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IN THIS ISSUE

**NATIONAL STEM
CHALLENGE**

**DUBLIN TECH
CIRCUIT**

**BD STEM STARS
IN MUNSTER**

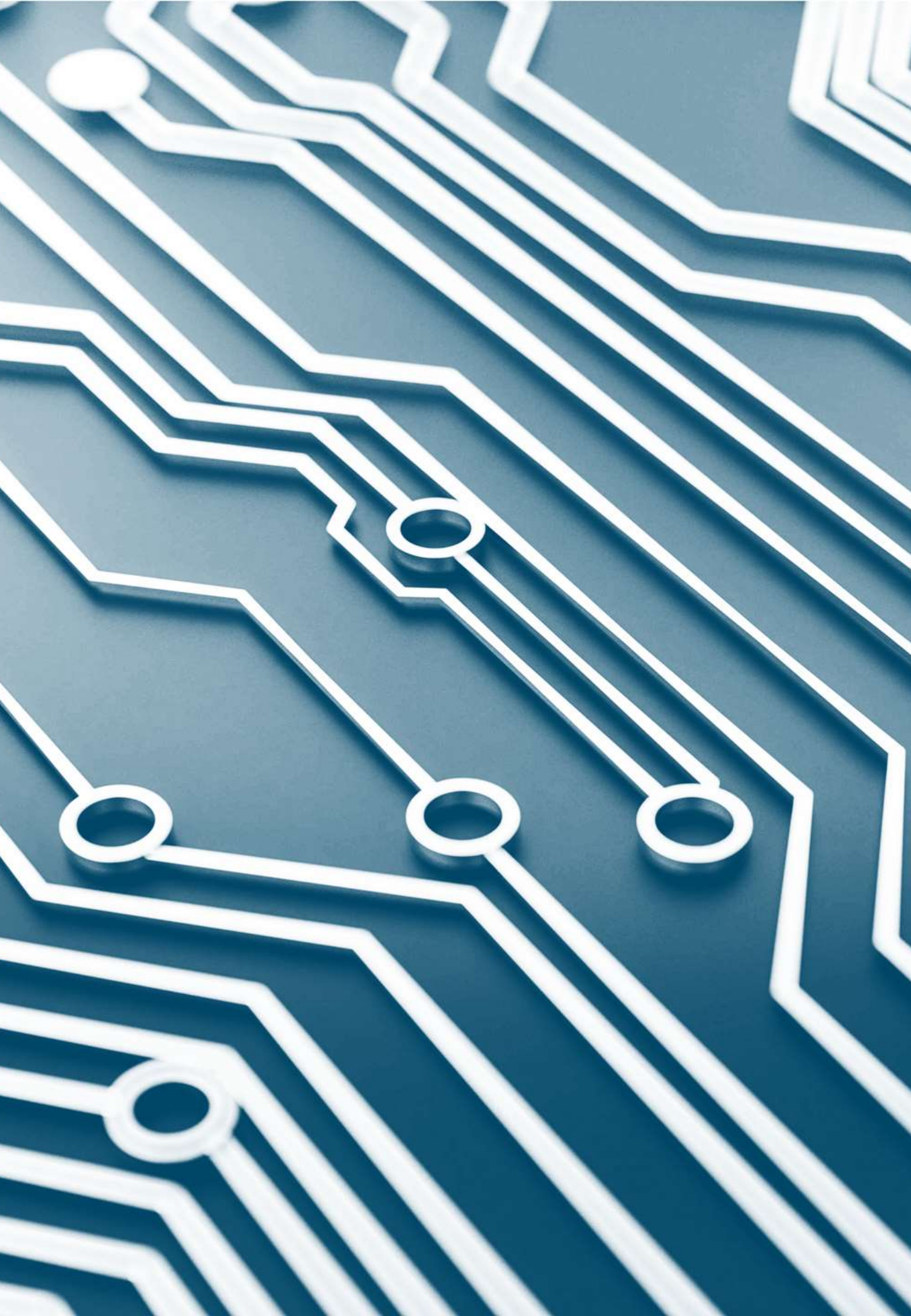
**MOVING
BEYOND
SCREENS IN A
POST-DIGITAL
WORLD**

**NOTEBOOKLM
FOR TEACHERS**

EXPLORING **ED**TECH

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EXPLORING EDTECH #14

September 2025

Editorial

Welcome to **Exploring EdTech #14**.

This edition features four insightful articles that highlight the innovative strides being made in various educational settings across Ireland.

Our first article, "Irish Students Explore 3D Printing in National STEM Challenge," showcases the achievements of five Irish primary schools in the 2025 'Manufacturing a Healthy Future' 3D printing competition. Led by Stryker in partnership with I-Form, this initiative has reached over 4,500 students across six European countries, embedding advanced manufacturing skills in classrooms. The winning projects, ranging from light switch covers to custom drainpipe mesh covers, demonstrate the students' technical prowess and creativity in solving real-world problems.

Next, we explore the "Dublin Tech Circuit," a student-led initiative transforming schools into tech innovation hubs. This programme reimagines inter-school competition by focusing on technology rather than sports, enabling students to form specialised teams in robotics, programming, and digital media. With support from prominent organisations like Google Ireland and the Raspberry Pi Foundation, the Dublin Tech Circuit is fostering a culture of peer-led learning and collaboration.

Our third article, "BD STEM Stars in Munster," highlights a competition designed to inspire secondary school students to tackle healthcare challenges through STEM. Now in its seventh year, the BD STEM Stars programme has empowered nearly 400 students to develop innovative solutions, from memory aids for dementia patients to physiotherapy apps. The competition not only recognises diverse talents but also offers work experience opportunities at BD's R&D Centre in Limerick, providing students with a glimpse into the world of healthcare innovation.

"Reframing Technology in Education: Moving Beyond Screens in a Post-Digital World" challenges educators to broaden their understanding of technology beyond digital screens. Paula Walshe advocates for a more expansive view of technology, encompassing tools and processes that extend human capability. By adopting a multifaceted approach to technology, educators can create rich, inquiry-based learning environments that prepare students for a technologically dependent world.

Finally, Dr Med Kharbach explores the potential of NotebookLM, Google's AI-powered research assistant, which is revolutionising how educators and researchers interact with their documents. By focusing exclusively on user-provided materials, NotebookLM offers a reliable and efficient way to analyse, synthesise, and create content, making it an invaluable tool for teachers.

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.

Tim Lavery, Editor-in-Chief, September 2025

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Pictured are students from Our Lady's Abbey, Adare and Scoil Naomh Iósaf, Adare with their awards alongside Conor Tolan, Vice President Manufacturing at Stryker. Picture: Clare Keogh



Leading with Innovation

**Irish Primary Students Explore 3D
Printing in National STEM Challenge**

Leading with Innovation

Irish Students Explore 3D Printing in National STEM Challenge

Five Irish primary schools have been named national winners in the 2025 'Manufacturing a Healthy Future' 3D printing competition, a pioneering initiative that's transforming how young students engage with science, technology, engineering and mathematics (STEM). The programme, led by global medical technology company Stryker in partnership with I-Form, the SFI Research Centre for Advanced Manufacturing, is helping to embed advanced manufacturing skills in classrooms across Ireland and Europe.

Since its launch in 2021, 'Manufacturing a Healthy Future' has reached over 4,500 students and 350 teachers across six European countries. In Ireland alone, more than 2,000 students - including over 500 from DEIS schools - have participated, gaining hands-on experience with 3D printing and digital design.

