likely to encounter in the future. AI tools like ChatGPT are ideal for helping students with such work.

Any new course should be equally interactive. Students should be forced to make decisions which mimic those required of a real-life entrepreneur. AI tools like ChatGPT are more than capable of creating interactive games in seconds which could teach students the basics of the importance of pricing, advertising, recruitment etc. Such interactive games could be used as an analysis tool to distinguish those students who are really developing their understanding of Business and the key concepts.

Longer term, over the duration of the Junior cert timeline, each student should be required to build and develop their own hypothetical (or not) business, from initial idea generation to R&D to design and build to marketing and sales.

As students work through the new course, the teacher is required as a facilitator to keep discussions and direction on point and to highlight key terms and concepts as they come up. At least 20 minutes of each class should require all

books and devices to be closed and students to engage in open discussions and debates to try and extrapolate deeper understanding and meaning on topics guided by the teacher.

Roleplaying exercises should be encouraged as much as possible as, according to Acharya et al. (2019), roleplay exercises are effective as an advanced learning tool in modern classrooms.

Various scenarios can again be easily created by AI tools to mimic real life business scenarios, such as:

- ✓ One v. one exercises where negotiation of a price is being practiced.
- ✓ Multirole exercises, for example a union dispute involving management, staff, and mediators.
- ✓ Multirole exercises mimicking a company boardroom where a bonus pot needs to be split but a consensus is required.

Harvard Business School and others have been using such strategies for many years to teach the brightest Business brains. Artificial intelligences mean that with even a little preparation, these activities can now be explored by students throughout Irish classrooms.

Conclusion

Poor economies do not become rich by accident. Ireland has not transformed itself since the 1950's by accident. A series of government policies designed intentionally to open ourselves up to the world and to exploit our unique skills and attributes has built this success. A part of this successful adaption can be traced to a Minister for Education having the vision to make secondary level education free for all. It is now time for our current Minister for Education to have similar vision.

We are on the cusp of the age of artificial intelligence and the idea that we continue to enforce rote learning on students is, to this author at least, reprehensible. We should instead embrace AI as a teaching and learning tool to make classrooms more enjoyable and enthusiastic.

Ultimately, it is this author's strong contention that no matter what a student is being asked to study, the environment in which they are being asked to do it should be one built to foster interest and enthusiasm for the subject, and not one based on rote learning of basic content.

The teaching of a subject like Business should be no different to the teaching of the various sports that most of our young people participate in. Learning the basic

rules should be a day one exercise and beyond that it should be about practice and enjoyment. With such a revolution in how we teach Business perhaps we can foster a more creative and entrepreneurial society which will ultimately be beneficial for the future direction of Ireland.

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Maker's Red Box

Cultivating Future Skills Through Creative Pedagogy

Tim Lavery

Maker's Red Box

Cultivating Future Skills Through Creative Pedagogy

Tim Lavery

With the increasing emphasis on developing both technical competencies and essential soft skills in primary and secondary education, educators are discovering the value of innovative pedagogical approaches that bridge these domains. This trend is evidenced by successful implementations such as a recent pilot at Mary Immaculate College's CRAFT (Creative Arts and Future Technologies) Maker Space in Limerick.

As part of the maker space activities, Dr. Eleanor Walsh (MIC)runs an after-school club with the Embracing Diversity & Nurturing Integration Project (EDNIP). They recently completed a six-week pilot of the Maker's Red Box “City of the Future” programme with 24 children aged 11-13 from diverse backgrounds. Her experience offers valuable insights into how this framework-based approach can be adapted to the Irish educational context.

What is Maker's Red Box?

Maker's Red Box develops comprehensive course materials for children aged 11-17 using a creative pedagogy approach that combines technical skill-building with the development of crucial soft skills. Unlike traditional STEM kits that often follow prescriptive, one-size-fits-all approaches, Maker's Red Box employs a constructivist, problem-based framework rooted in maker education principles.

“The coming together of maker space elements (using the engineering design process), strong technical elements (3D printing, programming) with design thinking, into an accessible, real-world scenario, that has clear outcomes, and is inclusive of all,” is how Walsh described the main benefits of Maker's Red Box (MRB) for schools in Ireland.

The methodology guides students through extended project-based learning experiences where they develop digital skills alongside teamwork, communication, self-confidence, data literacy, and information management capabilities. Each MRB contains a Teacher's Guide with detailed lesson plans, teaching materials, demonstration tools, and access to an online platform with supporting digital resources.

