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CHANGING TIMES, CHALLENGING ASSUMPTIONS

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THE EDUCATION TECHNOLOGY ASSOCIATION

Editorial:

Changing Times, Challenging Assumptions

As we bring you the spring issue of Advancing Education, we invite you to step into the lived realities of educational technology (edtech). Headlines often promise transformation; however, experience can be more complex: What is changing? What remains constant? And most importantly, how can we ensure that change serves learners and educators alike? Our contributors to this issue bring a wealth of insight, thinking not only about what technology can do but also about what it should do.

This edition is structured around three connected themes: Changing Times, Learning Innovations, and International Perspectives, each offering fresh insights into the evolution of edtech in schools, universities, and beyond.

In Changing Times, contributors reflect on how we're navigating the pace and pressure of digital transformation. Marilyn Leask's cartoons on AI and hallucinations inject humour into serious concerns about misinformation, while Alison Hramiak asks whether mobile technology in schools has reached a tipping point. Arguably, she writes, we must begin rethinking where educational responsibilities lie, especially as curriculum demands continue to grow. Others propose new starting points; Mick Chesterman reimagines game-making as pedagogy, blending retro-aesthetics with progressive learning design. And David Longman captures the paradox of edtech's evolution, reminding us that despite new technologies, educational practice remains remarkably resistant to change.

Our second theme, Learning Innovations, showcases practices that don't just adopt new tools but also reshape pedagogy. Cristina Costa and Michaela Oliver bring school and university students together to co-develop critical digital literacies, while Emma Whewell, Helen Caldwell, Rob Howe, and colleagues demonstrate how immersive technologies can connect learners with heritage in transformative ways. Amanda Gummer and Elliot Warren's discussion of AI and childhood adds depth to the conversation about digital play and agency.

Daniel Mitelpunkt sparks a conversation about missed opportunities in the use of educational media, suggesting that the transformational potential of media forms is often overlooked in universities.

In International Perspectives, we hear from educators reimagining teacher education in a global context. From eTwinning partnerships that develop intercultural competencies to UNESCO-supported collaborations on digital learning and AI, this theme highlights the power of international cooperation in addressing shared challenges. Giulia Oliveira's work in Brazil offers a powerful case for practical, inclusive LEGO programming education, while Patrick Jolomba's case study from Botswana shows how virtual reality is transforming clinical training in underserved regions.

Finally, our Practitioner Tips section offers grounded strategies for the here and now. Sara Bruun introduces Trelson Focus Room, a digital environment designed to reduce distractions and improve focus in K–12 settings. Sarah Earl provocatively asks whether it's time to embrace technology as a complementary force in outdoor education. As these contributions show, innovation often begins with a practitioner making a small shift that has potential for big impact.

Across all themes, a thread emerges about the context-sensitive integration of educational technology and the importance of challenging assumptions about pedagogy and practice to ensure that all can benefit. We hope this edition provokes discussion, inspires experimentation, and above all, supports educators navigating our changing times.

The Editors

Editorial Team

L to R: Christina Preston, Helen Caldwell, Emma Whewell, Yasemin Oezcelik

Chairs' Welcomes

Welcome to the spring edition of the Advancing Education Journal (AEJ)! It is a pleasure to welcome you to the latest edition of the AEJ. The last time I wrote a welcome was whilst I was chair of NAACE in 2020 – an interesting year for so many reasons – I was the COVID chair! I just hope there aren't any events resembling that year so that we can continue our work to help those who are learning, researching, or teaching at all levels in our community.

The range of articles in this edition is excellent and provides a number of themes, as well as the traditional reviews of books and articles of interest. As the warmer weather has just arrived and we look forward to the opportunity to read and catch up on research in our fields (perhaps while relaxing in a deck chair in the garden as the sun goes down), the AEJ provides us with so many starting points to spark further interests.

I hope you enjoy reading the journal and that you might wish to contribute to a future issue. Grateful thanks are due not only to the authors but also to the editorial team, proofreaders, and designers. THANK YOU!

Phil Blackburn, NAACE

This term, TPEA are pleased to welcome two new members to our executive committee. At our most recent AGM, Gary Beauchamp, Professor of Education in the Cardiff School of Education and Social Policy at Cardiff Metropolitan University, and Gavin Davenport, lecturer in primary education at Edge Hill University, were both elected to our committee for the first time. We look forward to working more closely with Gary and Gavin over the next few years. If you would like to know more about Gary, Gavin, and the rest of the TPEA Committee – and even get involved yourself – have a look at the committee profiles: https://tpea.ac.uk/who-we-are/

Planning has continued for this year's TPEA Annual Conference, which will take place in York on Wednesday 2 and Thursday 3 July. This year, we will be exploring an alternative approach to our conference, intending for it to be a working conference which will produce a report for members to use and to share. The conference will be free to attend for Members+, and there will be a range of travel bursaries to support attendance. Rather than individual presentations, we will be asking attendees to commit to contributing to our

conference work and writing over the conference period. More details, including the focus topics and how to apply for bursaries, will be published shortly.

We also continue to look for ways to support research and practice in educational technology. In a new initiative, the TPEA journal Technology, Pedagogy and Education wants to support early-career researchers by providing an opportunity to share new research within the field. If you are working towards your PhD or have recently finished doctoral studies, our editors would like to invite you to submit your original research to a special issue for new and emerging researchers.

The scope of the special issue is broadly the intersection of technology, pedagogy, and education, with each accepted article meeting the aims of the journal. This issue will focus on making the publication process as transparent as possible and supporting authors to develop articles according to best practice manuscript preparation and peer review guidelines. As with all submissions to the journal, these special issue papers will be subject to rigorous peer review, with a particular effort to provide constructive feedback and guidance on how to address reviewers' comments. Find out more at: https://think.taylorandfrancis.com/special_issues/emerging-research-special-issue/

Finally, do not forget that applications are still open for TPEA research and development grants. These offer up to £1,000 for research, practice-based projects and dissemination that align with our charitable aim of promoting effective practices in digital technologies and teacher professional development. More details and an application form can be found at: https://tpea.ac.uk/funding-opportunities/

Chris Shelton, TPEA

In praise of Jon Audain

Professor Christina Preston

"When Jon walked in the room, it was like a warm ray of sunshine lighting up everyone's mood. A hug from Jon was heart-warming, and his laugh was infectious."

(colleague and friend Dr Julie Wharton, University of Winchester)

Those who knew Jon Audain are still reeling from his death from cancer at the age of 45 in September 2024. He leaves his twin brother Rob, his wife Omega, and his two young boys Kofi and Luca, aged four and two at the time of Jon's death.

The impact is significant because Jon has been a driving force in TPEA and MESHGuides, and his work was well known in Naace. He wrote several articles for the Advancing Education journal as well as being the acclaimed author and collaborator of over 20 books and articles. He was particularly talented in the design of websites, where we relied on his design talent.

Jon worked in education as a teacher, lecturer, and consultant for over 20 years and has advised and worked with schools, teachers, and companies. He was Chair of the Technology, Pedagogy and Education Association (TPEA), an Apple Distinguished Educator (ADE), a member of the Promethean Advisory Council, an executive board member for the Education Futures Collaboration, a Founding Fellow of the Chartered College of Teaching, and a Fellow of the Royal Society for the Encouragement of Arts, Manufactures and Commerce.

Reflections on Jon's life from colleague and friend Laura Clarke

When we think of Jon, it is hard to not reflect on his understanding of time. For Jon, time was infinite. He always thought he had so much of it, and because of that, he had time to spend with you, laugh with you, be interested in you, care about you (even though he must have always been late for his next engagement). Jon filled every moment of his time with joyful mischief, flashes of wisdom, and insight and clarity. All the way through his illness, Jon believed he would have more time. Heartbreakingly, Jon had so much less time than he thought and than we had hoped. But I cannot think of anyone who used the time that he had better than Jon, and the many lives he touched is a testament

to that.

(Dr Laura Clarke, Director of the Institute of Education, University of Winchester)

Remembering Bouncy from colleague and friend Emma Goto

Fiona Aubrey-Smith and I always called Jon 'Bouncy', because for us he had all the enthusiasm and energy of Tigger. In fact, at his funeral, Fiona said to me that she almost was wondering who this Jon person was, because in her head, he had always been, and would always be, Bouncy.

I had the great pleasure of working with Jon for over twenty years, first as a leading ICT teacher in Hampshire, then as an Advanced Skills Teacher (AST), additionally as a learning platform consultant, and finally as a treasured colleague at the University of Winchester. Jon touched the lives of so many teachers and children across Hampshire and beyond during his career. There are a great many children who had their learning enhanced, in both ICT and music, because of the work Jon did to support primary education practice.

I do not really have the words to describe Jon's impact on me. Just to say, he always made me feel braver, try harder, and do more. I always felt like I could when Jon was with me. Jon was someone who threw himself in the pool first and then worried about whether he could swim (and always managed it). When Jon was by my side, I could jump in too, whereas without his bravery around me, my inclination is to sit on the edge trying to perfect my stroke techniques before dipping my toe in.

(*Emma Goto, Institute of Education, University of Winchester and TPEA membership secretary*)

Jon Audain at the University of Winchester

At the University of Winchester, Jon was co-lead of the PGCE with Dr Lisa-Marie Martin. Lisa was a very close friend to Jon and his family. She said, 'Jon made me feel safe; he always had my back and believed in me. He sold me the PGCE lead role as a way of hanging out together and getting paid for it. He made me laugh so much, often with a perfectly timed text while we were in a Teams meeting. Him with a poker face and me having to turn my camera off. Jon's smile meant everything was OK.'

Jon's life was full of music; he had studied primary education and world music at King Alfred's College of higher education (which later became the University of Winchester where he eventually worked). His teaching career had been full of school performances and choirs. Alongside ICT, music in schools was his passion. He was musical director of the Warsash Band, accompanied the Solent Singers on the piano and played in the Hampshire Constabulary Band. Therefore, it is fitting that it was also a big part of a recent celebration of Jon's life held at the University of Winchester. This was a chance for colleagues and friends to come together to celebrate all the creativity and joy that Jon had brought to the university. During the celebration, the congregation sang and listened to piano music played by Dr Miriam Walker in the chapel. Jon's favourite hymn was sung, "Be Thou My Vision", followed by "Three Little Birds" by Bob Marley, which was a real favourite of his and encapsulates in some way his essence. After the chapel, people came together to listen to recordings of Jon's music whilst painting pictures in response to what they heard.

The readings at his celebration were:

An adaptation of “The Little Prince” by Antoine de Saint-Exupéry

> *“All people have the stars, but they are not the same for everyone. For some, who are travellers, these stars are guides. For others they are no more than little lights in the sky. For others, who are scholars, they are problems. For businessmen they were wealth. But all these stars are silent.*
>
> *You—you alone—will have the stars as no one else has them and in one of the stars, I shall be living. In one of them, I shall be laughing when you look at the sky at night. And when your sorrow is comforted, for time soothes all sorrows, you will be content that you have known me. You will always be my friend. You will want to laugh with me. And you will sometimes open your window, just for that pleasure.”*

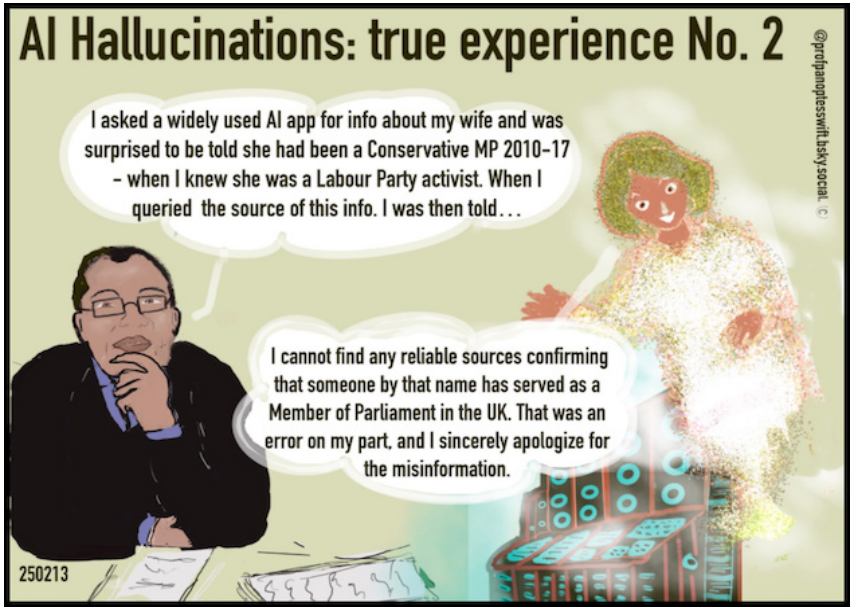
Reading from the work of Maya Angelou:

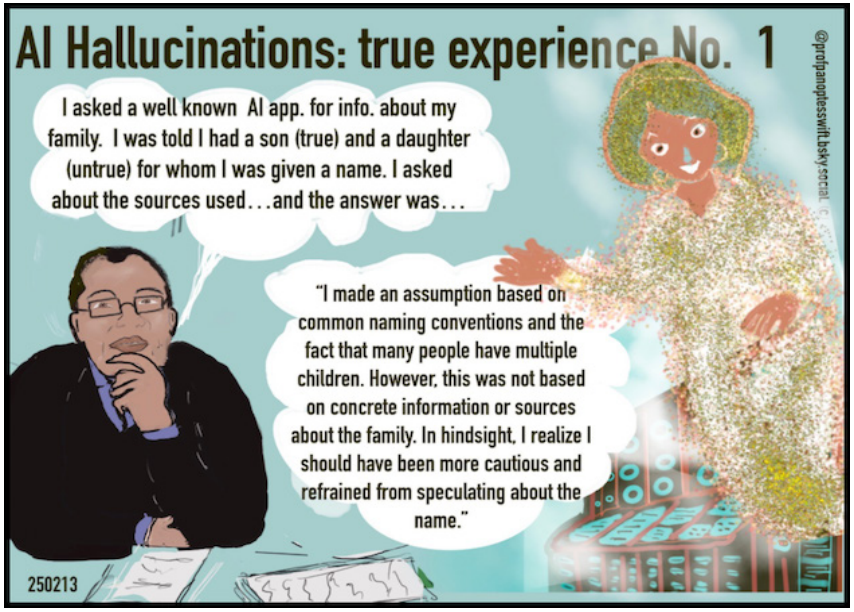
> *“I’ve learned that no matter what happens, or how bad it seems today, life does go on, and it will be better tomorrow. I’ve learned that you can tell a lot about a person by the way he/she handles these three things: a rainy day, lost luggage, and tangled Christmas tree lights. I’ve learned that regardless of your relationship with your parents, you’ll miss them when they’re gone from your life. I’ve learned that making a ‘living’ is not the same thing as making a ‘life.’ I’ve learned that life sometimes gives you a second chance. I’ve learned that you shouldn’t go through life with a catcher’s mitt on both hands; you need to be able to throw something back. I’ve learned that whenever I decide something with an open heart, I usually make the right decision. I’ve learned that even when I have pains, I don’t have to be one. I’ve learned that every day you should reach out and touch someone. People love a warm hug, or just a friendly pat on the back. I’ve learned that I still have a lot to learn. I’ve learned that people will forget what you said, people will forget what you did, but people will never forget how you made them feel.”*