Celebrating Innovation in the Classroom

This year's winning schools - Our Lady's Abbey, Adare, County Limerick; Scoil Naomh Íosaf, Adare, County Limerick; Croom National School, County Limerick; Scoil Phádraig, Ballyhale, County Kilkenny; and Central Model Senior School, Marlborough Street, County Dublin - stood out for their creative, sustainable solutions to real-world problems in their school environments.

From light switch covers, a ball-catching hockey goal and custom drainpipe mesh covers to reinforced chair backs and water bottle holders, the students' projects demonstrated not only technical skill but also a deep understanding of how technology can improve everyday life. The entries were judged by experts from Stryker and I-Form, who evaluated the designs based on innovation, collaboration and application of 3D printing concepts.

As part of their prize, the winning teams visited Stryker's advanced additive manufacturing facility in Anngrove, County Cork. There, the students enjoyed a behind-the-scenes look at how 3D printing is revolutionising healthcare and met with senior leaders from Stryker and I-Form who presented the students with trophies.

Empowering the Next Generation of Makers

The programme's impact goes far beyond the competition. By equipping schools with 3D printers and training teachers in digital design tools, 'Manufacturing a Healthy Future' is helping to build confidence and curiosity in STEM from an early age.

"In our school, the 3D printing project was a hugely valuable learning experience," said Patricia Lavin, Deputy Principal at Our Lady's Abbey, Adare, County Limerick.

"The children began by identifying real-life problems around the school, then worked in teams to design practical solutions. It was amazing to see their confidence grow as they developed spatial awareness, design thinking, and digital skills — all while collaborating, problem-solving and learning through trial and error. Seeing their designs come to life on the 3D printer was incredibly rewarding. Every child played an active role, and the sense of pride and ownership was huge. It's had a lasting impact – they now look at their environment with fresh eyes, always thinking creatively about how things could be improved."

Sarah McCormick, a 6th Class teacher at Scoil Phádraig, Ballyhale, added: *"Participating in the 3D printing competition gave the students of Scoil Phádraig a meaningful opportunity to think and work like engineers to solve real-life problems through collaborative thinking and creativity. They loved seeing their ideas come to life and it was very rewarding to see that they can make a real difference in terms of sustainability."*

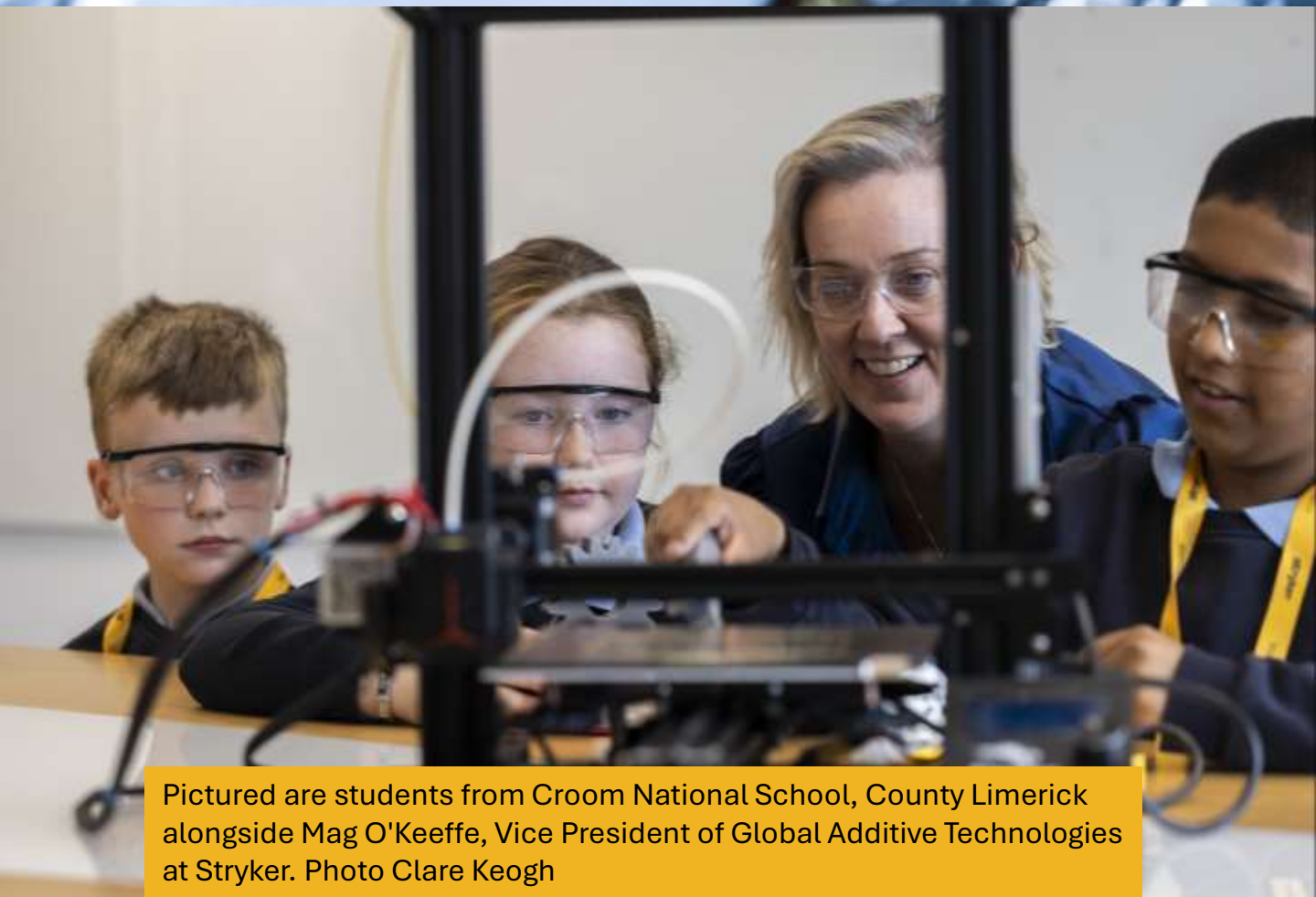
A Strategic Investment in STEM Education

Stryker's involvement in the programme reflects its long-standing commitment to innovation, sustainability and community engagement. As a global leader in medical technology, Stryker is passionate about supporting education that inspires future generations and continues to make healthcare better.

"Stryker's involvement in the 'Manufacturing a Healthy Future' programme underscores our commitment to innovation, sustainability and community engagement," said Mag O'Keeffe, Vice President of Global Additive Technologies at Stryker. *"By introducing students to 3D printing at an early age, and welcoming them to our manufacturing facilities, we hope to ignite their creativity and inspire the next generation of problem-solvers. We look forward to expanding the programme's impact and reach in the coming years."*

The programme also plays a vital role in addressing STEM skills shortages and increasing diversity in the sector. By reaching students from all backgrounds, including those in underrepresented communities, it helps to challenge traditional perceptions of who belongs in manufacturing and engineering.