The Pedagogical Framework

The educational approach of MRB is grounded in epochal, constructivist, problem-based pedagogy. Each course uses storytelling and role-play to challenge children to find solutions to real-world problems, transforming students into astronauts, eco-engineers, or superheroes. This narrative framing provides intrinsic motivation and makes complex skill acquisition feel purposeful and engaging.

Unlike traditional educational resources, MRB employs a competence matrix that encompasses:

- ✓ **Technical Skills:** 3D printing and design, laser cutting and vector graphics, programming and robotics, basic electronics and soldering, and manual crafting skills.
- ✓ **Digital Literacy:** Digital content creation, scientific enquiry skills, and change management.
- ✓ **Data Literacy:** Data and information management and AI literacy.
- ✓ **Global Competence:** Complex problem-solving and critical thinking, open-mindedness and tolerance, and sustainability.
- ✓ **Life and Workplace Competencies:** Collaboration, creativity, responsibility, self-confidence, emotional competence, entrepreneurship, and communication.

This comprehensive framework enables teachers to track student progress through personal, ipsative assessment, making it valuable for identifying individual strengths and providing meaningful career guidance.

Implementation in the Irish Context

Walsh's experience implementing the "*City of the Future*" project with primary school children in Limerick demonstrates how Maker's Red Box can be effectively adapted to the Irish educational setting. Over six weeks, with 90-minute weekly sessions, students organised themselves into themed administrative areas (such as health, education etc) to design buildings for a future city.

"*The MRB City of the Future project was an exciting, hands-on, accessible to all project,*" Walsh noted. "*The children were able to bring their diverse individual experiences and backgrounds into a solution for a City of the Future, which combined creativity and technical elements in equal measure*."

Walsh found the programme aligned well with elements of the primary school curriculum in Ireland, particularly in STEM Education, Social & Environmental Education, and Arts Education. She noted its potential for the new Primary School Framework in Ireland, with its nine key competencies, and five broad curriculum areas especially the new (draft) STE curriculum.

For adaptation to the Irish context, Walsh made some modifications appropriate for younger students, such as using Lego pieces for elements of their areas (as there was only time for one piece of 3D printing for each administrative area), incorporating a matching game of old and new for each administrative area, and using simple circuits with crocodile clips for lights instead of soldering, which was too complex for the age group.

Additionally, the project culminated in the creation of a set of "*Hexagonals*", each representing an administrative area. These hexagonals can be nestled together, in harmony with each other, building a working city, and providing a physical product at the end of the day. The discussion about which area should be in the centre or what areas should be beside each other was in itself educational for the children's understanding of society.

As a teacher, Walsh found the materials "well-structured and thorough" and supportive throughout the project. "I was able to adapt any of tasks and sessions very easily and make them age appropriate for my group. I always had a sense of being supported by the materials and able to go forward, no matter what."

Course Materials and Requirements

Maker's Red Box offers several thematic course packages, each containing a comprehensive 16-session programme:

The City of the Future: Students tackle urban design and development, finding future-oriented solutions to current city problems while learning to use 3D printers, sensors, and microcontrollers.

Green Engineers: Teams undertake the recolonisation of Mars, using engineering skills and scientific approaches to overcome challenges.

Superheroes – Digital Storytelling: Children become superheroes in their own universe, engaging in creative writing and problem-solving while creating working objects like personalised night lamps.

Global Warning: Students embark on a research voyage to understand climate change impacts worldwide, learning sustainability practices and developing technical skills.

Each course requires specific equipment, with "*City of the Future*" needing 2-4 3D printers, 12 micro:bits, 3-4 soldering stations, and 12 notebooks for an optimal group of 12 children. Walsh's experience suggests these requirements can be adapted based on available resources and student age.

Benefits for Irish Schools

The MRB approach offers several advantages for Irish educational settings:

Cross-curricular Integration: The framework aligns with multiple areas of the Irish curriculum and can be implemented as in-school activities, after-school programmes, or summer camps.

Inclusive by Design: The materials accommodate students of varying competencies and backgrounds. Walsh noted that the programme had "*entry levels for each of them and allowed them to share their cultural and familial experiences with the group*."

Teacher Support: The comprehensive Teacher's Guide provides detailed plans and resources, allowing educators with basic digital skills to confidently facilitate the programme.

Skill Development Measurement: The included assessment tool helps track individual student progress, making it valuable for identifying strengths and

providing career guidance.

Student Engagement: Walsh observed high student engagement with the programme, particularly with the micro:bit programming and 3D making elements: "*They seemed to really like it. They liked being able to deep dive into their one administrative area and then design the buildings and technology for that area*."