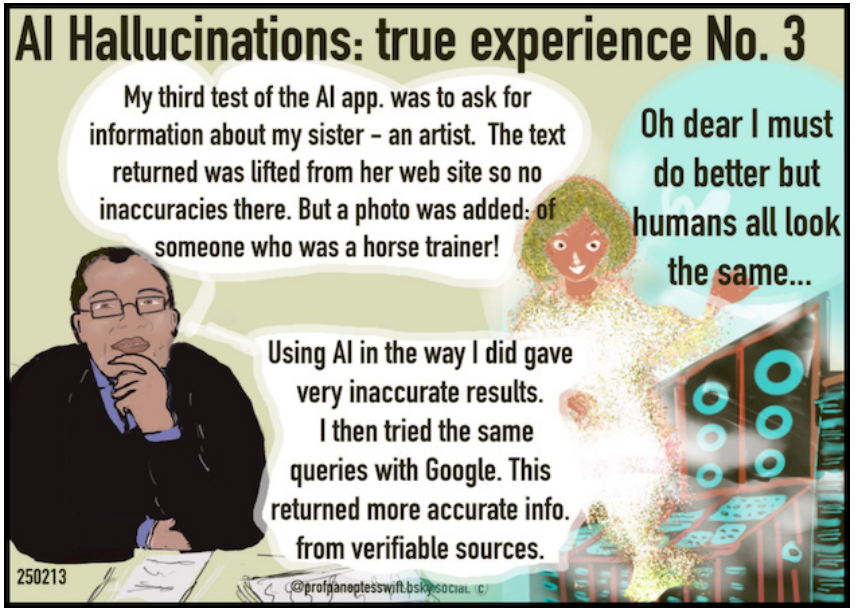
Theme 1: Changing Times

Professor Marilyn Leask (PhD, MPhil, PGCE, BA, Diploma in Radiography)

Marilyn has been a teacher, researcher, assistant head responsible for computing, science and technology departments, local authority officer, dean, professor, and policy officer in two UK national agencies. As an advisor for the OECD and the British Council she has given keynote speeches in many countries on knowledge mobilisation for education and the possibilities afforded by digital technologies. Her 35 years of research have focused on teacher knowledge, whole-system change, improvement and development across large systems, evidence-informed policy and practice, and the use of digital technologies in education.







Time to push back on some mobile technology?

Alison Hramiak

Have a read of this poem below. Take your time. Then reread it and ponder whether any of it speaks to you. Have you ever felt like this? Do you know anyone who has? Read on…

Look what computers did to my family

Here I stand, resolute but alone,
struggling to cling to the last vestiges
of face-to-face family life.
Saturday teatime tables and shared viewing.
Those tattered curtains of distant memories
appear unsullied when illuminated
through dyed pink lenses.
Images of a life gone by.
Down the shallow screen they fall,
eager for a steeper incline
leading to the valley floor.
A space, a place
where separate lives are led without
ever leaving their rooms.
These shifting patterns of modernity,
a kaleidoscope of otherworldly virtuality,
evolve into self-absorbed retreats,
isolation from human touch.
Sons and lovers welcome this
avalanche of new technology,
safe in their multi-media haven,
their cold electronic entertainment diversion.
See them run down the slope,
while I sit and watch from above:
resolute but alone.

Image credit: Tony Alter CC BY

About 17 years ago, my eldest son got an Xbox for Christmas (other platforms were available), and with the games that you could buy for it, became immersed in worlds beyond out living room. (We were always clear from the start that there would be no TVs or game consoles in bedrooms – yes, we were that mean). He was quickly followed by my second son, whose preference was for a PlayStation and its associated games. They were hooked and quickly bought into worlds such as those that came with Assassin's Creed, Skyrim, Call of Duty, and so on. All very different games but with the same principles and similar complexity. You became a character and inhabited that world – even if only for a short while.

This poem, then, was my reaction to their ability to do just that – to be in other spaces and places without ever leaving the house. It felt like a sudden change – even though it happened over months, possibly years – from watching TV together in the evenings, particularly at weekends, to this more disparate, detached state, where each finds their own virtual place in this world. A virtual space beyond the one they inhabit in reality. Even my husband could get lost in these games at times – with military campaigns that covered Napoleonic to Star Wars.

This is not something I've ever been interested in, and I'm still not, preferring instead my own headspace and nothing in my ears except fresh air. And I don't think I'm alone. As the poem says, my looking-back lenses might be pinker than they should be, but I think the circle might be turning.

Think about how technology has evolved in the last 20 years. If you want to hear a different (and humorous) take on this, have a listen to Aurie Styla on Radio 4 at: https://www.bbc.co.uk/programmes/m001xvqj . Here, Aurie takes us on his journey through the progress of technology, offering a human perspective on how the way the world has become less warm and human. He celebrates the march of tech while being appropriately terrified of it. (If this is not available at the time of printing, you can always check out his website to find clips on this).

Now think about how your phone is more like a small computer, capable of taking you anywhere at any time. When was the last time you went for a coffee or a meal and did NOT see people on their phones, rather than talking to each other, while their children watched something on a phone instead of colouring or reading books that they had been given? Or the last time you did NOT see any children being pushed in prams while their parents were on the phone? Or even dogs being walked by their owners busy talking to someone on or scrolling through their phones? At times, it feels like technology is pushing us further away from each other, rather than bringing us together by negating long distances between us. The distances now seem more than geographical too – they feel more cultural miles than physical ones.

All is not lost, however. There may be a counter-revolution starting to take hold, and it might be starting in education. Have a look at the February 2024 guidance published by the government for schools at: https://www.gov.uk/government/publications/mobile-phones-in-schools.

Has much changed since then? It's hard to quantify. We've also had a documentary on the effects of removing phones from students in schools, which reached millions. Might this be the tip of the iceberg (despite global warming)? There's an awful lot of guidance to read, but how much of it is being effectively implemented without backlash from irate parents and guardians?

If you put the words 'detrimental effects of mobile phone use in schools UK' into Google Scholar (as of 10 January 25 – remember, other search engines are available) with a time frame of 'since 2024', it brings back 17,500 articles on this subject. So, maybe something's starting to change. Yes, I know it's more anecdotal than true scientific evidence, but I think it makes the point.

Doesn't some of this change rest with parents too? "Do as I say, not as I do" possibly needs to change for some. You can't throw everything into the school curriculum and not expect something to give. It's pretty full already, and there are only so many hours in the day. It might be time to start pushing some things back to parents. A cultural change isn't a quick change, but you, arguably (and please use this word throughout this piece), need to start somewhere. Don't you?

So, we could start the change in education by getting rid of mobile phones (other than for emergency use) during the school day. There was a time when schools stored emergency phone numbers, and students didn't actually have phones, but calls were still made in times of need. But that was in days of yore…

We even have some (quite a bit, if you look at the results on Google Scholar) unsettling evidence. That ought to make us start thinking more seriously about these things – for the sake of our children. We've tried working with this technology, and in some cases, it has worked very well. Mobile phones are, after all, small computers capable of so much more than social media messaging. Even trainee teachers preferred them to alternative ways of locating information (see Hramiak, A. (2012) *'It's easier to use my phone': An exploration of the use of mobile technology with Trainee Teachers*. Paper presented at Information Technology in Teacher Education (ITTE) Annual Conference, Oxford University, Oxford, 5–7 July 2012). Indeed, it would be interesting to see if those trainees

still have the same opinions as they did then, after years of dealing with mobile phones in their own classrooms. But are the detrimental effects now outweighing the good?

I'm sure there are teachers out there who have tried over the years to teach without disruptions from mobile phones by removing them from students, but without support from further up the hierarchy (and from parents), it's not that easy to do. I know this because I was once of them. Some twenty-odd years ago – I was ahead of my time – in a further education college, I confiscated students' mobile phones at the start of lessons and got my staff to do the same. It lasted a day. The then Vice Principal of the college was not 'amused', and I was told (in no uncertain terms) that we were not allowed to remove mobile phones, as the parents of our students had complained to the college. This has to be a top-down and bottom-up thing involving parents, teachers, and governance.

It just might be time to push back – even if it's only one shove at a time.

Postscript:

To those of you out there who think you might have seen the poem before: No, you're not going mad. A very long time ago, before days of yore even, when I was the editor of the ITTE Newsletter, I included a version of this poem in an edition of the newsletter. There's a prize for anyone who can locate this rare and valuable edition – I can't find it anywhere.

Author

Alison Hramiak

Alison is a poet, writer, and tutor living and working in West Yorkshire, England. Her work has been published in several Forward Poetry anthologies, New Contexts: 4, 6, and 7, as well as on various poetry websites, including Impspired and The Causley Trust. She edits and reviews poetry anthologies and is a member of several poetry groups, such as Consilience. She blogs for the Sheffield Institute of Education. Her work can be found at: https://poetryforlives.co.uk/. Her poem featured in this article is published in The Fulcrum Review, Issue 2 at: https://www.fulcrumreview.org/issue-2

Use Game Design Patterns and Inclusive Methods within Game Programming Projects

Mick Chesterman

Introduction

Game making as a computing pedagogy offers an excellent opportunity to develop students' confidence and fluency in digital skills. However, to fully harness this potential, we must further develop and share effective practices. My research with home-educating families has led to the creation of a game-making pedagogy that incorporates patterns of home behaviours alongside the design principles found in retro platform games. This approach not only aligns with the learning styles of home-educated students but also utilises the engaging elements of retro games to enhance creativity and problem-solving skills. I share these strategies in the spirit of advocating for systemic changes that ensure all students can benefit from this innovative approach.

Contextual information including school-based barriers

Before attending the TPEA conference in summer 2024, I had started to doubt whether my hopes of integrating some of the findings and pedagogies into schools or other formal environments would amount to anything. This feeling, based on my experience of teacher training for computing at the secondary level, stemmed from the challenges of completing project work within the context of computing qualifications. My concerns were validated by discussions happening at TPEA, particularly during a panel that outlined the background to the last-minute reconfiguration of the computing qualifications guidelines. The focus had shifted towards more abstract knowledge, rather than encouraging hands-on creative digital projects.

Even the hands-on programming projects that were once part of the GCSE exam, later dropped due to concerns about plagiarism, were narrowly defined, leaving little room for creativity or the incorporation of students' personal interests. It is now possible to sit and pass a computing GCSE without ever touching a computer. I recently spoke with one of my child's friends, an artistic Year 8 student, who said she missed the creative multimedia and game projects she had been able to do using Scratch in Year 7. When I asked what she does now, she replied, "We write down definitions of routers." This is disappointing on a personal level and reflects a failure to prepare this student for the future.

At the TPEA conference, while it was acknowledged that good teachers do find ways to introduce creative project work, they do so in spite of, rather than because of, systemic pressures within schools such as the format of computing exams, timetabling, and the resources available. Drawing on data from Kemp which shows the increasing failure to attract a diverse range of students to take Computing at GCSE, there seemed to be a consensus that it is time for a stronger push to change the qualifications and the broader rhetoric around computing and IT education to bring back digital creativity. I left feeling more optimistic, as the wider application of my research requires a context that allows a project-based approach. Therefore, if the situation does change, the game-making pedagogy that emerged from my doctoral work will become more widely applicable

Summarising my results

The benefits of game making as a process have been well outlined in a book and accompanying papers by Kafai and Burke (Kafai and Burke, 2015; Kafai et al., 2016). The focus of the review draws on a constructionist tradition which includes the work of Papert on LOGO language and the use of drawing robots (Papert, 1980) and that of Resnick on block-based programming languages (Resnick et al., 2009). While their work on the diverse benefits of game making is convincing, the review is less thorough concerning pedagogies and approaches that emphasise social and cultural learning. Other reviews and commentaries conclude that more work is needed in this area (Denner et al., 2019). My research contributes to this field by using Cultural-Historical Activity Theory (CHAT) to examine these areas more systematically.

I adopted an approach that aligns with the increasing convergence of activity theory interventions and design-based research (Penuel, 2014) to collaboratively create a game-making pedagogy, drawing on the experiences and working patterns of families, primarily in parent-child pairings. I was also inspired by Stetsenko and Ho (2015), who advocate resisting artificial objectivist approaches and instead taking a transformative activist stance (TAS) to build participants' agency through active interventions. Through four iterations of research interventions in the form of short game-making courses, a pedagogy and set of tools emerged, which I now present as ready for wider testing

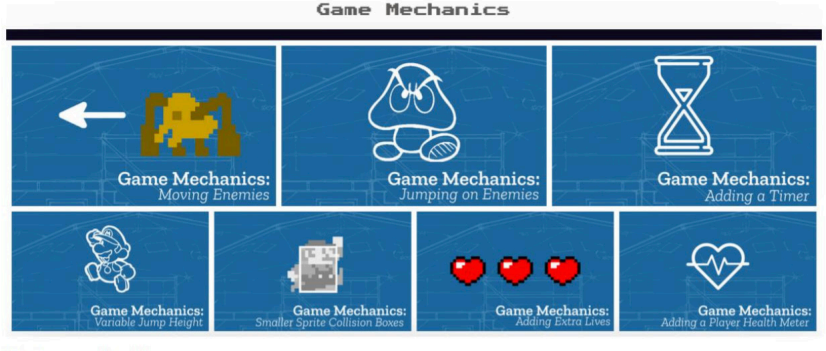
Describing the characteristics of the 3M game-making pedagogy

In the early stages of disseminating my research, I outlined the characteristics of the pedagogy as a game-making approach I called 3M, reflecting the use of missions, methods, and maps. The maps dimension helps teachers align skills learned in game making with curricular goals and concepts. I have written a chapter detailing this approach, focusing on its adaptation to the primary classroom (Chesterman, 2023). Although the mapping dimension has clear potential for utility, the focus of my research became the development of fluency in the game-making and coding process using a mission-based approach, alongside the incorporation of home interests through inclusive pedagogical methods. Given the limited scope of this blog post, I will focus on those aspects here.

Missions: leading activities offering both structure and choice

The term 'missions' became a playful way to represent two key aspects of the emerging pedagogy: first, the setting of short-term coding and asset production goals by participants, and second, the inclusion of social side missions that reinforced collaborative working patterns.