Limerick schools take top prizes in National 3D Printing Competition: Three Limerick primary schools - Our Lady's Abbey, Adare, Pictured are 2nd class students from Croom National School, County Limerick with their award. Photo Clare Keogh



Pictured are students from Croom National School, County Limerick alongside Mag O'Keeffe, Vice President of Global Additive Technologies at Stryker. Photo Clare Keogh

Michael Golden, Education and Public Engagement Manager at I-Form, explained: *“Manufacturing a Healthy Future is about sparking curiosity and confidence in STEM from an early age. By opening up access to cutting-edge technology like 3D printing in primary schools, this project helps break down barriers and challenges traditional perceptions of who belongs in manufacturing. We’re proud to support young learners from all backgrounds to see themselves as future engineers, innovators and makers.”*

A European Collaboration with Global Impact

‘Manufacturing a Healthy Future’ is part of a wider European initiative supported by the European Institute of Innovation and Technology (EIT). The programme is delivered in collaboration with partners across six countries, including Arts et Métiers Institute of Technology (France), University of Tartu (Estonia), LINPRA (Lithuania), PBN (Hungary) and LMS University of Patras (Greece).

In Ireland, the partnership between Stryker and I-Form at University College Dublin has been central to the programme’s success. Together, they provide technical support, judge competition entries and donate educational technology prizes to participating schools.

Ciarán Fay, a 4th Class teacher at Central Model Senior School in Dublin, highlighted the programme’s transformative effect: *“This is exactly the kind of project I would have loved to take part in as a student, so I’m thrilled to now have the chance to facilitate it with my own class through this collaboration with Stryker and I-Form. The 3D printing programme had a real impact on how my students viewed problem-solving, design, and technology — it opened their eyes to creative possibilities they hadn’t imagined before.”*

Looking Ahead

With the start of the 2025/2026 school year, the momentum behind *‘Manufacturing a Healthy Future’* continues to grow. With hopes to expand its reach and deepen its impact, the initiative is setting a new standard for how STEM can be taught in primary schools - through creativity, collaboration and real-world relevance.

Conor Tolan, Vice President of Manufacturing for Joint Replacement at Stryker, summed up the programme’s significance: *“Congratulations to all the students and teachers who took part in this year’s programme. Programmes like this show how hands-on learning can spark curiosity and bring real-world innovation into the classroom. It’s exciting to see students engaging with the same technologies we use every day to make healthcare better.”*

As Ireland and Europe look to the future of education and industry, initiatives like *'Manufacturing a Healthy Future'* offer a powerful reminder: the next generation of innovators is already here - and they're just getting started.

About I-Form:

I-Form is the SFI Research Centre for Advanced Manufacturing. Its mission is to shape the future of manufacturing through high-impact research into the application of digital technologies to materials processing. I-Form works in close collaboration with industry partners to ensure that its research is relevant, applicable and impactful, delivering a step-change in competitiveness for Irish manufacturing. I-Form aims to be globally recognised as a leading centre in advanced manufacturing research.

About Stryker:

Stryker is a global leader in medical technologies and, together with its customers, is driven to make healthcare better. The company offers innovative products and services in MedSurg, Neurotechnology and Orthopaedics that help improve patient and healthcare outcomes. Alongside its customers around the world, Stryker impacts more than 150 million patients annually.

Five primary schools take top prizes in National 3D Printing Competition:
Pictured are students from Our Lady's Abbey, Adare and Scoil Naomh Iósaf, Adare with their awards.
Photo Clare Keogh





Dublin Tech Circuit

Transforming Schools into Tech Innovation Hubs

Arjun Gambhir

Dublin Tech Circuit

Transforming Schools into Tech Innovation Hubs

Arjun Gambhir

Imagine a school where the excitement of match day isn't reserved for the football pitch—but for the robotics lab, the coding suite, and the digital media studio! The Dublin Tech Circuit (DTC) is making this vision a reality by ushering in a new era of peer-led, technology-powered inter-school competition across Ireland.

Bringing Team Spirit to Tech in Irish Schools

Dublin Tech Circuit is a student-led initiative that reimagines how schools foster innovation and collaboration. Established to address the question of why only sports teams traditionally represent their schools, **Dublin Tech Circuit** provides a platform uniting young leaders, scientists, and technologists for peer-to-peer learning and inter-school cooperation. The programme is dedicated to cultivating schools as dynamic centres of innovation, enabling students interested in robotics, programming, cybersecurity, digital art, and engineering to form specialised technology teams. This facilitates the creation of a nationwide, student-driven movement in which schools can establish technology teams analogous to existing athletic teams. These teams conduct open trials for membership, engage in collective training, and participate in competitions across disciplines including robotics, artificial intelligence, and digital media.

A distinguishing feature of Dublin Tech Circuit is its emphasis on student leadership at all levels. Students independently manage team formation, administration, and competition logistics, while benefiting from shared resources and collaborative learning opportunities. Within just eight weeks of its launch, the initiative had expanded to twelve participating schools and garnered support from prominent organisations such as Google Ireland, Learnovate at Trinity College Dublin, SimpleStudy, and the Raspberry Pi Foundation. Its pilot event, held on May 13th, 2025, convened over seventy students and showcased practical skills and teamwork, facilitated by generous sponsor engagement.

The initiative's impact has been recognised within educational and technology circles. Dublin Tech Circuit has received media coverage from outlets including

Silicon Republic, highlighting its role in advancing inter-school collaboration and student-led innovation. Further validation was attained through a Bronze Certification from EduEvidence, an international non-profit, acknowledging the initiative's effective and equitable approach to edtech.

Teachers continue to play an essential role in shaping the Circuit's growth and ensuring safety, guiding and supporting student-driven activities, fostering innovation, and inspiring the development of future leaders. The initiative has received strong endorsements from educators; for instance, Mitch Lindsay, faculty lead of Marian College's tech team, has praised the hands-on methodology and meaningful student participation evident at Circuit events.

“Technology is anything that was not around when you were born.”

Alan Kay

Looking ahead, Dublin Tech Circuit is preparing to launch a nationwide league, with plans for forty to fifty school teams competing throughout the academic year. The vision also encompasses rolling trophies and unique team identities, including kit, mascots, and colour schemes, designed to create an engaging atmosphere comparable to major sporting events. The organisers are actively seeking new mentors, partners, and supporters to join this secondary school student initiative, recognising that broad community involvement is vital for scaling the mission and achieving sustained impact.

How Can Your School Get Involved?

To introduce this dynamic, student-focused programme to your school, visit dublintechcircuit.com. The initiative welcomes partnerships, mentorship, and participation from dedicated educators committed to inspiring the next generation of Irish tech innovators.



Empowering the Next Generation of Innovators

BD STEM Stars in Munster

Empowering the Next Generation of Innovators

BD STEM Stars in Munster

In a world increasingly shaped by science and technology, empowering students to think critically and creatively about real-world challenges is more important than ever.

Inspiring Young Minds Through STEM

BD STEM Stars is a Munster-wide competition designed to inspire secondary school students to explore real-world healthcare challenges through Science, Technology, Engineering, and Math (STEM). Now in its seventh year, BD STEM Stars has grown from a local initiative in two counties to a Munster-wide programme, reflecting the rising enthusiasm and talent among young people in the region. Since its inception, the competition has empowered nearly 400 students to explore healthcare challenges through STEM, offering them a platform to showcase ideas, build skills, and practice real-world innovation.

BD, a global leader in medical technology with a rich heritage of innovation, offers diverse and meaningful career pathways across all STEM disciplines. In Limerick, its state-of-the-art R&D center serves as a hub of cutting-edge healthcare innovation, making it an ideal environment to inspire the next generation of STEM talent.

Students demonstrate their projects to Judges at the BD STEM Stars competition at the BD RCI site, Castletroy, Limerick.
Photo: Arthur Ellis



A Competition with Purpose

Open to students aged 13–19, BD STEM Stars challenges participants to identify a healthcare issue affecting them or their community and propose a STEM-based solution.