Considerations for Implementation

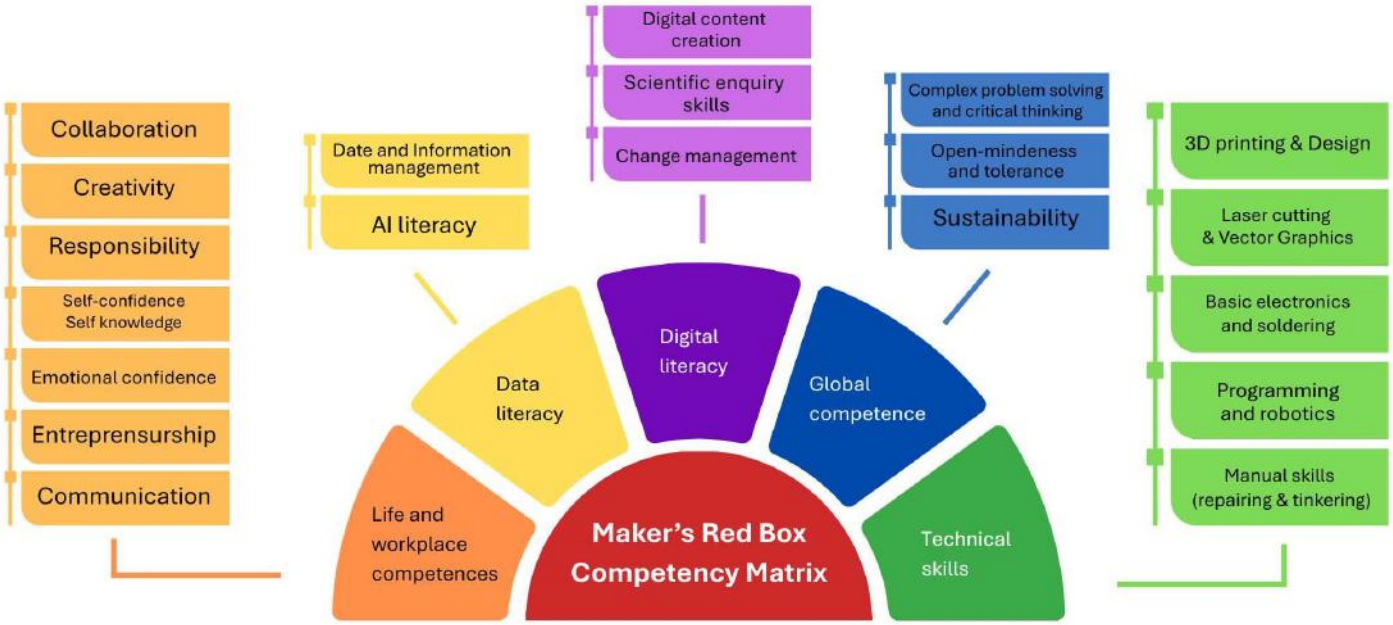
While Walsh reported a positive experience overall, she noted some considerations for Irish schools looking to implement Maker's Red Box:

Time Requirements: Double sessions (90+ minutes) work best for the activities, which may require adjustments to typical class schedules.

Technical Support: While any teacher can facilitate the programme regardless of subject specialisation, basic digital skills and openness to technology are necessary. A technical assistant can be helpful for troubleshooting.

Age Appropriateness: Walsh found the materials adaptable for children from age 11 upwards, suitable for the final two years of primary school (5th and 6th class) and secondary schools.

Group Size: An ideal group size is 12 students (maximum 16) managed by at least one teacher, with collaboration rather than competition emphasised.



The Future of Maker Education in Ireland

As Irish schools continue to integrate technology and develop future-focused curricula, approaches like Maker's Red Box offer a structured yet flexible framework for developing both technical and soft skills. The methodology has been tested with over 20,000 children and 800 teachers internationally, with implementations in over 20 countries.

By employing a creative pedagogy approach that emphasises problem-solving, collaboration, and hands-on making, Irish educators can help students develop the complex competencies needed for future success while maintaining engagement through purposeful, playful learning.

Walsh's successful pilot demonstrates the potential of such approaches in the Irish educational context. As she noted, the programme brought "*the Engineering Design Process and Design Thinking theories together*" in a way that engaged students from diverse backgrounds in meaningful, creative learning.