Main missions (gameplay design patterns)



Participants' requests to add new features to their games led me to research and develop support materials, drawing on the educational possibilities of design patterns. While design patterns are typically used in higher education to teach object-oriented programming, they are valuable for learners at all levels. Design patterns are based on real-life instances where common problems are solved in specific ways, offering concrete examples of coding principles in context.

Design patterns can foster coding communities when more experienced coders take the time to document the patterns they use in a way that is accessible to novice coders. For educators, design patterns can support learners in developing coding proficiency by providing scaffolding and modelling good design decisions. However, one challenge for teachers is how to effectively integrate worked examples and design patterns into student-led design challenges, ensuring that they support creativity without becoming overly prescriptive.

In the learning design of this research, responding to participants' requests led me to create resources in the form of code examples and snippets based on different gameplay design patterns (GDPs). Unlike the more complex, structural

form of traditional object-oriented code design patterns, GDPs focus on the end user's experience. I drew on the work of Schell (2008) and Salen-Tekinbaş and Zimmerman (2003) to scaffold the creative process for novice game makers, using a categorisation of design patterns derived from professional game development. After several iterations of the game-making programme, the result was an online menu or collection of resources organised by GDPs, which is now available at https://ggc-examples.glitch.me/.

Pattern collection

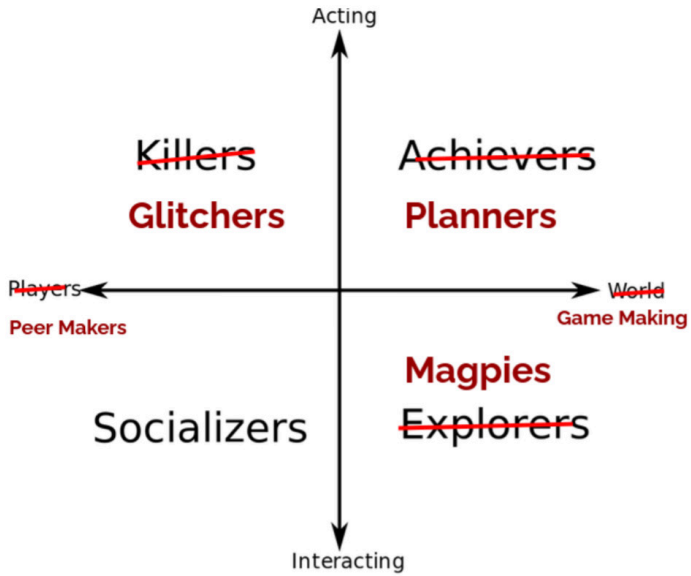
A selection of the GDPs themed under the category of Game Mechanics is available at: https://ggc-examples.glitch.me/

In addition to being an effective pedagogical approach, the implementation of GDPs, in line with activity theory, emerged as an ideal unit of analysis for understanding the evolving community processes of game making among participants. While some learners carefully used the resources to implement their chosen patterns, others adopted different approaches to game making. I began to observe these varying behaviours and actively sought to encourage them.

Playful missions (encouraging social repertoires)

The idea to encourage these diverse approaches emerged from a conversation with a colleague interested in playful learning, John Lean, regarding Bartle's game playing styles. Bartle's research explored the various motivations and play styles in digital adventure games. I applied a similar framework to investigate and reflect on the different game-making styles that began to emerge within the community.

Some families set clear goals and followed resources methodically to achieve them. Others took a more social approach, learning from peers and exchanging ideas and encouragement. Still others engaged in more unconventional ways, creating confusing or unusual games or working against some of the suggested creative practices. A summary of these different game-making styles is shown in the image below.



A revision of Bartle's game-player types based on observations of possible game-maker types

became intrigued by these emerging styles and began to reflect on my observations. In one iteration, I integrated playful side missions into the programme, which validated and legitimised some of the behaviours and repertoires that participants were engaging with in this space. These side missions encouraged participants to explore different approaches, further enriching the game making experience.

I became intrigued by these emerging styles and began to reflect on my observations. In one iteration, I integrated playful side missions into the programme, which validated and legitimised some of the behaviours and

repertoires that participants were engaging with in this space. These side missions encouraged participants to explore different approaches, further enriching the game making experience.

Your Alien Mission (social) Find out the names of 3 games that are being made.	**Your Secret Alien Mission** Change the variables at the start of someone else's game to make it play in a funny way.
Make a list of characters in two other games being made. Find out the favourite computer games of 4 people.	**Your Secret Alien Mission** Change the images in someone else's project to a totally different image and see if they notice. Change the level design of the first level of someone else's project to make it impossible, but try to change as little as possible to do that.

Examples of playful missions which helped legitimise different making approaches

In a later phase of my study's learning design, with the support of my school's drama department, I incorporated these playful missions into a drama scenario inspired by the Mantle of the Expert approach. This method of drawing on home styles of interaction, in a way that Gutiérrez et al. (2020) would describe as incorporating home and play repertoires of practice, encouraged me to explore additional ways in which funds of identity could be integrated into the game-making process. My aim was to increase participants' sense of agency through this approach. I briefly explore these ideas in the final section of this post.

Methods: inclusive methods to draw on home repertoires of practice and to build participant agency

The term 'agency' here is understood within a socio-cultural framework, where it is not seen as a personal trait but as something that exists within a particular context. Building agency within this emerging community of game makers is a process involving individual learners working as part of a collective, evolving shared practices and applying collective knowledge to develop necessary tools. Due to space constraints, rather than offering a deeper analysis of these evolving processes, I will provide some practical recommendations on inclusive methods for those aiming to support agency development in a new community of game makers.

Allow learners to draw on their home interests by creating an inclusive creative environment where they are encouraged to explore their existing knowledge of game conventions and their attitudes towards video game play.

Start coding with a half-baked game (Kynigos and Yiannoutsou, 2018): Provide learners with a partially completed game template that they can adapt, offering a shared structure that promotes peer learning. This also helps facilitators stay familiar with participants' evolving code.

Use emerging learner requests to shape a collection of code examples: Develop a set of code snippets and supporting documentation based on familiar GDPs. Encourage learners to use this resource, allowing them to add new features based on their own choices while receiving the necessary technical support.

Allow flexible working practices and incorporate regular playtesting: Create an environment where learners can draw on existing learning relationships with family members and develop new ways of working with peers. Regular playtesting helps foster these collaborative practices.

Incorporate playful approaches to build connections with funds of knowledge linked to home play practices, as briefly explored earlier. This helps create a more inclusive and engaging learning experience.

Concluding remarks

In summary, the implications of this research highlight the potential for reframing the primary focus of teaching computing through accessible project-based approaches structured around the application of relatable design patterns. I encourage wider testing of these processes to assess the

generalisability of the findings based on several motivations.

Firstly, the overall approach is aligned with solid foundations for using funds of identity as an inclusive and transformational practice for young people engaging with digital technology, as explored in a special issue of Mind, Culture and Activity (Kajamaa and Kumpulainen, 2019).

Secondly, the process of using games as a medium for expressing these funds of identity remains a valid approach. While research on game making may have waned in popularity, interest from young people endures.

Thirdly, in light of increased concerns about risky online activity and screen time addiction, family involvement in the digital lives of young people remains an ongoing issue. Game making as a joint family activity offers an accessible and inclusive foundation for exploring further digital issues that impact home lives.

Finally, we can hope that the pendulum of digital education in the UK and beyond may swing back from the conservative stance on the power of abstract knowledge, exemplified by Michael Gove's implementation of the computing curriculum and exam structure, towards a more applied approach. This shift would align with Papert's (1980) vision of computational thinking, which is grounded in concrete, hands-on computing experiences involving projects that can motivate personal connections to the underlying content knowledge in context.

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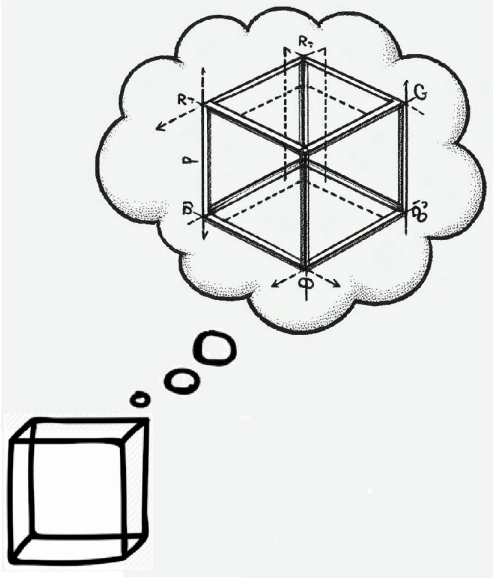
Mick teaches at Manchester Metropolitan University, specialising in project-based learning. His PhD research involves families exploring cultural and ecological issues related to coding platform games together. He has a strong background in teaching media making to facilitate positive change for various social groups. In recent years, he has led several outreach programmes in local communities and schools in collaboration with the university, focusing on creative coding and the use of physical materials. Mick is also the founder of Todmorden Makery, a community workshop operating as a volunteer-led organisation that works with adults, young people, and families to create and repair objects for well-being, education, and environmental benefit.

Plus ça change…

David Longman



If ever there was an aphorism that applies to edtech today, it is that "the more things change, the more they stay the same."[1]

Here we are in 2025, and the professional practice of edtech does not seem to have changed greatly in spite of the many sweeping and fundamental developments that computing has undergone even during this century alone. I say this, in particular, after looking at a recent report circulated via the ITTE mailing list.

This article is not intended to be a critical appraisal of that report, which was written for a specific trade fair audience, so I do not want to give an explicit reference. Members of the ITTE/TPEA mailing list can surely find it there as a recent attachment. What interests me is what the report ignores about possible futures that lie ahead of TPEA and its mission to develop edtech as a medium for teaching and learning.

That report seems to suggest, though not explicitly, that in spite of the startling changes that are going on around us – specifically the rapid emergence of 'AI' machines (yes, the apostrophes are deliberate) – the same historic institutional and professional deficiencies remain, holding back effective pedagogical development with edtech.

It is worth recalling that ITTE – now TPEA – held its inaugural conference in 1984 on the theme of "Permeation", where all the issues that have been described in the recent report were discussed, recorded, and formed the basis for the original mission statement for ITTE. That was 40 years ago! Apparently, however, in 2025 it is a case of plus ça change. In part, this is no doubt true, sadly, but goals that were identified in 1984 were based on entirely different circumstances.

What faces the community today is dramatically different, and let us be candid, a potential threat not only to the cultural and pedagogical constructions of 'subject knowledge' but also to the very definition of what it might mean to be a teacher. The report suggests that edtech has moved "…from the margins to the mainstream. Now it is time to focus on making sure every teacher has the skills and confidence to use it effectively."

That aspiration was active as recently as 2004, even if it remained challenging.[2] But what has changed so dramatically within recent years is that the margins have moved! Even if we had been making good progress on integrating edtech through better provision of training or more time for curriculum consolidation, we now face a new and forceful era of computational developments which, although they too will require time, training, INSET, etc., have the potential to alter the context of teaching and learning in ways that we, as a community of practitioners, have yet to fully comprehend.

The new world of 'AI' will not wait, and we cannot rely on the language of the 1980s to steer us.

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(1) “Plus ça change, plus c’est la même chose”, Jean-Baptiste Alphonse Karr.

(2) Many will remember (some with horror!) the New Opportunities Fund (NOF) ICT programme, 1999–2004.

Author

David Longman

Now retired, I began my career as a primary school teacher around the time the Micros in School Scheme was set in motion by the Department for Trade and Industry. I later moved into teacher training as a subject leader for IT, then ICT. Finally, not long before my retirement, the ‘Great Curriculum Change’ in 2012 led to a new title: Subject Leader for IT & Computing. Throughout, I have been a member of ITTE/TPEA since its inaugural conference in 1984 and now reside with others in the Hall of Honorary Members!

During that time, I worked with a wide range of students across nearly all phases and levels of education, starting as a primary school teacher. Much of my teaching work centred around undergraduate and postgraduate teacher training (primary and secondary), MA and Doctoral courses, as well as adults with learning difficulties. Course development and planning naturally formed a career background and included the development of MA programmes and modules, online CPD support and accreditation, schemes of work, and assessment frameworks.

I now live and work independently (aka retired!). I follow various blogs and social media timelines to stay informed about current issues in technology, politics, and education. Reading and occasional writing keep my mind busy, and I am a peer reviewer for Technology, Pedagogy and Education.

Theme 2: Learning innovations

The solution is the problem

Learning media questions from the studio floor

Daniel Mitelpunkt, Director of Digital Media Lab, Imperial College London

From Alien Abduction VR experience, Imperial College London's Digital Media Lab for Imperial College Business School's IDEA Lab

They say there is no shame in asking questions. My own first question, back when I crossed the lines to join a university as a staffer, six years ago, was, 'What's my notice period…?!' So uninspired was I by HE's gap between magnitude of opportunity and seriousness of approach in the wider field of learning media. Climatising to a new industry can be bumpy.

In the years that followed, I have had the privilege of collaborating with numerous inspirational experts with diverse backgrounds and perspectives. This was within Imperial College London's Digital Media Lab, which I founded and run, with our brilliant academic and professional collaborators from across the university and collaborating further afield. In the process, I have seen how much benefit can and should be delivered in this rich subset of edtech and developed an alarming passion for learning media, its role, and future.

Attempting to make sense of HE's struggles in this domain, I have come to appreciate that dysfunction, despite its chaotic form, can have a certain logic to it; an ethos, even.

There is method in the madness. Despite its significant and growing role and many years of production, in this day and age, one still frequently has to argue for learning media, in its widest sense, being an area of practice within HE[1]. It is hard to reconcile the size of the endeavour with the ease of its deniability. In any case, the reports of learning media's non-existence are an exaggeration. It is a dizzyingly dynamic praxis area and one where, I contend, HE has a mixed record.

It should not surprise that failure to acknowledge something exists, or else what we might wish it to be or do, gets in the way of optimising its benefit to students and staff.

To have better solutions, we should arguably first specify a problem; if we ask the wrong questions, we will likely get the wrong answers.

To chart those mixed results and some of their possible drivers, I will temporarily park the many examples of good practice, achievement, and sheer learning media joy that very much exist, nationally and internationally, because they still seem an exception to the rule. Overall, when it comes to learning media, I am afraid most universities have become unintended experts at missing tricks.

In this piece, I will attempt to point to some of those missed tricks and why it might be so, not as an exhaustive empirical audit, but merely to encourage a conversation. For ease, I will generalise 'learning media' to mean deliberately produced time-based, interactive, and immersive media experiences delivered as part of, or to complement, the curriculum, synchronously or not, online or on campus, hence excluding the likes of most lecture capture or student work. The observations and opinions to follow are just that and are entirely my own.