From designing memory aids for dementia patients to tackling adult literacy with smart tech, last year's BD STEM Stars winners proved that big ideas could come from young minds.

Whether it was a modular device to support independent living, a physiotherapy app, or a product for facial rehabilitation, these students turned passion into purpose and wowed the judges with their creativity, research, and storytelling.

The competition is designed to be inclusive, welcoming students of all abilities and backgrounds, and accommodating varying levels of access to STEM resources.

Photo: Arthur Ellis



“At Immersive Software Engineering, we believe in learning by doing and that starts with sparking curiosity early. Initiatives like BD STEM Stars are vital in showing young people that their ideas matter and that they can shape the future through technology and innovation. We’re proud to support programmes that empower the next generation of problem-solvers.”

Gillian Place, Public Engagement Officer, Immersive Software Engineering, University of Limerick

Expanding Opportunities for Recognition

To ensure that a wide range of talents are recognised, the competition now includes multiple award categories:

- Best Software
- Best Product
- Best Research Poster
- Outstanding Live Demo
- Outstanding Video

These categories allow students to play to their strengths and explore different ways of communicating their ideas. The competition culminates in a prestigious €10,000 grand prize, awarded annually to the winning school for use in enhancing its STEM capabilities.



We're incredibly proud of Eoghan, Abbie, and Lily for winning the 2025 STEM Stars competition, along with their dedicated mentor, Ms. Christine Carew.

At Mungret Community College, we're committed to delivering a modern education in our state-of-the-art campus, with STEM playing a central role. Competitions like STEM Stars challenge students to grow their research, problem-solving, and presentation skills—valuable tools for life.

This success wouldn't be possible without the dedication of our staff and the strong support across our school community. The generous prize fund for both students and the school is a thoughtful recognition of everyone's hard work and a well thought out model.

Liam O'Mahoney, School Principal
Mungret Community College, Limerick

Beyond the Competition: Real-World Experience

BD STEM Stars is more than just a competition, it's a launchpad for future careers. In recent years, the programme has introduced a work experience initiative, giving students a unique opportunity to step inside the world of healthcare innovation. Participants gain hands-on experience at BD Research Centre Ireland, working alongside scientists, engineers, and researchers who are advancing the world of health every day.



Students at the BD STEM Stars competition at the BD RCI site, Castletroy, Limerick.
Photo: Arthur Ellis

“When industry engages with the local community, it helps young people see what’s possible through STEM and helps define what possibilities their futures may hold. That connection turns curiosity into ambition and ambition in to careers that can affect change for the better, for individuals and for society.”

**Owen O’Neill, Senior R&D Director & Site Lead
BD Research Centre Ireland**



Photo: Arthur Ellis

Supporting Broader STEM Engagement

In addition to the competition and work experience programme, BD has also supported students with other STEM projects throughout the academic year. Whether it's mentoring or resources, the goal is to create a supportive ecosystem where students can thrive and pursue their passions.

Looking Ahead

As the BD STEM Stars programme continues to grow, so too does its impact. With new categories, expanded outreach, and deeper engagement with schools and communities, the initiative is helping to build a brighter, healthier future, one student at a time.

The BD STEM Stars 2026 competition has launched. Contact STEMStars@bd.com with any questions or visit the website to register your school [STEM Stars](#)



Reframing Technology in Education

Moving Beyond Screens in a Post-Digital World

Paula Walshe

Reframing Technology in Education: Moving Beyond Screens in a Post-Digital World

Paula Walshe

Author, Lecturer & PhD Candidate STEAM Education in Early Childhood. CPD Training Provider. Podcaster.

21st century culture has resulted in the term ‘technology’ being synonymous with digital tools and more specifically, digital screen-based devices such as smartphones and tablets. When we think about technology and children, we tend to think about them engaging with such digital screen-based devices (DSBDs) and this can cause us to move immediately to a place of concern regarding too much screen-time, online predators and diminishing social skills (Walshe 2024). However, this also means that we are potentially missing out on the positive impact and learning opportunities which technology, when introduced and used in a developmentally appropriate and meaningful way, can bring to children in the educational environment.

This article proposes a fundamental shift in how technology is understood and applied within the educational context generally, beginning in early childhood education and right through the educational continuum, to encourage educators who may be reluctant to introduce technology into their classroom to do so. Reasons for technological reluctance among educators may include their perceived lack of technical know-how, cost of digital equipment, the developmental impact of screen-time or online safety concerns.

Research has shown that educators’ knowledge and beliefs regarding new pedagogical strategies have a direct impact on what does and does not make it into their classroom (Jamil et al. 2018). However, if educators, as gatekeepers to the learning environment, are reluctant to introduce technological tools into their teaching practice, then ultimately it is the children who are missing out.

Technology Means More than Screens

In a post-digital world, where digital tools and technology are no longer novel but embedded in everyday life, we must move beyond the narrow, yet synonymous, association of the word ‘technology’ with digital screens (Walshe 2024). After all, the word ‘technology’ did not originate with the digital age; it has long referred to a broad spectrum of tools, systems, and processes designed to extend human capability and solve problems.

Despite this, prevailing beliefs among educators often equate technology solely with DSBDs. These beliefs may be shaped by concerns about developmental appropriateness or a lack of subject-matter knowledge, which can act as barriers to the integration of broader technological experiences in the learning environment.

Research has shown that such perceptions can limit the implementation of new pedagogies such as STEAM (science, technology, engineering, the arts, and mathematics) (Jamil et al. 2018), thereby potentially restricting children's access to rich, inquiry-based learning opportunities. Additionally, educator confidence to incorporate technology was also found to be a problem (Papadakis et al. 2021).

These issues can be addressed through the adoption of a more expansive and historically grounded understanding of technology beyond DSBDs. To achieve this, the word 'technology' must be reconceptualised as a multifaceted, creative, tangible and material domain; one that is not limited to, or solely dependent upon, digital tools or DSBDs (Walshe 2024)

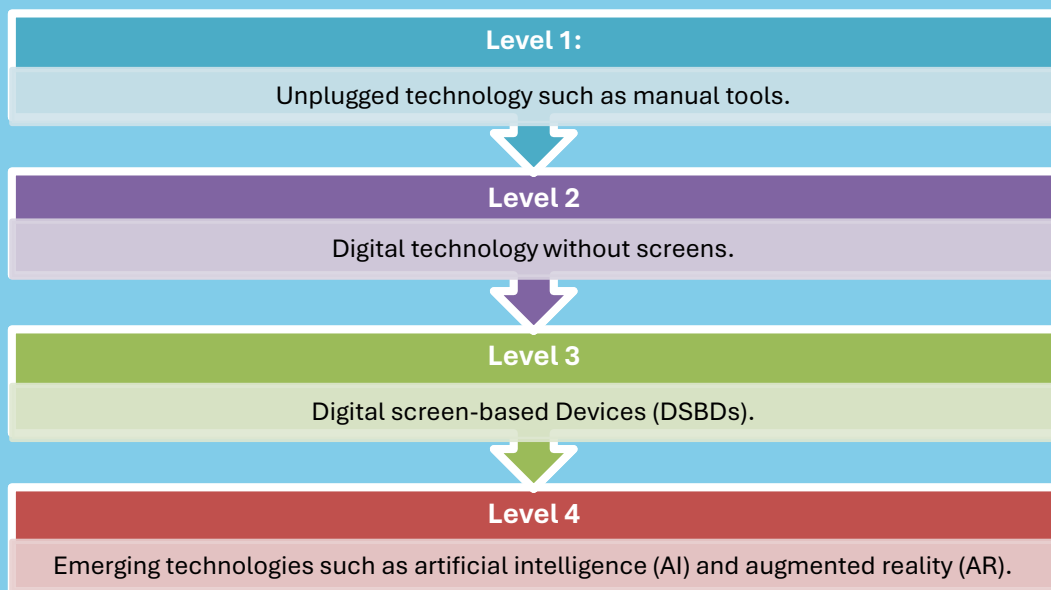
By initiating a pedagogical shift, that positions technology as an integrated element of the STEAM learning approach for example, grounded in inquiry, exploration, and challenging screen-dominant narratives, educators can be empowered to embrace a wider range of technologies which are developmentally appropriate and pedagogically rich.