Young Innovators Shine

Killoughteen N.S. Crowned Champions at 10th Annual Analog Devices Robotics Competition

Tim Lavery

Young Innovators Shine

Killoughteen N.S. Crowned Champions at 10th Annual Analog Devices Robotics Competition

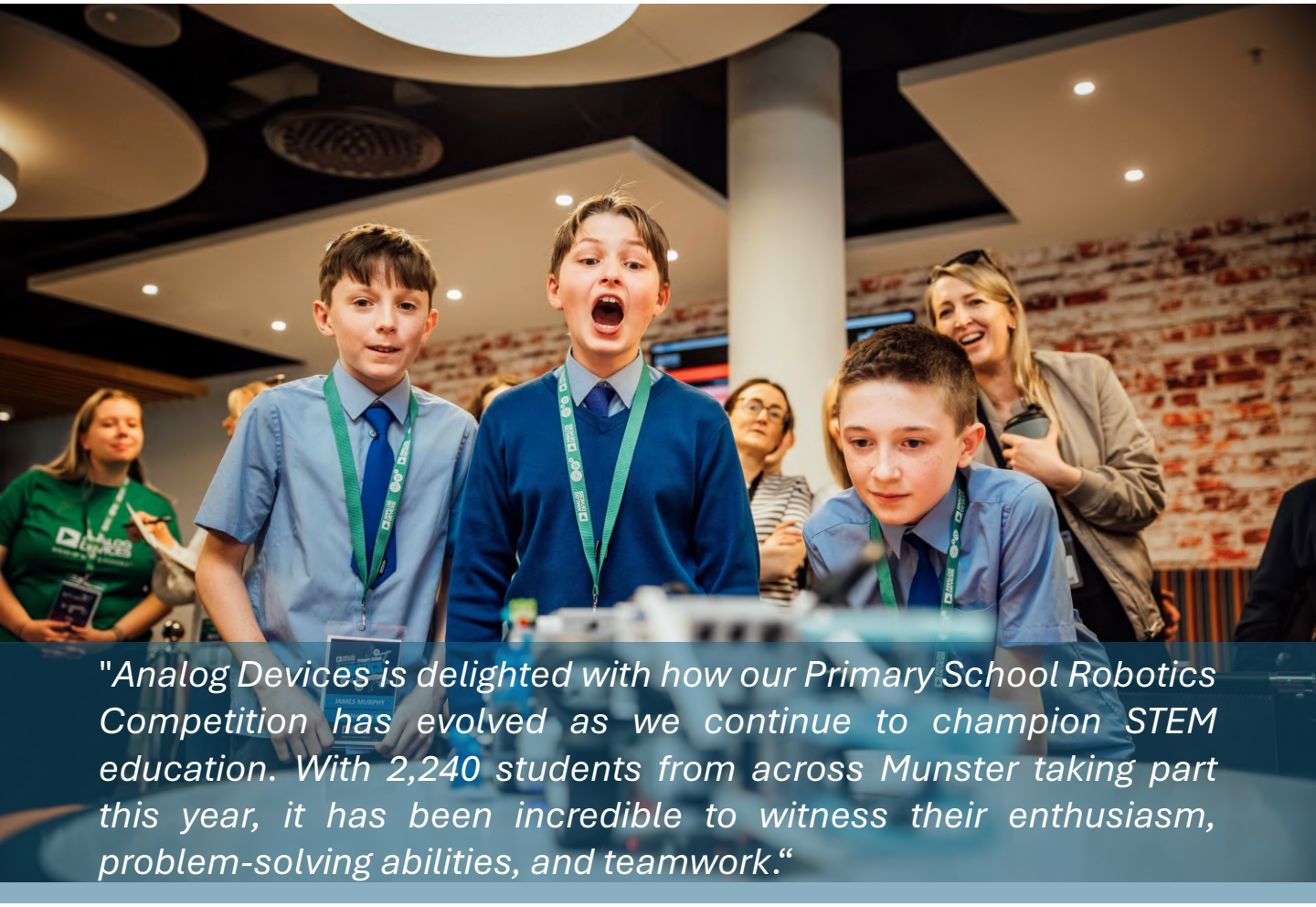
Tim Lavery

> *In an exciting display of innovation and teamwork, over 100 primary school students gathered at the Analog Devices Campus in Raheen, Limerick for the finals of the 10th annual Analog Devices Primary Schools Robotics Competition. Following intense competition, a team from* ***Killoughteen National School*** *in* ***Newcastle West*** *emerged victorious, securing the title of 2025 Analog Devices Primary School Robotics Champions.*

Expanded Reach Across Munster

This milestone year marks significant growth for the competition, which expanded beyond Limerick to welcome schools from across Munster for the first time. The initiative began with preliminary rounds in March, where 280 students from 80 primary schools participated in semi-finals. From these rounds, the top 32 schools advanced to the finals, including 19 from Limerick, 6 from Clare, 5 from Tipperary, and 2 from North Cork.