Edtech decision-making and spending are frequently porous and short-sighted,

[1]There are entire publications, teams, and budget columns dedicated to learning media, so this not a suggestion that it should prove difficult to conceptualise; merely that it sometimes is.

rushing to 'solutions' (panaceas from the private sector) rather than pondering real gaps or opportunities. Granted, most technologies and services come from the private sector, and even in-house teams use software and hardware that some company delivers, but this dependency is even more reason to understand our own requirements in some detail.

In the noisiness of dealmaking, amidst loud proclamations of 'innovation', it is sometimes hard to hear voices of those who actually deliver, design, or support teaching, questioning which of their real challenges or opportunities might be addressed by some costly new 'partnership'. This is not a learning media, as much as a wider edtech (if not HE) problem, but it tends to have learning media ramifications.

From AI for Student course animated video, Imperial College London

Interventions are routinely defined through a tool or a vendor, such as a 'VR experience' or a 'Coursera degree', rather than seen through teaching prisms, as in 'this is a physics lab simulation' or 'that is a graphic design degree'. Emphasis inevitably then shifts to hardware, software, or service, the 'solutions', before a problem has been properly specified. Whilst it is likely that opportunities or gaps would end up being addressed through utilisation of hardware, software, or service, which, and who by, should follow from better-defined requirements, which in turn should be informed by the problem or opportunity identified.

This means that many universities divert scarce resources, know-how and control, in both IP and practical terms, partially or fully, over to commercial entities with different and changing agendas and interests, in an area as critical to HE as delivering education. To my mind, this is less a case of breaking some eggs to make an omelette and more a case of breaking our eggs without necessarily owning (or wanting) the omelette.

Many edtech practitioners, academic or professional, thus become mere users or commissioners for generic interventions stemming from a vendor's product line rather than the institution's curriculum or values. Other outputs may be divorced from the university's people or places too, with work developed, produced, and presented by outsiders elsewhere. Attention, time, and resources are then shackled to that product or vendor, whereas the vendor may well still end up pivoting unliterally (on pricing, terms, or 3rd-party support). At some point one would be excused for asking, 'Does this even still count as our own university's educational offering?' or for struggling to distinguish it from teaching elsewhere.

A fragmented, ad-hoc approach with misaligned actions and outputs that are nevertheless all aimed at the same students also makes for a disjointed learner experience, eroding a sense of institutional identity or focus (while paying multiple businesses in the process).

There is a move-fast-and-break-things brigade hopping from one hyped product to the next, sometimes with insufficient regard for the need for longevity, consistency, cost-effectiveness, evaluation, or even compliance. To my mind, this is a disservice to large-scale innovation (a term now so misused that I already regret using it).

This techno-evangelical minority thus emboldens the larger techno-sceptical faction within HE in their misconception that any visualisation technology that matured after the London Olympics is a mere gimmick. 'VR? Gen-AI? game

engines? If it were of any use, we would have done it decades ago!' seems to be the line of thought.

Many students, however, are of a different mindset and may find lecterns and whiteboards more exotic than computer games (but please, move-fast-and-break-things colleagues, do not claim on their behalf that this means they all hate in-person teaching or see no value in chalk and talk).

With this reductive polarity in approach, it is no surprise if opportunities that technological advances offer are not fully explored or scaled. The sector ends up with a false dichotomy between those who, for example, preach that 'in the future all teaching will be in VR' to those who refuse to even explore the benefits of informed and judicious deployment of VR in today's teaching mix. Replace 'VR' with 'AI', 'video', or 'blended', and this might just sound familiar. We are further disadvantaged by the scarcity of good case studies. If curious, open-minded teaching staff can only observe unexciting or pointless learning media, why should they invest precious time in seeking to explore these modalities within their teaching?

Despite how regularly time-based and interactive learning media are produced within HE, budget holders do not tend to see it as a core, growing, and opportune in-house capability (some just don not tend to see it).

As spending on this activity breaks into numerous budgets, headings, and descriptors, there is little visibility of just how costly this non-activity can get, in the aggregate, and perhaps insufficient alarm when it turns out, down the line, that the university does not really own the very assets it paid for, or that it paid for practically identical work repeatedly (still without fully owning any of it).

On a sectoral level, it means we end up spending more for less. The potential, however, and, in places, demand, far exceed current provision and capacity. This suggests that serious investment might be required, which no decisionmaker wants to hear. To be fair, without cohesive and effective ecosystems, maximising value, and benefit, just throwing more money at this indeed makes no sense.

Universities, it should be said, make for difficult clients and do not always show greater appreciation of vendors' commercial or technical realities than of their own. Whilst it might be easier to ask for the moon, work unprofessionally, and expect the supplier to bite the bullet and own any blame, business cannot operate like that, so there will likely be some consequence (to the university, to business, or both). That is to say, this modus operandi does not even grow solid businesses.

Image combining real physical lab and digital twin lab (VR), from Briscoe Lab Digital

Given how fraught with complexity edtech can be, and that most interventions likely carry some downside or limitation, suppliers are not always keen on the strictest evaluation norms or on major departures from core offerings in response to local requirements. When HE jobs and reputations are attached to such 'partnerships', it is understandable if excellent colleagues involved might feel nudged to comply with more reductive, binary definitions around success or benefit. All they want is to be part of innovative practice and keep their project-associated jobs, yet they are stuck between the rock of business marketing and the hard place of university investment cultures. With some colleagues' roles actually encompassing a company or product name in the job title or description, it is little surprise if we find evaluation outputs or internal lessons

learnt at times compromised. The problem, of course, is that it gets in the way of moving from good to better (or from bad to good).

So 'partnering' has its pitfalls, but is not developing expert in-house learning media capability difficult? As a person whose job it is to do so, I admit that it is not easy, but very few jobs in HE are. Still, measured by Gross Value Added or jobs, the UK's world-class creative industries are a larger sector[2] than UK HE[3], and there are numerous skilled graduates added to the talent pool every year. Universities should know this, having taught those graduates these very skills, which is yet another missed trick. Availability of local expertise is at least a start.

Despite the availability of talent and know-how, universities do not usually have a serious, cohesive approach to original learning media and XR. Hiring is often in wasteful, siloed, lower-skill- or expectation generalist roles, such as 'videographer' or 'developer' with obscure job descriptions, baseless workload planning, and no informed praxis management. Consequently, many decades into an established medium's deployment in education (such as video), you will still find new blended or online learning projects involving video entail first surprise and then improvisation. Given that learning media is the undead, in the sense that teaching materials get refreshed, and brands and platforms change, that is always going to hurt.

Generalist learning media roles in HE do not tend to exist much within the creative industries, with each industry – broadcast to gaming – encompassing dozens of distinct roles, skill sets, and departments. HE's approach to these skills is analogous to a creative firm looking to recruit some generic 'academic' who would be as proficient in sociology as they were in bioengineering. Whilst it is true that we cannot and should not aim to replicate the division of labour or headcount of creative industries within HE, this only makes it more important to define which skills or skills mixes we do seek. There are very few 3D artists who are also seasoned camera operators, and even such polymaths may not be great at coding or planning (and even if they were, you might need more than one to deliver to deadline).

Beyond the missed opportunity around harnessing creative industries skills for better edtech, universities are missing an even more obvious trick by erecting or preserving walls between teams developing new edtech hardware, software, or frameworks, and staff members deploying edtech in teaching. Other walls prevail between researchers and teachers, academic and professional staff, theory and practice, and evaluation and procurement. Though there are also examples of great collaboration, with barriers being removed, overall, there are walls, and they get in the way. The organisational culture that such barriers both represent and enable is regressive. 'Tear down these walls!' I say.

Another division that seems to have been at least recognised as a problem is between edtech and IT. If we wish to specify the needs of tomorrow and start preparing today, mere coordination and mutual support are insufficient. Edtech should not ignore repercussions to the underpinning IT infrastructure that enables and secures delivery of student experience, whereas IT functions should see novel modalities evaluation as their duty, rather than extra-curricular. This too can be helped by framing exercises around the opportunity or need, rather than jumping the gun to which business or team would deliver solutions.

Still, money is being spent (more visible when cuts are discussed), so what is it spent on? Some of it pays for the frequently ad-hoc, clumsy procurement or hiring I already alluded to, but the area that seems to loosen wallets most easily is delivery platforms. Much money and time is spent on these platforms, from LMS to VR to immersive rooms; less, perhaps, on what will actually populate them. This is not atypical in institutions where, more generally, premium spending on teaching facilities, entire new buildings, on occasion, appears easier than investment in teaching staff or learning content and experienced developers.

These are, of course, apples and pears; I am merely arguing that we need both. The suggestion is not that platforms, whether hardware, software, service,

[2]Creative Industries, House of Lords, 6 February 2025

[3] Universities, UK Website, Finances, 2021-22

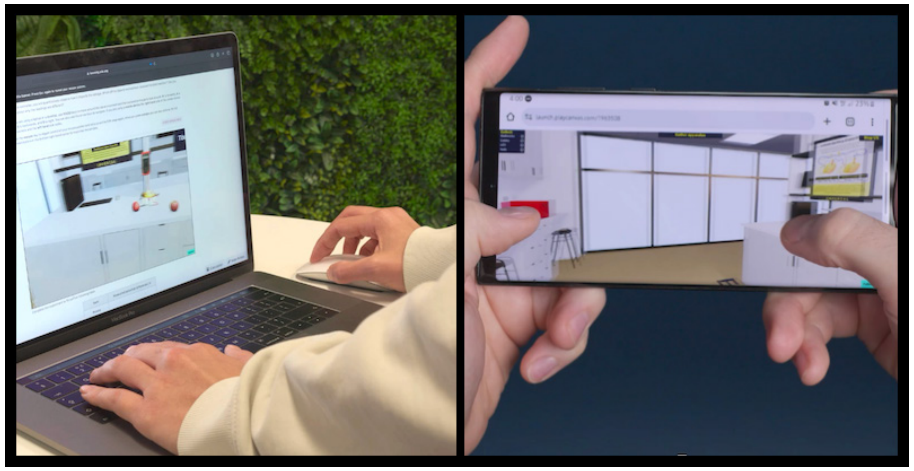
or indeed buildings, are unimportant; my point is around the imbalance. The platform is an enabling delivery vehicle, but what is it that we are delivering? Is our institution's educational offering not at least as impacted by how we teach in those spaces, whether digital or physical? If subject matter and curriculum are the 'what' and the delivery platform is the 'where', I am merely suggesting we do not forget the 'how'[4].

It seems that whilst many universities do have expert staff that would relish better cross-disciplinary collaboration in areas such as learning media, universities first hire too few of them, inattentive to the skill mix or workload, then use them ineffectively (those walls and silos) and finally spend on private sector panaceas or quick-fix solutions. The outcome could still be presented as transformational, I suppose, by branding the investment or role as 'strategic' or 'digital' (I should know, with 'digital' featuring in my own job title, reminding me daily not to focus efforts on vinyl records). Others cut to the chase by literally branding everything as 'transformation', for the avoidance of doubt. The notion, by the way, of 'transformation' or 'disruption' being universally desirable per se deserves its own piece, but I digress.

It is tempting to shift the blame to some nondescript leadership and their disconnect. My sense, however, is that many senior HE leaders are not that far removed from their lecture theatre origins. Their reports and stakeholders too are surely loud and clear when flagging risky plans (university staff do not mince their words). So, with bosses passionate about education, value for money, and opinionated and vocal underlings, how come we misfire so, as a sector?

This may just have something to do with an unhelpful perception that to 'get serious', to deliver scale, and to move faster, only big contracts with big business would do. It is understandable, given how frustrating it can be trying to do pretty much just anything at a British university. Edtech is no exception in this malaise, with surely its own instances of inadequacy. That same culture of favouring supposedly dynamic, results-orientated business over staff also favours the 'expert' consultant, ever the outsider, who somehow knows better than those staffers involved with the nitty-gritty.

Personally, I do value true consultancy, that is, people with specific expertise that will inform and improve thinking, but I am less keen on the expert-in-expertise graduate recruit telling in-house experts what to do. When I occasionally advise other institutions myself, I try to do so on similar terms, whilst pointing to the need for empowered and agent in-house expertise. Inevitably, things can look clear and easy when you lack an understanding of the real complexity. The best consultant should therefore be merely complementary to expert staff insight. To have such expert insight from staff in learning media, however, universities first need to have expert learning media staff. And so, we end up with too few, too siloed, too generalist in-house experts, sidelined in favour of the next glossy private sector partner that would sell a good story (maybe even release us from the greyness of the university office to some sunny corporate event).



Demoing project AIM, Digital Media Lab with Interdisciplinary EdTech Lab, Imperial College London Whatever we call this area of both significant potential

[4]The 'how' in itself is not merely technologically enhanced solutions but crucially learning design and good evidence-based teaching practice.

and deficit, a sea change in approach is required. If that is unpalatable, perhaps, instead of terming it learning media or edtech, if we simply referred to simulation, visualisation, gamification, case study, role play, field trips, digitisation, empathy, or asynchronous learning, to name but a few pertinent attributes, we might see greater traction?

At Imperial College London, we have seen sustained, tangible benefits where a different, more deliberate approach to original learning media was taken. Admittedly, I still spend my days noting where we could do better, but it is important to clarify that I do have multiple tangible examples of a different way of doing things.

Whilst this piece focuses on the problem, there is much to say and show for solutions too. In fact, some of it is rather simple and could even save time and money. For example, as a sector, we frequently make too many videos that do not use any of that medium's intrinsic benefits (they do not visualise, demonstrate, engender empathy, etc.) at some effort and cost. Good in-house learning media expertise is not just about what should be done but equally about what should not. Colleagues who are enthusiastic about learning media would benefit from a wider gamut of solutions to enhance teaching and learning, rather than knee-jerking onto high-volume video-making. To advance learning media, as part of a wide mix of other activities and touchpoints, I would encourage colleagues to first ask, 'Should this even be a video?' (or VR and so forth).

Whilst every institution's needs are different, I would like to propose a few other questions that we can all ask ourselves (cost-free):

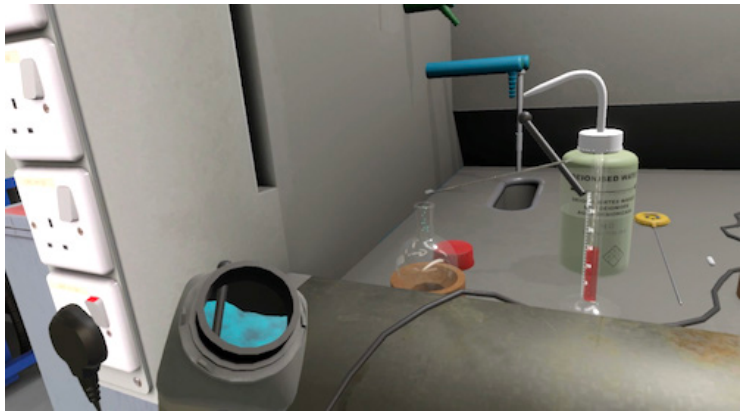
What if we invested in pivotable in-house skills and capabilities that would not only work in multitudes of delivery modalities (VR, simpler phone-based AR, 3D visualisation, and animation) but also help adapt and reuse the content or assets for future or additional delivery modalities?