This approach can ease open the door for educators, as the gatekeepers of the learning environment, and encourage them to 'dip their toe' in the technological domain. Furthermore, this approach can support the future integration of developmentally appropriate digital technologies by breaking down barriers and challenging beliefs around the concept of technology generally, therefore encouraging educators and building their technological awareness and confidence.

Proposing 4 Levels of Technology

To address barriers impacting the incorporation of technology in the learning environment, it is important to first consider technology in the absolute broadest sense and accept an understanding that technology existed long prior to the rise of digital media and the internet. Doing this allows for the delineation of what educational technology can mean, beyond DSBDs (Walshe 2024). For example, this article proposes breaking technology down into 4 levels:

Figure.1



(Examples of tools and strategies under each of the 4 levels are illustrated in Figure 2)

By thinking about technology in this way, educators can engage in the level of technology which suits them and their level of technological know-how. Furthermore, it allows for technology to be introduced in a developmentally appropriate and meaningful way at various stages along the educational continuum, beginning in early childhood education through to primary and secondary school and beyond.

As the confidence level of the educator builds, they might discover potential technological tools suitable for their pedagogical practice within one of the other technological levels and decide to take a step up into more complex or advanced technologies. However, even unplugged technological tools can support the development of digital competence among children by nurturing dispositions such as critical thinking and problem solving which are immensely useful to them when engaging in technology at all levels. Even if DSBDs (Level 3) or more advanced emerging technological tools such as AI and AR (Level 4) are not used within the classroom, children's engagement with unplugged

Figure 2: Pedagogical tools and strategies under the 4 proposed levels of technology



technologies (Level 1) or even digital technologies without screens (Level 2), will still support them to become critical thinkers, problem-solvers and imaginative innovators. Facilitating children to develop such important 21st century skills is vital in a world where everyday life is becoming increasingly technologically dependent and online mis-information can make it difficult to ascertain what is real and what is fake. Furthermore, we must prepare children for the future and for jobs and careers which currently do not exist (Allen 2016).

Reframing technology as described in this article and embedding it appropriately within our educational environments can empower children in this era of swift technological change, irrespective of the level of technology we choose.

Technologies which might be considered under each of the 4 proposed technological levels are listed in Figure 2 (above).

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NotebookLM for TEACHERS

PRACTICAL TIPS TO BOOST TEACHING
AND RESEARCH WITH AI



By Med Kharbach, PhD

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Introduction

One thing I always say about AI is that it is the perfect tool for people who have expertise in their specific disciplines. AI can help amplify that expertise because you get it to work like an intern or what Mishra (2023) refers to as a "smart, drunk intern"; drunk because it can always make mistakes and inaccuracies and given your expertise you get to notice that.

You become the judge. In this way, you engage with AI in a symbiotic relationship (Bronet, 2024) where your knowledge guides the technology, and the technology helps you work more efficiently and discover new connections in your field.

Among the many AI tools available today, NotebookLM stands out as particularly valuable for educators and researchers. This is a tool that I think every teacher and researcher should try out, which is why I devoted a whole guide to it.

NotebookLM transforms how we interact with documents and sources by creating a controlled AI environment where you upload your own materials and the AI works exclusively within that context. Unlike general chatbots that draw from their broad training data, NotebookLM focuses only on the sources you provide which makes it incredibly reliable for academic work.

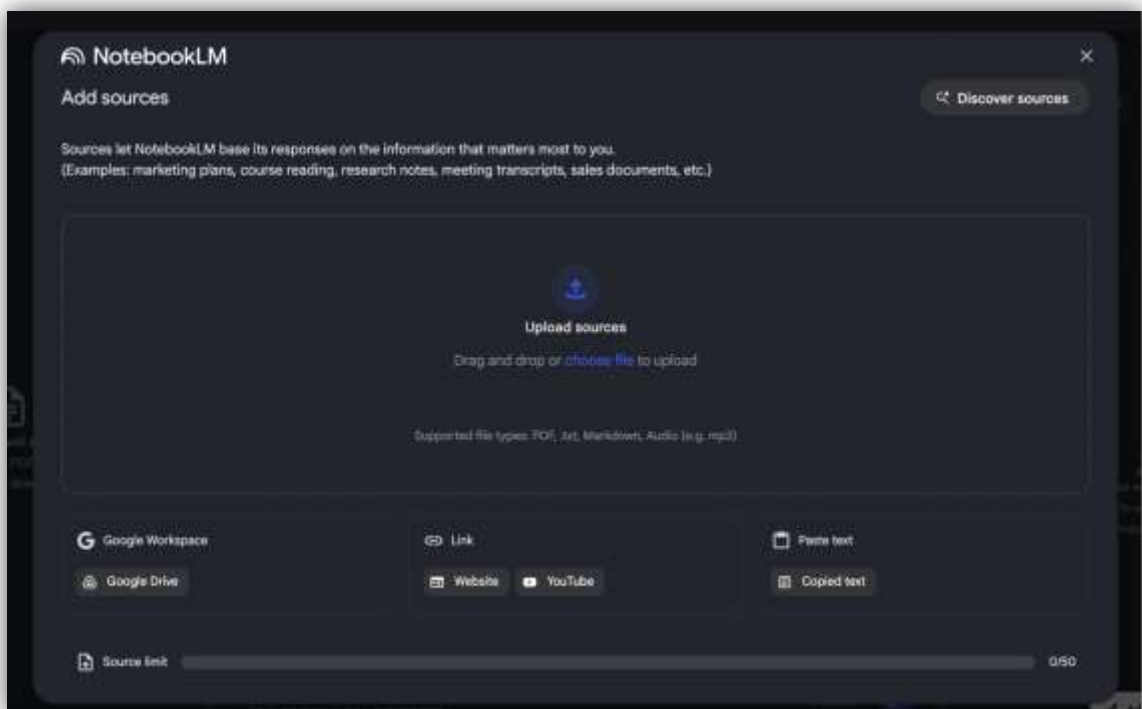
In this guide, you will learn how to use NotebookLM's core features through practical examples and proven strategies. We'll explore its general uses including creating personal libraries, generating study materials, and visualizing data through mind maps. You'll discover specific applications for research and for teaching. We'll also cover two of its main features namely Audio Overviews and Video Overviews and we will talk about some practical ways to leverage them in your instruction. We will then conclude with tips to help you make the best of NotebookLM in both your teaching and research. By the end of this guide, you'll have everything you need to integrate NotebookLM effectively into your professional workflow.

Med Kharbach, PhD
Montréal, Sep 16, 2025

1. What is NotebookLM?

NotebookLM is Google's AI-powered research assistant that works exclusively with documents you provide. Unlike ChatGPT or Claude that draw from vast training data, NotebookLM only references the materials you upload: PDFs, notes, or transcripts.