The competition showcases Analog Devices' commitment to championing STEM education and inspiring the next generation of engineers and innovators. Teams of 5th and 6th class students applied creative problem-solving, teamwork, and technical skills to construct and program their robotic creations for sumo-style showdowns.



"Analog Devices is delighted with how our Primary School Robotics Competition has evolved as we continue to champion STEM education. With 2,240 students from across Munster taking part this year, it has been incredible to witness their enthusiasm, problem-solving abilities, and teamwork."

Fiona Treacy, Managing Director, Industrial Automation at Analog Devices

A Day of Learning and Competition

On competition day, young participants arrived early to begin constructing and programming their robots. Throughout the event, teams collected points for multiple aspects of their work, including their ability to collaborate effectively as a team, their innovative approaches to robot design, and their creativity in showcasing their projects through poster presentations. The competition emphasized both technical skills and the students' ability to communicate their ideas and processes.

The afternoon culminated in high-energy robot competitions, with parents, teachers, and friends cheering on the participants as their creations entered the ring for sumo-style showdowns. Teams earned additional points for wins and draws in both the pool stages and throughout the highly competitive knockout rounds, adding to the excitement and learning experience.

After intense competition, Liam Collins, Freya Smith, and Oisin O'Connor from Killoughteen N.S. claimed the overall championship, while Cian O'Donoghue, Alex Clancy, and Tommy Hayes from St Joseph's N.S. Ballybrown secured the runner-up position.

Building STEM Foundations

In preparation for the competition, Analog Devices partnered with LearnIt to deliver robotics workshops to all registered primary schools. These sessions taught students to build and program robots using LEGO kits. Over the past decade, nearly 9,000 students have benefited from these workshops.

"*Developing young minds and providing them with opportunities to explore the fascinating field of robotics will hopefully inspire the next generation of engineers and innovators*," added **Treacy**, highlighting the long-term vision behind the initiative.

On competition day, participants built on their foundational skills with an advanced workshop, preparing them for the 1-vs-1 robot battles. The structured format began with pool stages, followed by playoffs to determine the ultimate champions.

Killoughteen N.S. adds this victory to its impressive competition history, having previously won in 2018. Other past champions include Scoil Íde (2015), St Patrick's Girls NS (2016), Our Lady Queen of Peace NS (2017), Scoil Mhuire Broadford (2019 & 2023), St Patricks N.S Bruree (2020), and St Patrick's National School, Dublin Road (2022 & 2024).

This competition represents an excellent example of how industry-education partnerships can create engaging STEM learning experiences that develop critical skills while inspiring students to explore technology-focused career paths.

What is the Analog Devices Primary Schools Robotics Competition?

Analog Devices partners with LearnIt to provide complimentary robotics workshops to participating schools, where students learn to build and program robots using LEGO kits. The competition itself includes a day of advanced robotics workshops followed by 1-vs-1 robot battles and pool stages, with top teams advancing to the playoffs.

Learn more about this year's competition: https://youtu.be/BsREPqzvTJ8?si=M7XHhMyU7ZLHC4iW

Cully Coders Triumph

Donegal Team's Innovation Shines at LEGO League Final

Tim Lavery

Cully Coders Triumph

Donegal Team's Innovation Shines at LEGO League Final

Tim Lavery

> *In an impressive display of creativity and technical prowess, a team of seven young people from the Moyne Ulster-Scots Association in Donegal have been crowned overall champions at this year's FIRST® LEGO® League Ireland Final. The Cully Coders team demonstrated exceptional skills across multiple challenges in the competition, which attracted 273 teams from across Ireland*

Innovative Solutions to Real-World Problems

This year's tournament theme, SUBMERGED℠, challenged participants to develop solutions to oceanic problems while designing and programming robots for competitive games. The Cully Coders - comprising Zoe, Rebecca and Abby McElhinney, Georgia Green, Jonathan and Andrew Morrow, and Sienna Deane - impressed judges with their innovative approach to bringing light to the darkest ocean zones.

The team, coached by Adele and Scott McElhinney, qualified for the Ireland Final after taking top prize at the Galway Regional competition. Their winning entry featured a LEGO® SPIKE Prime Robot named "Olly" alongside an ingenious innovation project using repurposed plastic bottles.

The Donegal team's prototype solution combined Epsom salts with glow-in-the-dark paint, funnelled into repurposed plastic bottles. This creative design took inspiration from nature - specifically the female anglerfish, which uses bioluminescence to attract prey in the ocean's darkest depths.