Or at the very least, how about securing our ability to repackage VR experiences, as software and hardware evolve, without being locked to the vendor that produced the original experience or delivery device?

What if we pulled resources, grouping practitioners with complementary skills, including from the creative industries, around defined objectives, rather than jumping to solutions from suppliers?

Can we not empower cross-disciplinary teams (learning media, pedagogy and learning design, learning tech, SME), focusing on defined gaps or opportunities in the nuanced reality of specific teaching and learning, and leave behind such binaries as 'to VR or not to VR'?

What if more universities started growing owned volumes of know-how, assets, and code that could not only be reused and adapted when desirable but also pulled together so that HE overall maintains greater ownership, IP, control, and credit?[5]



From Briscoe Lab Digital Twin VR, Digital Media Lab and Department of Chemistry

Imperial College LondonTwin VR, Digital Media Lab and Department of Chemistry, Imperial College London And what if, through exploring these approaches, we occasionally found that some of what we wish to deliver or pilot does not require a costly change of LMS, major space renovations,

[5]Rules, agreements, and expectation management would be required, but it is not like there is much benefit from not having any, yet still producing content, as is frequently the case.

or procurement of costly hardware, because by refining the hypothesis on opportunity and possible solutions, our in-house experts proposed a nimbler, more flexible intervention?

Undertaking such ongoing technical due diligence could also point to where the private sector and its products and services could have a better-defined role that truly addresses opportunity or gaps (because we will know what we do or should do and have or should have). The case for informed outsourcing would arguably be greatly informed by first making the case for insourcing. We have done some of this (by no means all) at Imperial; it is doable.

Whilst universities, it seems to me, are better at counting staff costs than outsourcing or opportunity costs, wouldn't it be good if the private sector were nevertheless nudged to work harder in service of HE, rather than frame the exercise unilaterally, based on mostly vendor, rather than client, interests? What if instead of telling universities what they needed, vendors were told? I have heard it from more than one major player in these industries that they have been spending fortunes on products and marketing, and yet still struggle to understand what their prospective HE clients want. Better-informed spending, it follows, could do both sides some good.

Having pointed fingers at the private sector, which is itself full of capable, hard-working people, as well as excellent colleagues commissioning outsourced services, I am afraid that as a wider edtech community, we too have some questions to answer.

Would it not be constructive if in our own conversations within edtech we started taking ourselves more seriously by doing away with the notion that all learning technologists are the same and sufficient, rather than it being a large sphere of different competences, with much scope for niche expertise, from Python to podcasts to 3D?

It took me years, once already working in HE, to even unpick that when 'edtech' (or 'professional', or 'support') people were mentioned, that meant me too. A snidey remark about 'learning technologists' at a recent meeting almost flew over my head, as I was slow to clock it was aimed at me. If we pretend that we already know it all, whatever our skill sets were, is it any wonder that our employers are not rushing to recruit others with complementary skill sets? I think we should all feel comfortable, if not duty bound, to state what we are not experts at. If not in academia, then where...?

Having been part of some positive change, or partial positive change, or, many a time, attempted partial positive change, around institutional approaches to learning media, I fully appreciate both the mountain to climb and our ability to and interest in climbing it.

As for those best practice examples I parked some lines back, there are many pockets of those in the sector, so perhaps we merely need to change everything else to empower them.

How best to address that? Excellent question.

Author

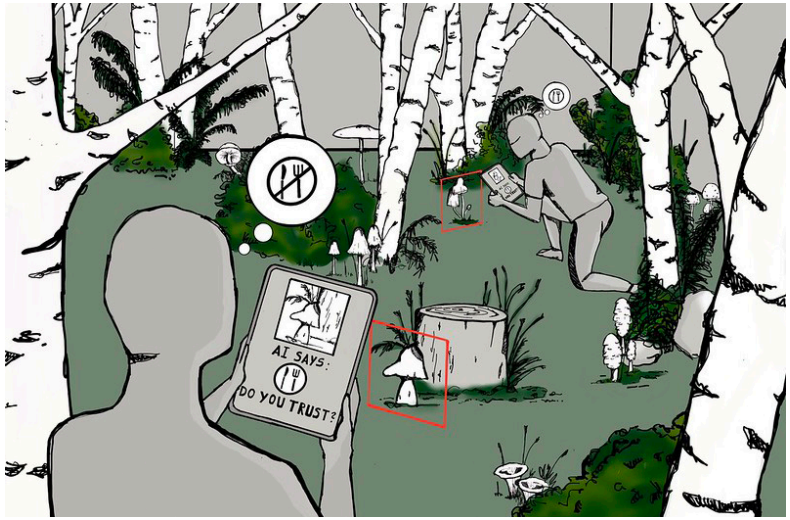
Daniel Mitelpunkt

As Director of Imperial College London's Digital Media Lab, Daniel has overall responsibility for strategy, operations, creative direction, and R&D. In his capacity as Imperial's senior applied media officer, he leads on institute-wide policy and planning in this area.

Prior to setting up applied media capabilities for the university, he worked as Executive Producer of filmed content on health and social issues for NGOs, universities, and the private sector.

Fostering critical digital literacies: Connecting young people with university students as meaningful others

Cristina Costa and Michaela Oliver
Durham University



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Introduction

The Durham Digital Literacy Project represented a collaborative effort between Durham University and High Grove Academy, a state-funded secondary school located in the Northeast of England. This project aimed to develop and implement an advanced digital literacy programme to tackle some of the most pressing challenges young people face in the digital age, such as navigating online spaces amid misinformation and dealing with issues like sexting. A total of 160 students (aged 13–15) from Year 9 and 10 participated in the initiative, which sought to equip them with the necessary skills and knowledge to navigate the complexities and the (perceived) risks of the digital world.

The primary goal of the project was to create lesson plans and a set of interactive learning activities that spoke to young people's digital experiences in comprehensive and non-intrusive ways. The programme was founded on a collaborative ethos, bringing together a variety of stakeholders – including school leaders, teachers, school and university students, and researchers – with the goal of creating a meaningful partnership. The project was designed to link theoretical conceptions to practice-based interventions with the purpose of making a tangible impact on how young people engage with technology and digital environments, especially social media.

At the heart of this project was the involvement of university students, who took on the role of "digital ambassadors"2 to work through thorny digital issues – misinformation and sexting – with school students. This approach was based on the belief that fresh and relevant knowledge is best learnt through connections between individuals who share similar social and cultural experiences (Mannheim, 1952). In this particular case, university students were deemed closer in age and digital experience to school students, thus playing an essential role in guiding discussions about digital literacy as knowledgeable others.

The project was also underpinned by a critical perspective on digital literacy, one that goes beyond mere technical or basic communication skills to foster a deeper understanding of the power dynamics and the socio-cultural and ethical contexts in which digital practices occur. The project encouraged students to make informed decisions about their online behaviour and to critically reflect on digital issues, such as privacy, misinformation, and online communication norms, including those associated with the sharing of information and the impact of its spreadability. Through this initiative, we aimed to extend the reach of academic work beyond the academic community and help young people acquire essential digital cultural knowledge to take advantage of the benefits of the so-called digital society.

What is critical in critical digital literacies: A conceptualisation with practical application

The project started with the understanding of digital literacies as essential skill sets for effective digital citizenship, i.e., participation online. These skills aim to encompass not only the technical abilities of using certain tools or software packages but also the capacity to engage in deliberative and ethical digital communication (Habermas, 1992). Both aspects are deemed critical, as in 'crucial', in today's digital world. The meaning attributed to critical digital literacies does not, however, stop here. 'Critical' is also used in this project to refer to how engagement with digital technologies can contribute to the (re) production of (in)equalities, (in)justice and/or (dis)(em)power(ment) of digital users (see Macgilchrist, 2021, p.244).

In this context, digital literacies were understood as a form of digital cultural knowledge, of understanding how the digital world works. This involves an exercise of reasoning, ethical decision-making, an understanding of how digital environments function (Costa et al., 2018), and how individuals can choose to act in the digital environments in which they are participants. Thus, the project was designed to foster digital literacy that is critical in a way that would enable students to become active, ethical, and informed participants in the digital world.

From a critical pedagogical standpoint, we chose to understand online participation through a perspective of communicative reason (Habermas, 2023) that entails the following core skills:

1. **Opinion formation**: engaging in digital reasoning to understand the dynamics of online communication
2. **Intersubjective understanding**: interacting with others in digital spaces while embracing unity within diversity (Freire, 1997)
3. **Cultural adaptation**: navigating implicit rules and norms to maintain ethical behaviour online

Building on this framework, these skills were refined into three key pillars of digital engagement, which guided the creation of learning activities:

1. **Digital reasoning**: the ability to form opinions and make informed decisions based on online information and interactions
2. **Digital being**: the awareness of oneself and others within the context of digital interactions
3. **Digital integrity**: the capacity to adapt culturally and ethically to the complexities of the digital world.

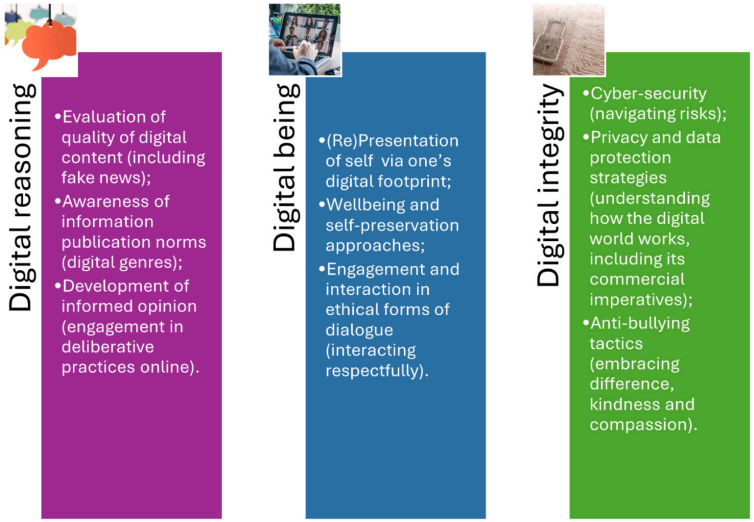

Figure 1: Pillars of digital engagement

The design of digital literacy sessions

The design of the digital literacy sessions within the project was based on two central concepts: 1) digital literacies as a form of digital cultural knowledge and 2) the notion of "disciplinary-specific reasoning" (Oliver, 2021). These concepts formed the foundation of the task design, which aimed to bridge academic research with practical, context-based interventions (see Oliver & Higgins,

2023). The design focused on creating learning activities that addressed the digital environments students were familiar with, ensuring that the sessions were both engaging and relevant to their lived experiences. The project was carried out in three distinct phases:

1. **Desk research**: The first phase identified the most pertinent digital issues related to young people's experiences through a review of published research. In consultation with the school, two key topics were selected: sexting and misinformation. This phase also involved creating reading cards that synthesised the key findings and recommendations from existing research, which were also used to inform the development of the lessons.
2. **Session design**: During this phase, detailed lesson plans were created based on principles of digital cultural practices and critical pedagogy3. The lessons were designed to 1) elicit students' prior knowledge and lived experiences of the issues under discussion, 2) encourage deliberative action, and 3) allow students to express their understanding creatively.
3. **Training digital ambassadors**: University students were trained to serve as digital ambassadors. They engaged with the reading cards, shared lesson plans, and trialled the activities in small groups. This phase allowed the digital ambassadors to gain practical experience and reflect on potential challenges in working with young people on the topics assigned.

Capturing experiences

To evaluate the processes and experiences of the project, a variety of research methods were employed to gather data from multiple stakeholders. These included observations by the researchers, feedback from students and teachers, reflective entries from the digital ambassadors, and focus-group interviews with students, digital ambassadors, and school leaders.

Given the involvement of underage participants, the research was guided by a detailed and sensitive ethics plan. Consent to participate was obtained through an informed process that involved both students and their guardians. Although adult consent is typically sufficient when working with minors, the research aimed to promote student agency and voice, granting students autonomy in having the last say regarding their participation. This approach was intentionally designed to affirm students' right to choose and ensure they had equal control over their participation. One student chose not to join a focus group just before it began; their decision was fully respected, and they were guided to an alternative activity by a designated teacher before the session commenced. All collected data has been anonymised to protect participant identities and the research site, with identifying details removed. Due to the relatively large number of participants for a qualitative study, numerical codes were used in place of pseudonyms to organise participant responses. Data has been securely stored in compliance with GDPR protocols, with access restricted to the project's researchers. The data provided valuable insights into the initiative's impact on students, digital ambassadors, and the school as a whole. Below, we offer a distilled version of findings and recommendations from the analysis of the data.

Findings

The research revealed several key findings related to the usefulness of the sessions inspired by the three pillars of digital engagement.

1. **Dialogic task design:** Students found the sessions to be more engaging than past experiences of similar topic sessions in that they were encouraged to participate in dialogue that promoted their engagement with the issues at hand as a form of raising critical consciousness (Freire, 2001) rather than simply being told what to do or think. This approach allowed students to explore their views, engage with different perspectives, and develop a more nuanced understanding of the topics, giving them a sense of agency regarding their digital activity. The quotes below reflect this:

"It was fun to learn about things that aren't always spoken about... I had never thought

of it [sexting] from different points of view." (Student Feedback 15) "It [felt] less judgmental." (Student Focus Group 1)

"[This session] made me realise that people have different opinions." (Student Feedback 17)

2. **Role of digital ambassadors:** The presence of university students as digital ambassadors was seen as crucial to the project's success. School students felt more comfortable discussing sensitive topics when they were led by people closer to their digital culture location. Digital ambassadors helped create an atmosphere of trust and openness that stood in contrast with adult, risk-averse informative sessions. The ambassadors' role in facilitating discussions and guiding students through the learning activities was appreciated by both students and teachers alike:

   "*It is much easier to talk to ambassadors than with teachers… [I] wouldn't have joined in as much [otherwise]… It is weird to talk to teachers [about sexting]." (Student Focus Group 1)*

   "The students were engaged really well by the hosts." (Teacher's Feedback 1)

3. **Creative outputs as representations of learning:** The students' final creations, whether memes, posters, or other digital artefacts, were seen as valuable learning outputs. These creative tasks allowed students to express their learning in a tangible way, and many students reported that these activities helped them externalise the issues at hand.