This focused approach means you control exactly what the AI knows and can trust that every response comes directly from your sources. It's like having a research assistant who has read only your specific materials and can help you analyze, synthesize, and create content from them.



2. General Uses of NotebookLM

There are various ways to use NotebookLM to help with your research and teaching. Here are some examples:

1. Personal Library

View NotebookLM as a Zotero alternative but with powerful AI-driven features. You can save your research materials such as papers, guides, and other resources then query them when in need of specific information.

You can ask complex questions across all your sources, find connections between different materials, and instantly retrieve relevant passages without manual searching through multiple of documents.

2. Book and Content Summaries

If you have a big reading assignment, you can split chapters, upload them separately, and get comprehensive summaries of each section. NotebookLM can distill lengthy academic texts into digestible summaries while preserving key arguments, evidence, and theoretical frameworks that are essential for understanding the material.

3. Create Study Guides and Flashcards

This is an excellent feature that enables you to create flashcards, study guides, and quizzes from your uploaded materials. It can be used to prepare for exams by creating practice questions at different difficulty levels, identify key areas to focus on based on your sources, and generate comprehensive review materials tailored to your specific learning objectives.

4. Visualize Your Data in Mind maps

NotebookLM allows you to create AI-based mind maps from your sources. This can help you visualize complex relationships between concepts, theories, and findings. These visual representations can reveal hidden connections, support brainstorming sessions, and provide a bird's-eye view of your research landscape.

5. Research Assistant

If you are working on a literature review or comprehensive research project, you can upload your materials such as research papers, textbooks, and web pages to turn your notebook into a mini subject-matter expert. It can generate summaries of large and complex documents, provide detailed explanations of difficult concepts, and help you synthesize information across multiple sources to build stronger arguments.

6. Audio Overviews

This is great for learning on the go. You can turn books, papers, or long YouTube videos into audio summaries to listen to while driving, commuting, or exercising. The conversational format

makes complex academic content more approachable and helps reinforce learning through auditory channels.

7. Subject-Specific Notebooks

Another great way to use NotebookLM is to build topic-focused notebooks (e.g., "Neuroscience Research 2024" or "Climate Policy Analysis") so queries stay focused and context-aware. This organization strategy prevents information overload and ensures more accurate, relevant responses to your questions.

8. Enhance Accessible and Inclusive Learning

Audio summaries and video overviews allow you to accommodate different learning styles and accessibility needs. Students with dyslexia, visual impairments, or attention challenges can benefit from multiple content formats thus ensuring equal access to educational materials.

9. Grow Professionally

You can use NotebookLM to help with your professional development. For instance, you can upload recent research in your area and engage in deep analysis of emerging trends. Another way to use it is to get personal insights by uploading your teaching reflections or professional journal entries (avoiding personal data) and get NotebookLM to help analyze patterns, identify areas for growth, and support self-analysis for continuous improvement.

10. Review Policies and Manuals

No one likes to go through policy jargon whether it's a school technology policy, institutional handbook, or legal documents. NotebookLM can help by summarizing key points, extracting relevant sections for specific questions, and translating bureaucratic language into plain English for better understanding and compliance.

11. Generate Transcriptions

NotebookLM can help you transcribe and summarize meetings, YouTube videos, and audio recordings. For instance, you can upload meeting audios and get NotebookLM to extract action items, key decisions, and important discussion points, creating organized meeting minutes that are searchable and actionable.

12. Get Assistance with Creative Writing

If you are working on a novel, academic book, or creative non-fiction, NotebookLM can help with character development, plot summaries, thematic analysis, and maintaining consistency across your manuscript. Upload your drafts, outlines, and research materials to create an intelligent writing companion that understands your project's unique voice and goals.

These are general uses that show the educational potential of NotebookLM. However, we can also go deeper and explore the different ways you can use this amazing tool to help you with your research and teaching.

3. Using NotebookLM to Help with Research

NotebookLM, as I stated before, is originally a research assistant and it does a great job helping you organize your research materials and synthesize information across multiple sources. I like to think of it as Zotero on steroids. Here are some practical ways to leverage NotebookLM in your research:

3.1. Summarize Research Articles

This is one of the main strengths of NotebookLM. You can create notebooks for your research projects, upload materials to each notebook and get NotebookLM to summarize key insights, methodologies, and findings across multiple papers. Ask it to highlight common methodologies, conflicting results, or emerging trends and it will save you hours of reading time.

3.2. Discover Gaps in the Literature

If you are not yet sure which gaps in the literature in your research area need to be explored, create a notebook and upload materials you collected during your research search (use tools such as Scite, Elicit, SciSpace, Research Rabbit, Consensus, among others, to help with the search part). Ask NotebookLM to identify understudied areas, methodological limitations across studies, or questions that remain unanswered in the current literature.

3.3 Pull Quotes

Use NotebookLM to extract quotes from your uploaded sources to back up your arguments in manuscripts, grant proposals, or presentations. You will need to verify the accuracy of the quotes though. Simply go to the original source, Cmd + F (Mac) or Ctrl + F (Windows) and paste a phrase or two from the quote to quickly locate it and ensure proper context and citation.

3.4. Get Feedback

Upload your research draft and ask NotebookLM to find weaknesses in your arguments, identify unsupported claims, and provide constructive feedback on your methodology, literature review, or discussion sections. It can act as an intelligent peer reviewer helping you strengthen your work before submission.

3.5. Identify Recurring Themes

Upload research papers and ask NotebookLM to identify recurring themes, methodologies, or theoretical frameworks across the papers. Use these patterns to structure a literature review, organize your theoretical framework, or identify which approaches are most used in your field.

3.6. Discover New Sources

Use the Discover feature in NotebookLM to conduct AI-enhanced online searches around a particular topic. NotebookLM searches the web and suggests various linked sources you can add to your notebook. You can then generate summaries, compare these new sources with your existing materials, and expand your research scope systematically.

3.7. Create Video Presentations

Upload the script of your presentation or even upload your research papers and use the Video Overview feature to generate engaging video summaries. You can use these for conference presentations, teaching materials, or to share your research findings with non-academic audiences in an accessible format.

3.8. Get Help with Data Analysis

Upload your research data and ask NotebookLM to identify patterns, suggest analytical approaches, or help interpret results. While it won't replace statistical software, it can help you understand trends, formulate hypotheses, or explain complex findings in plain language for your discussion section.

3.9. Visualize Your Research Data

Use NotebookLM to create mind maps from your sourced data. You can ask it to visualize connections between concepts, theories, or research findings which can help you see relationships you might have missed and organize your thoughts for writing or presentations.

3.10. Learn on the Go

Generate audio summaries from uploaded research materials to review literature while commuting, exercising, or doing other tasks. This is particularly useful for staying current with new publications in your field or reviewing materials before meetings, defenses, or conferences.

4. Using NotebookLM to help with Teaching

Here are 10 ways to use NotebookLM to help with teaching:

4.1. Create Engaging Lesson Plans:

Upload previous lesson plans or sample exemplary lesson plans and ask NotebookLM to analyze patterns, suggest improvements, or generate new variations. Create a notebook exclusively for lesson planning where you upload successful templates, curriculum standards, and teaching resources to build a personalized AI assistant for curriculum design.

4.2. Create Flashcards

Use NotebookLM to create comprehensive flashcard sets by uploading textbooks, lecture notes, or study guides. Ask it to identify key terms, concepts, and definitions, then format them into question-answer pairs suitable for digital flashcard platforms like Anki or Quizlet.