Robotics Excellence

The Cully Coders demonstrated exceptional technical skill in the robotics portion of the competition, scoring an impressive 540 points in the Robot Game - the highest of the season. This outstanding performance earned them both the Robot Game Award and victory in the competition's Knockout Round.

They were joined on the winners' podium by the Mounthawk Masterminds from Mercy Secondary School Mounthawk in Tralee, Co. Kerry, who secured the Runner's Up position.

Developing Key Skills Through Fun Challenges

Ross Maguire, Chief Impact Officer at CreativeHUT, which organises FIRST® LEGO® League in Ireland, explains the educational value of the programme: "***The fun team-challenge is designed to promote collaboration, critical thinking, and experiential learning***."

The competition has seen tremendous growth in recent years, with over 20,000 children participating in FIRST® LEGO® League in Ireland during the past three years of the global programme.

A Platform for Future Innovation

The annual FIRST® LEGO® League competition serves as more than just a robotics contest - it provides young participants with opportunities to apply STEM concepts to real-world problems while developing valuable teamwork and communication skills.

"Cully Coders will take their place representing Ireland at an international tournament," noted the organisers, highlighting the progression opportunities the competition provides for talented young engineers and programmers.

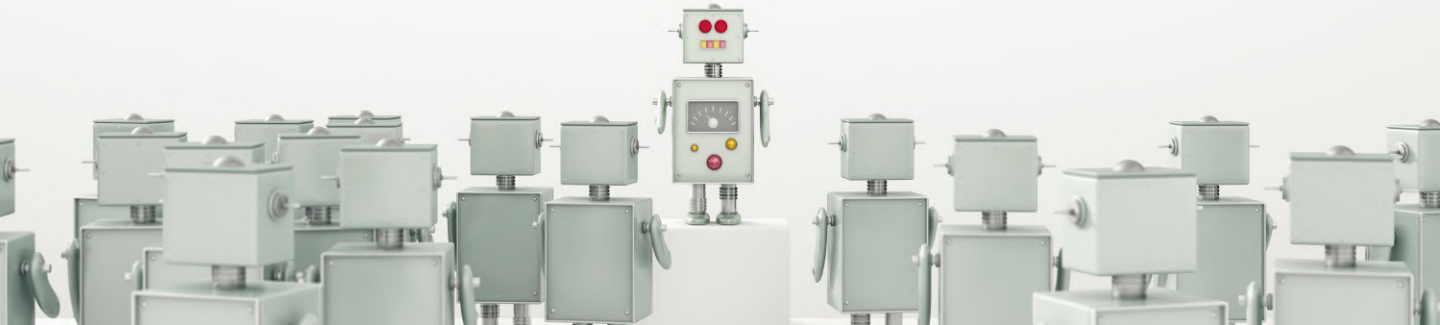
The FIRST® LEGO® League Ireland is supported by the Research Ireland Discover Programme and delivered by CreativeHUT Ireland, with event sponsorship provided by Meta and national sponsorship by Amazon.

Inspiring the Next Generation

FIRST® (For Inspiration and Recognition of Science and Technology) LEGO® League inspires young people through three programme levels - Discover, Explore and Challenge - tailored to different age groups from early years learning to Transition Year students.

This structured approach allows participants to develop a broad range of practical and soft skills over time, with robot games and activities suited to each level. The competition exemplifies how engaging, hands-on STEM activities can inspire the next generation of innovators while addressing real-world challenges.

As this year's champions prepare to represent Ireland internationally, the competition continues to demonstrate the powerful combination of creativity, technical skill, and teamwork that drives innovation in education.



The 2025 **AI Almanac for** *Educators*

Mark Anderson
ICT Evangelist

ICT EVANGELIST

Welcome to the ICT Evangelist AI Almanac!

AI and EdTech are everywhere, but the language around them can often feel impenetrable. That's where my **AI Almanac for Educators** comes in; a no-nonsense guide to cutting through the jargon to help you have informed conversations with vendors, policymakers, and colleagues.

Whether you're leading on digital strategy or just starting to explore AI in education, my hope is that this resource gives you clear, accessible explanations of key terms and concepts. It's here to help you separate the reality of these terms from marketing hype, so that youcan make smarter decisions about the technology shaping your classroom and school.