   Using memes helped us to understand since our generation uses memes a lot." (Student Feedback 16)

   "I liked making the comic strips (Student Feedback 32)… [and] our own storyboards." (Student Feedback 42)"

University students as digital ambassadors

The university students who participated as digital ambassadors also reported benefiting from the experience. They valued the opportunity to work in a school setting and to apply their academic knowledge to real-world situations. The experience gave them valuable skills, such as teaching, mentoring, and applying digital literacy concepts to practice.

> *"I didn't know a lot about digital literacy before the performance, so it was a good experience and [helped] to expand my knowledge on it." (University Student Digital Ambassador Focus Group, P1)*

> *"[I'm] not a Primary Ed [student]… We don't do any placements. So having some time in the classroom … [was] one of the big reasons I wanted to do it." (University Student Digital Ambassador Focus Group, P4)*

Impact on the school

Interviews with school leaders indicated that the project had a positive impact on students' learning and conduct. One notable outcome was a decrease in incidents related to sexting, which was identified as a particular concern before the project began:

> *"We obviously talked about this the first time you came in… There was, you know, in terms of things that were trending in terms of … our safeguarding recording. It was sexting and imagery being sent online. And now we've taken a few different approaches … that you guys have been part of that. And that's certainly a trend, and it's certainly something that is quite high profile… And in the school, it has reduced the amount of cases that we've been recording." (Interview with School Leaders, P2)*

The school leaders also noted that the project helped to create a culture of digital responsibility, with students becoming more aware of the ethical implications of their own and others' online actions.

> *"…. It's [digital literacies learning] central to the curriculum … It's providing important life skills for our students. It's really preparing them for the world of work and further education. And so I think*

absolutely crucial [that they are exposed to these interventions]."
(Interview with School Leaders, P1)

The school is now an official partner in our faculty placement module, Digital Literacies in Action, which will connect university students with the community and pupils

Recommendations

Based on the outcomes of the project, several lessons can be learnt for application in future digital literacy initiatives:

1. **Responding to students' needs**: Digital literacy programmes designed to address the specific issues and concerns that students face in their digital lives help capture students' attention and imagination. Working within a paradigm of lived experience helps students attach meaning and purpose to what they are expected to learn.
2. **Promoting dialogue and student voice**: Teaching activities that incorporate dialogue, deliberation, and the inclusion of student perspectives help dynamise the classroom. This is an important approach to foster critical thinking and support students to develop their own informed conclusions about digital issues.
3. **Supporting digital cultural knowledge**: Time devoted to developing students' digital cultural knowledge, particularly in relation to ethics, reasoning, and deliberation, is crucial for students to grasp the hidden curriculum of digital experiences, i.e., how the digital world works. This requires contextualised learning.
4. **Integrating digital literacies into the curriculum**: Education Studies programmes would benefit from integrating digital literacy initiatives into their curriculum, with opportunities for students to gain practical experience in teaching and mentoring young people on their digital experiences. Collaboration between universities and schools is an obvious partnership in this regard.

Conclusion

Via the Durham Digital Literacy Project, we have demonstrated the importance of fostering critical digital literacies among young people and highlighted the value of collaborative approaches in the development of digital learning. By engaging both school students and university students as active participants in the learning process, the project was able to create a meaningful and dynamic learning environment that addressed some of the key digital challenges faced by young people and teachers today. Through dialogue, creative expression, and the development of ethical digital practices, the project contributes to the development of critical digital literacies that are essential for responsible and informed digital citizenship in the 21st century.

Acknowledgements

The researchers would like to express their gratitude to the school that served as the research site and to the teachers, students, and the digital ambassadors who participated in the project. Without their involvement, this research would not have been possible. Thanks also go to our funder, ESRC IAA, for supporting this work.

Contacts and further collaborations

We welcome communication from teachers, policymakers, students, researchers, and colleagues from other sectors who are interested in applying or further developing this approach in their own contexts. Please get in touch with us at cristina.costa@durham.ac.uk and michaela.oliver@durham.ac.uk.

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Empowering Learners through Immersive Technologies: A Case Study at Chester House Estate

Emma Whewell

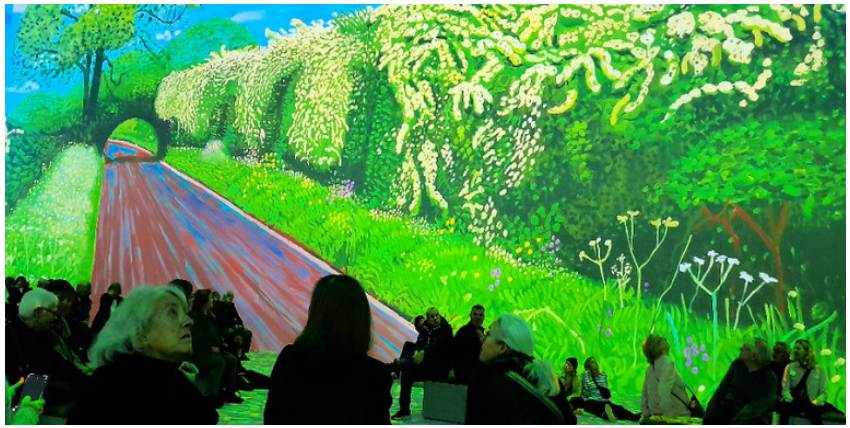


Image credit: Peter Denton, CC BY SA NC

Abstract

This article explores the integration of immersive technologies such as augmented reality and virtual reality in educational contexts, using the Chester House Estate as a case study. Through a collaborative effort between students and staff at the University of Northampton and the students and staff at the Creating Tomorrow College, the project developed a set of interactive digital resources aimed at enriching the visitor experience and increasing accessibility and social impact through the involvement of students as co-creators in the learning process.

Keywords: immersive technologies, augmented reality, virtual reality, educational innovation, social impact, student engagement, heritage education

Introduction

Immersive technologies, including augmented reality (AR) and virtual reality (VR), have increasingly been recognised for their potential to transform educational experiences. These tools can overlay or simulate the real world with interactive virtual information, creating an intelligent and responsive learning environment. The project 'Bringing Learning Alive' sought to demonstrate how immersive technologies can be effectively incorporated into education in authentic and socially impactful contexts such as the Chester House Estate (CHE).

Project Overview

The CHE is a heritage site located in Irchester, Wellingborough, North Northamptonshire, recognised for showcasing 10,000 years of human activity. In collaboration with the University of Leicester, the CHE has become a hub for extensive archaeological digs, making it an ideal location for educational and research activities. Additionally, the site is home to the Creating Tomorrow College (CTC), which offers young adults aged 16–25 with special educational needs and disabilities (SEND) a curriculum focused on the skills and knowledge necessary for future employment. The college's proximity to the CHE provides students with unique opportunities to engage in work experience, integrating education with real-world applications.

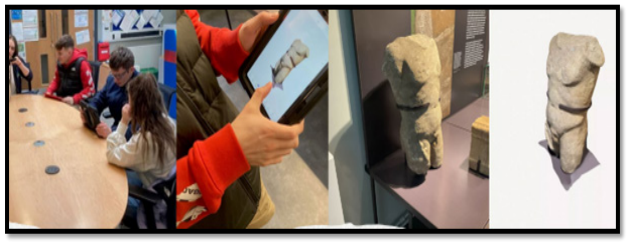
The primary aims of the project were:

1. **Accessible digital technology**: to integrate simple and accessible digital technologies into teaching, learning, and everyday life, thereby enhancing educational practices
2. **Social impact:** to explore and address themes such as inclusion, accessibility, and employability, ensuring that the project had a meaningful impact on both students and the broader community
3. **Co-creation with SEND experts**: to enable University of Northampton (UON) students, alongside young adults with SEND from the CTC, to co-create authentic and purposeful interactive and immersive resources, positioning these students as 'experts' in the process

Technologies involved

The UON students and the CTC students worked with three technologies:

- AR Makr: Students created historical scenes using the AR Makr app, which allowed them to overlay digital elements onto the real world.



- 3D visual representation of artefacts using the Polycam app
- Teaching learners how to use and add QR codes to their CVs to display employability skills through photo and video

Project Methodology

Engaging with experts such as carers and teachers—those who closely interact with the participants—proved invaluable in identifying individual ideas and preferences during the technology co-design process. The project used a Participatory Action Research (PAR) approach, integrating adult learners from the onsite CTC and UON students as active participants in the design, implementation, and evaluation of resources. PAR is characterised by collaboration with participants and used to achieve social justice by addressing societal challenges. Central to PAR are the principles of self-reflection, inquiry, community involvement, and empowerment, making it a fitting choice for this project, which aimed to ensure that students engaged meaningfully in their education and felt valued as part of the community.

Ethnographic methodologies, which involve researchers immersing themselves in the participants' environment, were chosen for their effectiveness in identifying suitable technological solutions. The research was conducted with participants, with the dual goals of generating theoretical insights and driving

social change. The co-creation process was guided by feedback from the adult learners at the onsite SEND college, focusing on how to improve content, delivery, access, and engagement in the educational resources.

Ethical approval for the study was secured from UON and the CTC. All students and staff involved in the design of the educational resources were invited to participate. Comprehensive information on the study's aims and objectives was provided via a participant information sheet. Participants were also given the opportunity to discuss the project with the research team and ask any questions before consenting to participate. Given the specific needs of the learners at the CTC, this process was carried out in collaboration with their staff to ensure that the information was conveyed in an accessible manner. The project was evaluated based on interview responses from the UON students involved, the CTC learners, and their tutors.

Findings

The project enhanced the employability skills among young adults with SEND at the CTC. The participatory nature of the project, particularly the co-creation process, played a crucial role in fostering these skills. Participants developed problem-solving abilities, teamwork, and communication skills. For instance, tutors observed notable progress in problem-solving skills, as participants learned to navigate challenges and take responsibility for their tasks.

> *"Throughout the project … they acquired skills such as problem-solving. By working collaboratively as a team, they also focused on goal orientation, character development, taking on responsibilities, and fostering mutual respect." (tutor)*

This collaborative environment also encouraged the development of mutual respect and responsibility, further enhancing participants' character and readiness for the workplace.

Teamwork was another area where participants showed significant growth. For example, two young adults with SEND reflected on their experiences:

> *"I think … teamwork, showing responsibility, and problem-solving—especially when the apps weren't working … also respect for the UON students, and they've given us respect." (adult learner)*

Participants who initially struggled to collaborate with unfamiliar peers noted improvements in their ability to work effectively within a team. This transformation was evident in their reflections on overcoming the challenge of working with new people, as one participant shared:

> *"When you first started college, you found it difficult to work with people you didn't know. But hopefully, working on this project and doing so well with others shows you that you can work with others, even in a workplace with unfamiliar faces." (adult learner)*

Participants emphasised the importance of clear communication, especially when working as part of a team:

> *"… communication, because that's what you have to do if youre working as a team, you need to speak to each other, give each other feedback and comments, and try not to panic when it goes wrong. Yeah, that really is a good skill. Yeah, trying to keep calm … that's a really good skill." (adult learner)*

This experience helped participants learn to give and receive feedback, stay calm under pressure, and maintain a positive outlook, all of which are crucial for effective communication in any professional setting.

The project also provided a unique opportunity for the young adults with SEND to develop their digital literacy. As one of the tutors observed,

> *"Having the opportunity to be using like the cutting-edge technologies, you know the stuff that will be meaningful in the future to them, I think some of our students maybe don't have those opportunities necessarily or aren't as experienced using technology." (tutor)*

This exposure to AR and VR not only enhanced their digital proficiency but also significantly contributed to their overall learning experience.

The project developed the resilience and determination among participants. Despite encountering challenges, such as technical difficulties with the apps, the young adults with SEND demonstrated persistence and problem-solving skills:

> *"Determination as well. And so being passionate as well... And then .... determination definitely. Especially when the apps were messing around. That taking responsibility for what you do." (adult learner)*

This sentiment was echoed by the tutors, who noted the participants' patience and resilience in overcoming obstacles:

> *"... These apps hadn't worked, they did research themselves, and they were actually really patient and resilient with that, that then something might not work, but we can carry on investigating and exploring to find the positive outcome. For some of our students, that can be quite a difficult skill to maintain that resilience and come back to it when it hasn't worked." (tutor)*

This resilience was a critical factor in the participants' overall development, contributing to their confidence and ability to handle challenging situations.

Conclusion

The CHE project has identified ways in which immersive technologies can be effectively integrated into educational practices, particularly in contexts that use PAR as a methodology. By involving students and young adults as co-creators, the project not only enhanced their learning experiences but also contributed to the broader educational objectives of UON and CTC.

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Artificial Intelligence and Childhood: Enhancing Digital Play and Education

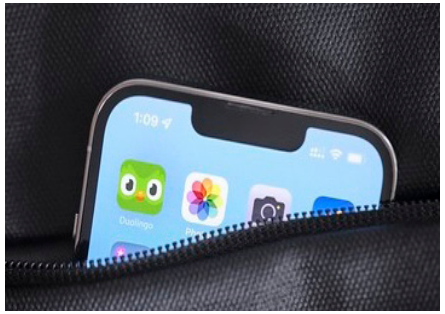
Dr Amanda Gummer and Gemma Ballard, (Fundamentally Children) explore how artificial intelligence (AI) is reshaping learning, play, and family life – and what this means for educators.

Introduction

AI is already woven into the fabric of modern childhood. From adaptive apps and virtual assistants to educational games and smart toys, AI is shaping the way children engage with the world around them. This article draws on insights from the AI in Childhood white paper by Dr Amanda Gummer, exploring the opportunities, risks, and practical implications of AI for educators, families, and children themselves. At its best, AI has the potential to enrich education and play. However, thoughtful integration and a human-centred approach are essential to ensure it supports, rather than disrupts, healthy child development.

Understanding AI in the Context of Childhood

AI refers to systems that simulate human intelligence, such as problem-solving, language processing, and pattern recognition. While the term may sound technical, its presence in children's lives is increasingly commonplace, for example:



Duolingo: An adaptive language learning app that uses AI to tailor lesson content and difficulty based on a child's individual progress, making language acquisition more responsive and engaging.

Cozmo: A small, interactive robot designed to introduce coding and problem-solving through play. Cozmo can be programmed using a graphical interface, encouraging computational thinking and creativity.

Ghotit Real Writer: An accessibility tool that assists children with dyslexia and dysgraphia by offering intelligent grammar and spelling support, context-sensitive corrections, and advanced word prediction.

Amazon Alexa: A voice-controlled virtual assistant that helps children manage daily routines, answer questions, and access learning resources through conversational interaction.