4.3. Generate Differentiated Materials

Upload your lesson or curriculum unit and ask NotebookLM to create multiple versions at different reading levels, complexity levels, or learning styles. Request modifications for advanced learners, struggling students, or those with specific learning needs.

4.4. Design Assessment Questions

Feed NotebookLM your course materials and learning objectives to generate varied assessment questions including multiple choice, short answer, essay prompts, and project-based assessments aligned with Bloom's Taxonomy levels.

4.5. Create Student Handouts and Worksheets

Upload core content and ask NotebookLM to design accompanying worksheets, graphic organizers, note-taking templates, and practice problems that reinforce key concepts through different exercise types.

4.6. Develop Rubrics and Grading Criteria

Input assignment descriptions and learning outcomes to have NotebookLM create detailed, objective rubrics with clear performance indicators and point distributions for consistent, transparent grading.

4.7. Generate Discussion Questions

Upload readings, videos transcripts, or lecture content and request thought-provoking discussion questions at various depth levels, from comprehension checks to critical analysis prompts that encourage student engagement.

4.8. Build Vocabulary Lists and Glossaries

Have NotebookLM analyze course materials to extract subject-specific terminology, create definitions in student-friendly language, and organize vocabulary by unit or difficulty level with example sentences.

4.9. Create Parent Communication Resources

Upload curriculum outlines and class activities to generate parent newsletters, homework help guides, or suggestions for at-home extension activities that align with classroom learning.

4.10. Design Cross-Curricular Connections

Input materials from multiple subjects and ask NotebookLM to identify interdisciplinary links, suggest integrated projects, and create lessons that connect your subject area to others, promoting holistic learning.

5. NotebookLM Audio Overview

NotebookLM Audio Overview is a powerful feature that allows you to transform your uploaded sources into engaging podcast-style conversations between AI hosts. You can customize the format of your audio overview to match your specific learning or presentation needs.

You can choose between four distinct formats:

- **Deep dive:** A lively conversation between two hosts, unpacking and connecting topics in your sources for comprehensive understanding
- **Brief:** A bite-sized overview to help you grasp the core ideas from your sources quickly
- **Critique:** An expert review of your sources, offering constructive feedback to help you improve your material
- **Debate:** A thoughtful debate between two hosts, illuminating different perspectives on your sources

The customization options extend beyond just format selection. You can also generate audio overviews in different languages to accommodate multilingual audiences or personal preferences.

Additionally, you can specify what the AI hosts should focus on in the episode. For instance, ask them to concentrate only on a particular source from your notebook, dive deep into a specific topic, or address certain themes or questions you're most interested in exploring.

This level of customization ensures that each audio overview is tailored to your exact needs, whether you're studying for an exam, preparing a presentation, or conducting research analysis.

5.1 Using Audio Overviews in Teaching

Here are some practical ways to use Audio Overviews in your teaching:

5.1.1. Podcast Generation

This is especially great for auditory learners. You can upload your course materials, lecture notes, or textbook chapters and generate podcast-style narrations to listen to on the go. Students can review complex topics during their commute, while exercising, or as they prepare for bed, turning passive time into active learning opportunities.

5.1.2. Language Learning Support

Generate audio overviews in multiple languages to support multilingual classrooms or create immersive language learning experiences. Upload texts in the target language and have the AI hosts discuss them. This provides natural conversation models that help students develop listening comprehension and familiarize themselves with academic discourse patterns.

The screenshot shows a dark-themed interface titled "Customise Audio Overview" with a close button (X) in the top right corner. The interface is divided into several sections:

- Format:** Four selectable options are shown as cards:
 - Deep dive** (selected with a checkmark): "A lively conversation between two hosts, unpacking and connecting topics in your sources."
 - Brief**: "A bite-sized overview to help you grasp the core ideas from your sources quickly."
 - Critique**: "An expert review of your sources, offering constructive feedback to help you improve your material."
 - Debate**: "A thoughtful debate between two hosts, illuminating different perspectives on your sources."
- Choose language:** A dropdown menu currently set to "English".
- Length:** Three buttons: "Shorter", "Default" (selected with a checkmark), and "Longer".
- What should the AI hosts focus on in this episode?:** A text input area containing the prompt: "Things to try" followed by two bullet points:
 - Focus on a specific source ('only cover the article about Italy')
 - Focus on a specific topic ('just discuss the novel's main character')
- Generate:** A blue button at the bottom right to start the audio generation process.

5.1.3. Exam Review Sessions

Transform study guides and past exam materials into engaging audio reviews using the "Brief" format. Students can listen to condensed versions of key concepts repeatedly, reinforcing memory through auditory repetition. The conversational format makes dry material more memorable than traditional study methods.

5.1.4. Critical Thinking Development

Use the "Debate" format to model academic discourse and critical analysis. Upload controversial topics or competing theories and let students hear how to respectfully discuss opposing viewpoints and teach them to consider multiple perspectives and construct balanced arguments.

5.1.5. Accessibility Accommodations

Create audio alternatives for students with dyslexia, visual impairments, or reading difficulties. The conversational format is often easier to follow than dense academic text which enables all students to have equal access to course content regardless of their learning challenges.

5.1.6. Parent Engagement Tools

Generate audio summaries of curriculum units, student progress reports, or classroom activities that busy parents can listen to while commuting or doing household tasks. This improves home-school communication without requiring parents to read lengthy documents.

5.1.7. Professional Development Resources

Use the "Critique" format to analyze your own teaching materials, lesson plans, or student work samples. The AI hosts can provide objective feedback on your instructional design and help you identify areas for improvement in a non-threatening, conversational manner.

5.1.8. Flipped Classroom Content

Create audio overviews of new topics for students to listen to before class, using the "Deep dive" format to thoroughly explore concepts. This pre-exposure to material through audio allows class time to focus on application, discussion, and hands-on activities.

5.1.9. Differentiated Instruction

Generate multiple audio versions of the same content at different complexity levels or focusing on different aspects. Advanced students might receive a debate-style overview exploring nuances, while struggling students get a brief, simplified explanation of core concepts.

5.1.10. Reflection and Metacognition

Have students upload their own work (essays, projects, or portfolios) to generate audio critiques. This external perspective promotes self-reflection and helps students identify strengths and weaknesses in their own academic work, and develop crucial metacognitive skills.