If you want to dig even deeper, my upcoming book, **The EdTech Playbook,** co-authored with Oliy Lewis, takes a research-informed approach to AI, EdTech strategy, and making technology work for you. You can find out more or pre-order it here: **https://amzn.eu/d/ejeD9XI**

Let me know what you think of the Almanac and even better, share about it on social media using the hashtag **#AiAlmanac**

Adaptive learning

Adaptive learning systems use AI to modify the delivery of educational content based on a student's performance and progress. These systems can identify knowledge gaps, reinforce conceptsthat need more practice, and challenge students ready to move ahead. While powerful, their effectiveness relies on high-quality algorithms and alignment with well-designed curricula.

Algorithmic Transparency

Algorithmic Transparency refers to the ability to understand and explain how an AI system makes decisions. In education, this is vital for maintaining trust, ensuring fairness, and avoiding biases that could negatively impact students. Transparent systems allow teachers and leaders to make informed decisions about how AI tools are used.

Artificial General Intelligence (AGI)

AGI refers to a theoretical form of artificial intelligence capable of performing any intellectual task a human can do. It has the ability to learn, reason, and adapt across a wide range of domains. In education, AGI could potentially act as a personalised tutor for every student, though its implications bring both opportunities and ethical challenges that require careful thought.

Brain-Computer Interfaces (BCIs)

Brain-Computer Interfaces are technologies that enable direct communication between the brain and external devices. In education, BCIs could revolutionise learning by allowing students to interact with computers or virtual environments using neural activity. While promising, they raise ethical, privacy, and accessibility questions that need careful consideration.

Cognitive Load Theory

Cognitive Load Theory focuses on the limits of working memory and how instructional design can reduce unnecessary cognitive demands to optimise learning. AI tools can support this by scaffolding content delivery, providing incremental information, and tailoring challenges to the learner's capacity, ensuring engagement without overwhelming students.

Data Privacy in Education

Data privacy in education refers to the ethical collection, use, and storage of student and teacher data. With AI systems increasingly embedded in classrooms, safeguarding personal information is critical. Schools must comply with regulations like GDPR, ensuring that the use of AI tools aligns with privacy standards and protects all users. It is also statutory practice that every tool should undergo a DPIA (Data Protection Impact Assessment) before its use. If unsure, speak with your Data Protection Officer.

Deskilling

Deskilling refers to the reduction in the skill level required to perform a job due to technological advancements. In education, over-reliance on AI tools could lead to the deskilling of educators, diminishing their professional expertise and autonomy. It's essential to use AI to enhance teaching skills rather than replace them.

Digital Citizenship

Digital Citizenship encompasses the knowledge, skills, and behaviours needed to navigate and participate responsibly in the digital world. AI can help teach these principles by identifying online risks, fostering critical thinking, and promoting ethical use. It is vital that students understand the benefits and risks of AI, becoming informed, responsible users.

Ethical AI

Ethical AI refers to the practice of designing and using AI systems that prioritise fairness, transparency, and accountability. In education, this includes ensuring that AI tools do not perpetuate bias, protect student data, and are implemented in ways that complement teacher expertise rather than undermine it.

Fake News

Fake news refers to false or misleading information presented as legitimate news, often designed to deceive or manipulate. In an era where AI can generate highly convincing content, recognising fake news is a critical skill for both teachers and students. Developing digital citizenship and AI literacy enables them to evaluate sources, identify biases, and question authenticity. Educators can teach strategies like cross referencing information, recognising misinformation markers, and using tools like reverse image searches or fact-checking websites.

Fake Work

Fake Work describes tasks that appear productive but contribute little to meaningful outcomes. Not all busy work is valuable. Poorly implemented AI risks creating more fake work, adding complexity without value. When integrating AI, ask yourself: does this save time or enhance outcomes? If not, it's worth rethinking.

Gamification

Gamification is the application of game-like elements, such as points, challenges, and rewards, to non-game contexts like education. When implemented thoughtfully, gamification can create a highly engaging and motivational learning environment. AI enhances this by tailoring challenges to each student's needs, helping to maintain what researchers call the "Goldilocks effect" - ensuring tasks are not too easy or too hard, but just right to sustain engagement and promote learning. However, it's essential to recognise that badges and points alone cannot replace sound pedagogy; they must complement a well-designed educational framework.

Generative AI

Generative AI refers to AI systems capable of creating new content, such as text, images, or audio, based on patterns it has learned. Generative AI can spin up lesson plans, quizzes, or even poetry in seconds. However, research suggests that the most effective use of such tools lies in adopting an input-based approach rather than an output-based one. By leveraging AI to refine ideas, develop teaching strategies, or enhance planning processes, educators can achieve greater productivity gains. Studies have shown that input-focused methods empower teachers to maintain ownership and alignment with pedagogical goals, whereas over-reliance on AI-generated outputs risks reducing the depth and relevance of educational content. Quality control and thoughtful integration remain paramount.