These tools bring enormous potential but also raise new questions about how we guide and balance children's interaction with intelligent technologies. Recent academic reviews highlight that AI-powered tools can support literacy, adaptive behaviours, and social interaction in children, as well as provide valuable support for educators.

AI in Education: Supporting Personalised and Inclusive Learning

In the classroom, AI offers several practical benefits:

- **Personalised learning**: AI systems can adjust lesson content and difficulty in real time, allowing children to move at their own pace. This supports differentiated learning and accommodates varied preferences – visual, auditory, or kinaesthetic – helping to sustain engagement and build confidence.
- **Reduced administrative workload**: Tasks like marking, resource planning, and reporting can be streamlined, freeing up more time for pupil interaction and creativity.
- **Inclusion**: Tools that support voice recognition and adaptive content delivery make learning more accessible for children with additional needs.

However, these benefits must be weighed against certain limitations. Over-reliance on AI can undermine critical thinking or creativity if children become passive recipients of AI-generated content. There are also concerns around social development, as technology cannot replicate the nuance of human emotional engagement. Excessive screen time and data privacy issues remain ongoing challenges, particularly for young users.

Practical Approaches for Educators

To make the most of AI in education, schools must adopt a measured and informed approach. It is crucial that AI is used to support, not replace, teacher judgement. Integrating AI tools within a broader framework of collaborative and enquiry-based learning can help develop higher-order thinking and interpersonal skills.

Embedding AI literacy into the curriculum is another key step, helping children understand how these systems work and encouraging responsible use. At the same time, teachers need appropriate training and professional development to use AI confidently and ethically. Finally, schools should implement clear policies to ensure that data protection and safeguarding measures are in place.

When used thoughtfully, AI can also help schools tailor education to students' interests, not just their abilities. For instance, a child who responds better to storytelling or interactive games might benefit from content delivered in these formats. This kind of flexibility creates a more inclusive and engaging environment, particularly for those who may struggle with traditional methods.

AI at Home: Learning, Play, and Everyday Interaction

Beyond the classroom, AI is increasingly shaping family learning and play. Voice-activated devices, interactive platforms, and educational apps are becoming staples of domestic life. For example, Lumo Play projects interactive, motion-sensitive games onto floors or walls, encouraging physical activity and cooperative play, while voice assistants can deliver personalised stories, encourage healthy habits, or host family quizzes. Another example, Osmo, blends physical books and digital play using AI and speech recognition to guide children through reading and problem-solving tasks.

These technologies embed educational moments into daily life, blending entertainment with meaningful engagement. However, privacy concerns and the risk of over-reliance on technology remain. Families should set boundaries, blend digital and traditional play, and involve children in open conversations about how AI works and why certain tools are used.

These technologies offer valuable opportunities for informal learning. They help embed educational moments into the rhythm of daily life, without the formality or resistance that sometimes comes with structured homework. For families, AI can also act as a bridge between fun and function, blending entertainment with meaningful engagement.

Yet the home environment presents its own risks. Privacy concerns are amplified where smart devices collect sensitive data. Children may also become overly reliant on technology for answers, diminishing their problem-solving abilities. In

some cases, digital play may displace outdoor activity or imaginative interaction.

To mitigate these risks, families should be encouraged to set boundaries around device use, blend digital and traditional play, and involve children in open conversations about how AI works and why certain tools are used. Educators can play a valuable role here, helping parents identify developmentally appropriate apps, encouraging shared use, and reinforcing a balanced approach.

Gamification and AI: Enhancing Motivation and Retention

The use of gamification in education, where learning is structured with game-like features such as rewards, levels, and feedback, is significantly enhanced by AI. Intelligent systems can tailor these elements to each child's pace, preferences, and engagement levels, keeping them motivated without overwhelming or under-challenging them.

Platforms like Osmo and Lumo exemplify this approach by blending physical and digital interaction. When thoughtfully applied, such tools can improve focus, motivation, and long-term knowledge retention, making learning feel more like discovery than instruction.

Striking the Right Balance: Human and AI Collaboration

The most successful examples of AI in childhood rely on a collaborative approach, where human relationships remain central. Educational apps like Duolingo are more effective when supplemented by teacher feedback. Lesson planning platforms such as LessonUp, an online teaching platform offering interactive lessons, real-time feedback, and AI-supported lesson creation for educators, offer time-saving templates but require adaptation to context by skilled educators for maximum benefit. Even accessibility tools depend on adult guidance to ensure their effective use.

Similarly, at home, AI-supported routines (e.g., using Alexa to manage screen time or reading schedules) work best when combined with direct parental involvement. In each case, AI adds value when it complements – not replaces – the social and emotional richness of human interaction.

Responsible Innovation: A Shared Responsibility

For AI to truly benefit children, its design and use must reflect core principles of child development and education. This includes involving educators, psychologists, and even children themselves in the design process. Tools should be transparent in their operation, accessible for diverse users, and grounded in ethical practice.

Clear data protection measures are vital, particularly in education settings. Beyond compliance, schools and developers should also prioritise building trust, explaining how systems work and empowering children with the knowledge to use them wisely. As research into children's digital wellbeing evolves, ongoing learning and adaptation will be essential.

Conclusion

AI is rapidly becoming part of the everyday lives of children, and, if used well, it can support more personalised, inclusive, and engaging learning. But its impact depends on how it is introduced, used, and monitored. Educators have a vital role to play in shaping these experiences and ensuring they support – not hinder – the social, emotional, and cognitive development of every child.

By combining technological innovation with human insight, we can create learning environments that are not only intelligent but also compassionate, curious, and child centred.

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Authors

Dr Amanda Gummer

Amanda Gummer holds a PhD in Neuropsychology and a Postgraduate Certificate in Higher Education, with over 20 years of experience working with children and families. Widely considered one of the UK's leading experts on play, parenting, and child development, Amanda combines her theoretical knowledge with a refreshingly pragmatic approach to family life, which resonates with both parents and professionals.

Amanda is regularly featured in the media and continues to engage actively in research, presenting papers at various international conferences. Her involvement in government policy on children's issues includes presenting her Balanced Play Model at the European Parliament in September 2019. Her extensive research, media presence, and policy work continue to make her a pivotal figure in promoting the importance of play in child development.

Gemma Ballard

Gemma has worked with the Good Play Guide for five years, contributing to both national and international projects. Having a background in both Clinical Psychology and child development, Gemma has brought a wealth of knowledge to the team. She completed her MSc degree in 2011 in Child and Adolescent Mental Health and is currently undertaking a PhD at the Open University, where she is developing a new screening tool to identify those fathers most at risk of developing mental health conditions during the perinatal period.

Gemma currently works as an Associate Lecturer at the Open University and has worked on a number of academic research projects focusing on the concept of 'sharenting', which explores the digital practices of parents and the sharing of information about their children on social media.

Theme 3: International perspectives

Global values in teacher education: Two examples of eTwinning projects in initial teacher education

Frederik De Laere and Madeleine Flötotto

Introduction

In 2023, I met Madeleine Flötotto, a colleague in teacher education at Friedrich-Alexander-Universität (FAU) Erlangen-Nürnberg, at the ETEN conference in Nuremberg, Germany. During this meeting with teacher trainers from all over Europe and outside Europe, we discussed the possibility of starting an eTwinning project about European/global values. We thought it would be interesting to let students think about and reflect upon the idea of the 'global' school, what it means to be either a national or an international teacher and what the identity of a teacher is. We decided to start an eTwinning project in the autumn semester of the academic year 2023–2024 and named it 'The worldwide school: educating global competences'.

This project was a cooperation initially between two initial teacher education (ITE) institutions (Howest University of Applied Sciences, Belgium, and FAU Erlangen-Nürnberg, Germany). Later a Turkish partner (University of Tekirdağ Namık Kemal) joined the project. The group consisted of students from European (Germany, Belgium, and Spain) and non-European countries (Japan and Turkey). The project aimed at getting students in teacher education to think about how to design learning environments that develop global competence. Further goals were teaching student teachers to work with eTwinning and the eTwinning platform, acquiring intercultural and communicative skills during idea-sharing sessions and the online work together on the topic of global competence in education, and improving English language skills. [1]

The process of the project

The project was carried out entirely remotely, structured around a number of online meetings. The students involved had to follow a number of steps.

In the first online session, they had to think about the global and international aspects of teaching. They also had to write down their idea of a dream school: 'How would your ideal school/your dream school look like?' At the end of the first session, they had to look for a quotation and upload it in their mother tongue to encourage the students to adopt a multilingual habitus in teaching and give voice to current national discourses and perspectives on global competences. The student teachers designed a workshop for teachers and made lesson plans for primary and secondary education. During the project, students could express their ideas in creative ways.

In the second session, they had to do research about global education and global competences and afterwards gather their ideas of bringing these competences to the classroom using the tool Padlet.

After the first two online sessions, the students had to design a workshop for teachers in international teams, based on the idea sharing and the expertise they acquired from the research. They had to plan their work and organise the meetings themselves. The end product (a video of a TED-style talk that was created by different groups of students) was uploaded on the Twinspace of the eTwinning project. In advance, we offered the students a series of TED talks that could be an inspiration for their own video presentation. In this way, they learnt to create videos by combining presentation files with audio files and upload them on YouTube in a private setting.

In the third and last online meeting together, they had to present their workshop to the group.

At the end, they had to do a final evaluation with a reflection on the project as a whole. All students were active on the Twinspace and posted their work, comments, and reflections on the pages and discussion forum, as well as in the document and image and video section of the Twinspace.

[1] The project was part of an "innovative internationalised course in initial teacher edication" realised and funded by the Project "FAU Lehramt International/FAU Teacher Education International" https://www.teachedinter.fau.de/ (funded by the German Academic Exchange Service Deutscher Akademischer Austauschdienst (DAAD) with financial means provided by the German Ministry of Education Bundesministeriums für Bildung und Forschung [BMBF]).

The national within the international: exploring what it means to be a teacher in Europe

In the months that followed the first project, Madeleine Flötotto and I had a few online meetings in which we shared ideas about a follow-up project. We decided to create another project around global values and identity of teachers in Europe and the world. The project was realised in the autumn semester of 2024–2025.

The difference with the previous project was that there was now a physical component; we had two international meetings: in Bruges and in Nuremberg. In this project student teachers explored European teacher identity, talked about languages, thought about migration and teaching in Europe, reflected on internationalisation and global competence in Europe and discussed nation building, national pride, (new and old) nationalism, and the role of education in Europe.

The goal of the project was to create teacher workshops to understand how national and European values come together in teacher education and teacher identity in Europe.

Through the project student teachers transcended the national perspective on teacher education and explored what more a European teacher identity had to offer. The student teachers reflected and discussed how they could position themselves (or how they are positioned by ITEs and other institutions) between being a national state representative and a European teacher.

Looking at the latest elections of the European Parliament and the formation of the "Patriots for Europe", (new and old) nationalism and the role of education in Europe were being discussed. Student teachers in Europe reflected on how they and their national institutions contribute to national pride and how the prevention of extremism in schools in international comparison is conceptualised in ethical school standards and school programmes. In this way student teachers could understand reflection and international cooperation as part of lifelong learning and professionalisation as a teacher. The student teachers used digital tools and the eTwinning platform to enhance their media competences and were active in internationalisation@home via digital platforms.

The German student teachers from FAU first visited Howest in Bruges for a couple of days, where they met the students from the English-taught semester 'We Teach The World' in Howest's School of Education (*) (Figure 2).

Figure 1: Frederik introducing eTwinning

During the meet in Bruges, the student teachers had to carry out various travel activities through which they prepared themselves for international encounters and international exchange, exploring Belgium and Belgian culture. One of these activities was to create an expectations Bingo using the app Bingo Baker, in

which the students had to base the squares on what they thought they might encounter or experience in the partner country, such as cultural icons, historical landmarks, foods, or stereotypes. Other travel activities were a photo challenge, a celebrity's quiz, exploring local music and history, and the sound and lyrics of the national anthem.

Mixed international groups were created, and the student teachers had a number of working sessions coached by Madeleine and me, in which they explored Europe as a context for teaching and European teacher identity. In Bruges, a school visit and a guided tour were part of the programme to build awareness and understanding. The student teachers also had time to socialise and get to know each other in informal moments. There was also a visit to the European Parliament (Figure 2), which included a Q&A session with Janet Barthet in which the student teachers had the chance to voice their questions on Europe as an educational space, and a teacher workshop at the House of European History, providing teaching materials on how to introduce European topics and values into everyday teaching.

Figure 2: Visit to the European Parliament

During the meet in Bruges, the students gathered the necessary info formation the final task: creating a workshop for teachers. Each group worked on a different topic (from a list that was provided): multilingualism and multiculturality in the classroom, Sustainable Development Goals (SDG), European values and citizenship, and prevention of extremism in schools.

After the week in Bruges, the students had to plan and work together to create the final product: the teacher workshop (Figure 3). They had to make a podcast together in international teams and upload it on the Twinspace of the eTwinning project.

Figure 3: Teacher workshop example

Before travelling to Nuremberg, the Howest students prepared themselves for Germany and German culture by doing similar travel activities during their trip on the train. A school visit was also included, where the students observed some lessons, just like during the week in Belgium. Furthermore, we visited the Nazi Party Rally Grounds, which reminded us of the atrocities of the Nazi regime and the possible consequences of extreme right-wing policies, which was a great impulse to reflect on the value of remembrance education in different national contexts. There was also a historical walk in Nuremberg, starting at the castle, and a visit to Erlangen and the FAU campuses there. We had time to enjoy the Christmas markets and social activities in the evenings.

During the meeting at Nuremberg, the international teams of student teachers gave their workshops to different audiences: teachers, student teachers, and pupils, some in person and one online webinar for eTwinning teacher educators. The student teachers did a great job in organising interactive workshops using activities such as Mentimeter surveys, WordClouds, Kahoot quizzes, thematic group discussions on Padlet, and SurveyMonkey surveys for a final evaluation. They also created registration files for the participants on Google Docs and worked out their own style of document sharing in remote international group work. Frederik introduced ICT content in team teaching, inspiring the students to use student response systems like Kahoot, Quizziz, Blooket, and Plickers; interactive presentations like Nearpod, gamified learning apps; and using Book Creator in their lessons. Throughout the course of the Summer School, WhatsApp polls and Etherpad were actively used and reflected.

Summary

As in the previous project 'The worldwide school: educating global competences', the aim was to get students familiar with eTwinning and encourage them to continue using it in their studies at ITEs and in their further teaching at schools and, moreover, attend international workshops and webinars in their field of profession. Another goal was to let student teachers gain global competence talking about topics of citizenship education, nation building, and educational policies in Europe, as well as compare curricula and didactics in Europe.