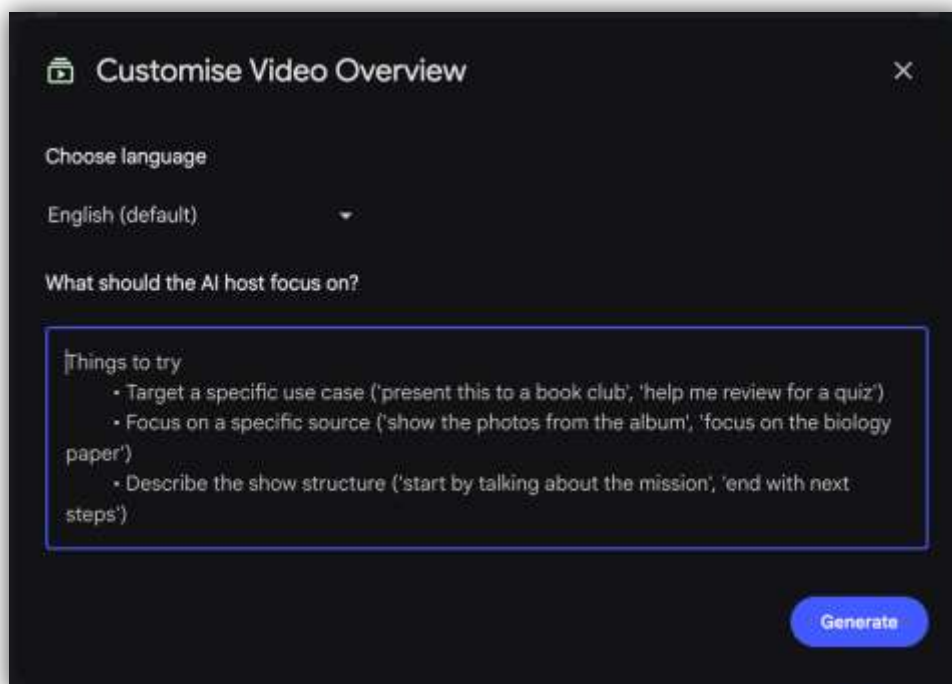
6. NotebookLM Video Overviews

Now let's talk about NotebookLM Video Overviews. Video Overviews is another powerful feature by NotebookLM. It allows you to create engaging visual presentations with AI hosts who explain your source materials using dynamic visuals and clear narration. Like Audio Overviews, you can also customize the language and direct the AI host's focus to specific aspects of your content.

The customization interface lets you guide the presentation by:

- Targeting specific use cases (like "present this to a book club" or "help me review for a quiz")
- Focusing on particular sources (such as "show the photos from the album" or "focus on the biology paper")
- Describing the show structure (for example, "start by talking about the mission, end with next steps")

I have used video overviews feature with some of my blog posts and it generated amazing videos with illustrative visuals. It was able to pull key insights, create relevant visual metaphors, and present complex ideas in an accessible, engaging format that brought my written content to life.



6.1. Using Video Overviews in Teaching

Here are 10 ways to use Video Overviews in your teaching:

6.1.1. Visual Review Activities

Transform study guides or chapter summaries into engaging video reviews that students can watch before exams. The visual elements help reinforce key concepts and create memorable associations that improve retention.

6.1.2. Flipped Classroom Lectures

Create video overviews of new topics for students to watch at home, replacing traditional lectures. This allows class time to focus on discussions, problem-solving, and hands-on activities while ensuring consistent content delivery.

6.1.3. Parent Conference Presentations

Generate video overviews of student progress, curriculum goals, or classroom projects that can be shared during virtual parent conferences or sent home for parents who couldn't attend meetings.

6.1.4. Multi-Modal Assignment Feedback

Upload student essays or projects to create video critiques that combine visual and auditory feedback. Students often engage more deeply with video feedback than written comments alone.

6.1.5. Differentiated Learning Resources

Create multiple video versions of the same content at different complexity levels or focusing on different learning objectives, allowing students to choose the version that best meets their needs.

6.1.6. Professional Development Portfolios

Document your teaching innovations, classroom successes, or action research by creating video overviews of your work, perfect for tenure applications, job interviews, or sharing best practices with colleagues.

6.1.7. Lab and Procedure Demonstrations

Upload written lab procedures or safety protocols to generate video overviews that visually explain steps, making complex procedures more accessible and reducing the risk of misunderstandings.

6.1.8. Literature and Text Analysis

Transform written literary analyses or book reports into dynamic video presentations that explore themes, characters, and symbolism through visual storytelling, making abstract concepts more concrete.

6.1.9. Student Presentation Support

Help students overcome presentation anxiety by having them create video overviews of their research or projects. They can focus on content quality while the AI handles the visual presentation aspects.

6.1.10. Substitute Teacher Resources

Create video overviews of lesson plans and classroom procedures that substitute teachers can watch quickly to understand your expectations, routines, and the day's learning objectives, ensuring continuity in your absence.

7. Tips for Making the Best of NotebookLM

In this section, I share practical strategies to maximize NotebookLM's effectiveness in your teaching and research workflow. While NotebookLM is a powerful AI tool, understanding its capabilities and limitations will help you use it more effectively. These tips come from extensive hands-on experience and will help you avoid common pitfalls while leveraging the tool's full potential for educational purposes.

7.1.1. Always Verify Output

NotebookLM is an AI tool and like any AI tool, it succumbs to AI limitations which we all know. Risks of hallucinations, inaccuracies, and fabrications are possible, though less frequent than with open-ended models. Always verify quotes, statistics, and specific claims against your original sources. Use NotebookLM as a research assistant, not a replacement for critical thinking.

7.1.2. Read Your Materials Before Uploading

Always read the materials you upload to the model. This is something I always recommend to teachers and researchers. Don't let AI take over your role as the primary reader. You need to do at least the first reading to understand the content's context and relevance. For research papers, read them multiple times, annotate, and highlight key sections. This familiarity helps you ask better questions and spot any AI misinterpretations.

7.1.3. Upload Around 10 Documents Per Notebook

Based on my experience, the ideal upload is around 10 documents per notebook. When you upload more, the model tends to struggle with accurate citations and may confuse information across sources. For larger projects, create multiple themed notebooks rather than one overloaded notebook.

7.1.4. Use Specific, Targeted Prompts

To get the most from your sources, prepare specific questions before engaging with NotebookLM. Instead of "summarize this paper," try "What methodology did the authors use to measure student engagement, and what were their three main findings?" Specific prompts yield more useful, accurate responses.

7.1.5. Organize Sources Thematically

Create separate notebooks for different aspects of your work. For example, one for lesson planning, another for research papers on a specific topic, and another for student resources. This thematic organization improves the AI's ability to provide relevant, contextual responses.

7.1.6. Check Citations and Cross-Reference

When NotebookLM provides citations, always click through to verify the source material. The AI occasionally misattributes information or takes quotes out of context. Treat citations as starting points for verification, not definitive references.

7.1.7. Layer Your Queries Progressively

Start with broad overview questions, then drill down into specifics. For example, begin with "What are the main themes across all sources?" then follow with "How does Smith's approach to differentiated instruction differ from Johnson's?" This progressive questioning helps build comprehensive understanding.

7.1.8. Combine Multiple Output Formats

Don't rely on just one feature. Use text summaries for quick understanding, audio overviews for deeper reflection, and video presentations for visual learning. Each format reveals different insights from the same source material.

7.1.9. Document Your Limitations

Keep a record of what NotebookLM handles well and where it struggles with your specific content. For instance, it might excel at summarizing empirical studies but struggle with theoretical philosophy papers. This awareness helps you use the tool more strategically.

7.1.10. Use NotebookLM as a Collaboration Tool, Not a Replacement

Think of NotebookLM as a highly capable research assistant or teaching aide, not a substitute for your expertise. Use it to enhance your work, to find connections you might miss, to generate new perspectives, or to create alternate formats of your content. The best results come when you combine AI capabilities with your professional judgment and domain knowledge.

Conclusion

NotebookLM is a powerful AI tool to help with your research and teaching. It transforms how we work with documents and makes it easier to understand complex materials and create content that resonates with students. I've found it particularly valuable when I need to synthesize information from multiple sources quickly or produce different formats like audio podcasts and video summaries.

NotebookLM has saved me hours of work while I maintain control over the quality and accuracy of the output. I can spot connections between sources I might have missed, present information in different formats, and create professional materials in a fraction of the time it used to take. The secret lies in how you use it: always verify outputs, organize notebooks by theme, and treat the AI as your research assistant, not your replacement.

I encourage you to try its various features, adapt them to your specific needs, and discover how it can transform your educational practice. When we combine our professional judgment with AI capabilities, we create learning experiences that would have been impossible just a few years ago.

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