Human-AI Collaboration

Human-AI Collaboration refers to the partnership between human expertise and artificial intelligence to achieve shared goals. In education, this involves leveraging AI systems to handle routine or time-consuming tasks, such as grading or generating insights, allowing teachers to focus on the complex, relational, and creative aspects of teaching. Rather than replacing educators, this collaboration enriches the learning experience, ensuring AI serves as a support mechanism while educators maintain control over pedagogical decisions and strategies.

Large Language Models

Large Language Models (LLMs) are advanced AI systems trained on vast datasets to understand and generate human like text. LLMs like ChatGPT are game-changers for generating ideas and content. The key to unlocking their potential? Strong prompts. Think of them as a recipe: the better the ingredients, the better the result.

Learning Analytics

Learning Analytics involves collecting and analysing data on student behaviours and performance to improve teaching and learning. AI systems can provide real-time insights to help teachers identify struggling students or adjust instruction to meet individual needs. However, these systems must be used responsibly to ensure the insights lead to meaningful interventions.

Machine Learning (ML)

Machine Learning is a subset of AI where algorithms learn from data to improve their performance over time. In education, ML powers adaptive platforms, identifies trends in student achievement, and automates administrative tasks. However, it's crucial to ensure that ML systems are trained on high quality, unbiased data to avoid reinforcing inequalities.

Narrow AI

Narrow AI, also known as weak AI, is designed to perform a single task or a limited range of tasks with high efficiency. Unlike Artificial General Intelligence (AGI), which aims to replicate human versatility, narrow AI focuses on specific applications like speech recognition or language translation. In education, narrow AI drives tools like personalised learning platforms, chatbots, and automated grading systems. While its capabilities are impressive, narrow AI cannot generalise or understand context beyond its programming. This makes it powerful and focused and supports teachers without replacing their expertise.

Natural Language Processing (NLP)

NLP is the field of AI focused on enabling machines to understand, interpret, and respond to human language. In education, NLP powers tools like chatbots for student support, grammar-checking software, and platforms that provide nuanced feedback on student writing. These applications make communication with technology more seamless and impactful.

Personalised Learning

Personalised Learning involves tailoring educational experiences to meet the individual needs, interests, and abilities of each student. Using AI, it helps systems to adapt dynamically to a learner's progress, providing specific challenges or support as needed. It helps to align lessons with individual requirements, making them more targeted and engaging. However, while AI tools can offer helpful support and insights to personalise learning pathways, it is crucial to approach claims of effectiveness with caution. Research demonstrating that personalised learning leads to additional progress is limited, and some studies, such as Bloom's 2 Sigma research, have been heavily critiqued or debunked. AI should, therefore, be seen as a tool to enhance. Teacher pedagogy and expertise, as always, rules.

Predictive Analytics

Predictive Analytics uses AI to identify trends and forecast future outcomes based on historical data. In education, it can help predict which students are at risk of underachievement, enabling timely interventions. While promising, predictive systems must be used cautiously to avoid labelling or limiting students' potential.

Transhumanism

Transhumanism is a philosophical movement advocating for the transformation of the human condition through advanced technologies, aiming to enhance human intellect and physiology. In education, this raises questions about the future role of human cognition and the ethical implications of integrating such technologies into learning.

Universal Design for Learning (UDL)

UDL is a framework for creating inclusive learning environments that meet the needs of all students, regardless of ability. AI supports UDL by providing accessible resources, such as text-to-speech or adaptive content delivery, ensuring that every student has the opportunity to succeed.

I've shared lots of resources on UDL both on **LinkedIn** and **on my website** so please check these out if you'd like to learn more.

Thank you!

Whilst obviously not exhaustive, I hope that this almanac is seen not as a complete glossary, as there are many more terms and more depth, we could cover but a helpful reference point as you dive into conversations about technology, AI and the ways in which it can support and enhance learning, teaching and reduce workload.

If you're interested and you want to dig deeper, as I mentioned at the start of the almanac, my upcoming book, **The EdTech Playbook,** co-authored with Oily Lewis, would be a good place to start. Taking a research-informed approach to AI, EdTech strategy, the aim is that this book, as with all of my work, can help make technology work for you.

You can find out more or pre-order it here:
https://amzn.eu/d/ejeD9XI

Let me know what you think of the Almanac and as I also shared at the beginning of the document, if you have liked it, please do share about it on social media using the hashtag **#AiAlmanac** and drop me a tag on there too!

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