Students gained and reflected on their teaching experience in international teams in a lingua franca and learnt about teaching standards and didactics in other national contexts. By creating teacher workshops in international teams, they explored the concepts of national, international, and transnational didactics, or how international cooperation in teaching might lead to the emergence of transnational didactics and teaching styles, also directed by the interface and the internal logic of digital platforms like eTwinning. We reflected on the platformisation of teacher professionality and how digital media and the use of ICT content shape teaching styles and didactics in ITE, especially in international cooperation in teaching when different national traditions and national discourses on the digitalisation in education come together.

To conclude, these two complementary eTwinning projects contributed to greater consciousness and awareness of global values and teaching in international contexts. We had the impression that the students really benefitted from the intercultural experiences and exchange – as became clear in the Pre-Post-Test Global Competence and our final evaluations – and developed a broader perspective on teaching and learning.

The Summer School Project was realised and funded by the project FAU Lehramt International/FAU Teacher Education International.

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Frederik is a teacher educator and an international coordinator in the School of Education at Howest University of Applied Sciences in Bruges, Belgium. He has been involved in many international projects in teacher training and is an eTwinning ambassador for Initial Teacher Education in Europe. He writes poetry and has published several books in Dutch.

Madeleine Flötotto

Madeleine is a teacher educator at Friedrich-Alexander-Universität Erlangen-Nürnberg (FAU) and project assistant for "FAU Teacher Education International". She has been involved in many international projects on eTwinning for Future Teachers and is passionate about introducing an international dimension to national teacher training at her university. Her research focuses on international teacher mobility.

EFC/MESH to co-lead the UNESCO supported International Teacher Task Force thematic group on digital learning and AI

Professor Christina Preston and Professor Sarah Younie

Prestigious invitation for EFC/MESH to co-lead the UNESCO-supported International Teacher Task Force thematic group on digital learning and AI

The charity Education Futures Collaboration (EFC), which provides governance to the Mapping Education Specialist knowHow (MESH) project, has been invited by the UNESCO-supported International Teacher Task Force (ITTF) to co-lead one of ITTF's thematic groups on technology, focusing on digital learning and AI. EFC/MESH's partner in this exciting new venture in AI in education is Digital Promise, an organisation based in Washington, D.C.

The digital learning and AI thematic group's remit is to create a vibrant community of practice "to meet online for sharing and recording practices; developing new knowledge; and collating resources in the field and policy documents". The ITTF has set up a knowledge hub for disseminating up-to-date information on policy and practice globally in digital learning and AI in education.

Professor of Education Innovation, Sarah Younie, De Montfort University, is leading on this for EFC/MESH, alongside April Williamson from Digital Promise. Termly webinars will be held with ITTF members – including teachers, policymakers, NGOs, academics, and education technology (edtech) and AI experts from around the world – for knowledge capture purposes. The working group will document the outcomes of these webinars.

Publications from the working group and ITTF members will be published via the ITTF Knowledge Hub on themes related to AI and teaching, such as AI practice in school teaching/administration, in-school assessments and teacher training practices, and analysis of the benefits and potential disbenefits of AI.

EFC/MESH have a long history of translational research, which includes providing resources for research and evidence-based practice in digital teaching and learning through the production of MESHGuides for sharing evidence-based practice through their associations with MirandaNet, TPEA, and Naace. Translational research in education is a process of applying findings from research both strategically and operationally to develop teaching approaches and interventions. It bridges the gap between academic study and using and applying the knowledge in educational settings, aiming to benefit and improve pupils' and students' learning outcomes.

MESHGuides offer teachers professional knowledge for pedagogic practice and ongoing support through online research summaries, freely available and accessible globally to inform classroom practice. MESHGuides unite different elements within a systems-thinking approach to education so that professional learning practitioners and researchers interact, connect, and collaborate both locally and internationally in more informed and effective ways. This strengthening of the link between researchers and practitioners is providing practical support in those countries where MESHGuides are being used, increasing the impact of research in education.

Professor Younie acknowledged that this is an important opportunity to take a leading role in the development of knowledge sharing and dissemination in the field of digital learning and AI globally. The appointment recognises EFC/MESH's continued leadership in translational research through the open-access publication of MESHGuides and the global discussion on the future of education and how AI can be used to its best advantage for making learning more accessible, in line with the UN Sustainable Development Goals (SDG), particularly SDG 4: Quality Education.

Authors

Christina Preston

Retired Professor Christina has been at the forefront of education and technology for over 25 years. The MirandaNet Fellowship that she founded in 1992 has become a global thought leader in edtech with over 1,400 members in 80 countries. At the core of the members' philosophy is the sharing of knowledge and change management based on grassroots evidence. The members worked with schools, charities, and edtech companies to research the impact of technology and learning in classrooms and report their findings to the global community. Christina has won five international awards for her contribution to education innovation and community of practice development. The MirandaNet website is now archived, and Fellows have joined the Technology, Pedagogy and Education Association. Christina continues as an editor of the Naace Advancing Education Journal.

Sarah Younie

Sarah Younie is a Professor in Education Innovation at De Montfort University and visiting Professor at Chichester University. She is co-chair and founder member of the Education Futures Collaboration (EFC) charity and MESH (Mapping Education Specialist knowHow) project (online research summaries for teachers), which is a recognised NGO member of the UNESCO supported International Teacher Task Force (TTF); MESH contributes to UN SDG4. She is the elected chair of ICET (International Council on Education for Teaching) and Editor-in-Chief of the Journal Technology, Pedagogy and Education.

Teaching Python with LEGO™ Spike Prime: A practical approach for young learners aged 13 to 18

Giulia Oliveira, Rafael Ribeiro and Dr Cristina Dusi

1. Introduction

Teaching adolescents is a challenging endeavour, as their emotional lives and unresolved personal issues often divert their attention from academic pursuits [Ferreira et al. 2021]. Furthermore, a curriculum lacking in resources and unprepared educators contributes to student disinterest, a significant problem today in Brazil, with an almost six percent dropout rate [Agência Brasil 2024]. Research indicates that students yearn for a change in the way they are taught [Andrada et al. 2018], moving away from the traditional methods in the wake of globalisation and social networks.

In contemporary society, programming has gained significant relevance, both in everyday life and within the educational landscape [Tavares et al. 2021]. It holds the potential to be the transformative change students desire in their educational journey. Programming opens opportunities to teach and improve rational thinking, computational logic, and problem-solving abilities [Silva et al. 2023]. When integrated with robotics, it further expands the horizon for skill development, as demonstrated in this study.

In response to these insights, the research initiative “Minds of The Future” was created to provide a digital and entrepreneurial learning base, aiming to teach different programming languages and the use of technologies to teenagers. The project primarily targets students from public schools in Minas Gerais, supported by the Department of Education of Minas Gerais, and works hard to reach those who might not have access to often expensive programming courses. Additionally, the project aspires to contribute to undergraduate students’ gain in knowledge about innovation, entrepreneurship, robotics, and the use of active teaching methodologies.

Since 2023, “Minds of The Future” has welcomed participants from state and municipal school networks, as well as some from private institutions, to engage in interactive classes using LEGO™ Spike Prime materials. The curriculum is currently structured into two thematic modules: block programming and Python programming. This article presents a report on the teaching in Module 2: LEGO™ and Python – which included 20 returning students from Module 1: LEGO™ and block Programming – showcasing the positive outcomes of our efforts.

It is essential to emphasise that the instructional approach described here extensively used LEGO™ for Education resources, notably the Spike Prime building kits, alongside materials developed by the project’s research collaborators. Similar to the work conducted by [Vahldick et al. 2009] with the Mindstorms kit, these materials were used to foster and develop individual and collective logical skills through techniques that diverge from traditional pedagogical methods, granting students freedom and opportunity to conduct creative tests within a controlled and conducive learning environment.

2. Methodology

To design the courses offered in the project, our approach was grounded in the STEAM methodology, which encompasses Science, Technology, Engineering, Arts, and Mathematics. This proposal involves the integration of these disciplines through interdisciplinary resources, focusing on the development of innovative thinking:

The idea behind STEAM in education is to break down barriers between disciplines. It is interdisciplinary at its core. STEAM disciplines are worked on together, allowing students to mobilize skills and knowledge in an integrated way, contributing to meaningful learning. There is an emphasis on teamwork, which enables each student to perform functions and activities that use and develop their skills and competencies, contributing to common learning [Silva et al. 2017].

With this framework in consideration, the implementation of STEAM enabled the essential linkage among science (which elucidates the physical functioning of the hardware components in the kits and is manifested through programming), technology (via the utilisation of computers and all modular content), engineering (embodied by robotics), art (put forward by the creativity needed to tackle challenges and competitions), and mathematics (expressed through logical reasoning).

Lesson Plan

What we refer to as 'computational thinking' involves the ability to solve problems systematically and logically, breaking down complex tasks into smaller more manageable parts, identifying patterns, and devising effective solutions. Introducing programming to young people in their teens not only teaches a new language but also promotes cognitive skills, crucial across various fields, from science and technology to everyday problem-solving [Wing 2006].

In this regard, the use of Python, combined with LEGO™ Spike Prime, emerges as a powerful tool for cultivating computational thinking in a practical and interactive manner. Python is an accessible and versatile high-level language, while LEGO™ Spike Prime allows students to observe the tangible impact of their algorithms in real-time through the control of robots that respond to commands, sensors, and conditions. Thus, each lesson is not limited to mere programming but also involves creating strategies, adapting to failures, and seeking alternative solutions – core competencies for computational thinking and life.

The subsequent lesson plan was structured to guide students from basic and fundamental Python concepts, such as conditionals and loops, to more advanced structures, including the application of sensors and motors in self-constructed robots. Over six two-hour sessions, students applied this methodology to program robots that interact with their environment and solve specific challenges, culminating in a competition where they could test their programming and logical reasoning skills. This hands-on and challenging approach aims to strengthen their understanding of programming logic and solidify computational thinking as an essential skill in their education.

Session 1: **Lights, Sounds, and Action!** The initial session introduced students to the basics of software and hardware, catering especially to those with limited prior exposure, given their public-school background. Using a pair-programming approach – where students collaborate in pairs – the session began with an introduction to Python as a programming language. Students imported the necessary libraries to communicate with the LEGO™ Spike kit and, after printing their first "Hello, World!", learnt to emit beeps, draw on the hub's screen, and program individual motors. These activities allowed them to take their first steps in controlling the robot.

Session 2: Learning by Moving The second session concentrated on coordinated motor control, enabling students to program synchronized movements using a motorised base they built. The lesson started by differentiating between paired and individual motor operations, as well as

clockwise and anticlockwise movements. Students programmed the robot to move in straight lines and perform turns, reinforcing code comprehension and the use of 'await' to avoid execution errors. Practical challenges, such as spinning the robot on its axis and performing manoeuvres, prepared students for future sensor-involved activities, including the final competition.

Session 3: What If ...? In the third session, students began working with the colour sensor and learnt to implement conditional structures (if, elif, else) to create decision trees. They also used a 'for loop' as a counter. A playful activity called "Guess the Colour" associated sounds with colors detected by the sensor, encouraging practical understanding of conditionals alongside code reading. Students also constructed a trainer robot named 'Leo', which simulated repetitive gym movements using a 'for loop', reinforcing their comprehension of loops and conditionals.

Session 4: Press 1 for Motors, 2 for Sensors, or 3 to Exit. The fourth session introduced the pressure sensor and deepened the integration of motors and sensors. Students created functions and employed commands like 'while True' and 'until' to program the robot to interact autonomously with its environment. For instance, they simulated the behaviour of a robotic vacuum navigating around obstacles. This practice consolidated the use of functions and conditionals to develop autonomy and dynamic movement in the robot.

Session 5: The Challenge In the fifth session, students were challenged to independently apply the concepts acquired throughout the course. They built a delivery cart equipped with distance and colour sensors, utilising a glossary of functions to program the cart autonomously. By integrating commands like 'if', 'elif', and 'until', students demonstrated their ability to think critically and solve problems with minimal assistance from instructors. This session served as a test of their readiness for the final competition.

Session 6: The Competition The final session was dedicated to the competition. Each robot was equipped with a balloon attached to the back and a skewer at the front, with the goal of popping the opponent's balloon. The competition encouraged teamwork, creativity, and the practical application of the concepts learnt. The skewers and balloons were installed by the instructors after the students finished assembling their robots, and students were not allowed to approach the robots unsupervised after this point – for safety reasons and to prevent further modifications after the start of the challenge.

3. Results and Discussion

It was observed that older students, between 16 and 18 years old, exhibited greater ease in grasping programming logic, whereas younger students (13 to 15 years old) faced more difficulties, especially in the transition from block-based to text-based programming. This difficulty arises because text-based programming requires students to interpret programs abstractly and without visual support, making the process more complex compared to block-based programming, which provides a more intuitive and accessible interface for beginners [Weintrop and Wilensky 2015].

One of the main perceived challenges was the level of familiarity with technology, as students with little or no prior experience with computers initially struggled to assimilate the basic concepts of Python and robotics. Another obstacle was attention and engagement, as some students showed a lack of attention in theoretical classes, resulting in poor performance in practical challenges. Additionally, their level of autonomy posed a challenge. Since the fifth class was a 'test of autonomy', students who actively participated in previous sessions excelled, while those who did not closely follow the content faced difficulties in completing their tasks.

Conversely, the main benefits were the integration of Python and robotics (this integration proved to be a powerful tool for teaching programming logic, making learning more dynamic and visual) and the development of cognitive skills in such a way that the final competition encouraged students to think critically and apply concepts creatively and practically. This experience also suggested that

adjustments to the lesson plan would be necessary to offer more support to students with less experience and to ensure intermediate reviews of concepts related to programming logic and less intuitive parts of Python, such as handling errors.

Additional support materials were developed to assist students who had difficulties with programming and interaction with digital technologies. During the classes, many of them needed continuous assistance, resulting in positive feedback afterwards. To make the content more accessible, the collaborators brought complex programming concepts closer to the participants' daily lives: for instance, using sports races to explain parallel and asynchronous activities, football teams to create a more familiar environment with the material, and activities involving decision-making to intuitively introduce algorithmic logic.

For a final thought, it is essential to consider the students' external lives for the effective execution of the classes, as well as for the re-elaboration of the teaching material, taking into account the socioeconomic context in which the project participants were inserted. Coming mostly from the public education system, their limited access to costly technologies became a burden capable of delaying their learning, but we could see that this was abandoned along the way [Silva and Hasenbalg 2000].

4. Final Considerations

In this article, we presented an experience report on the first implementation of the Python teaching module in the project "Minds of The Future", developed to promote the learning of programming, computational thinking, and robotics among high school students in public schools. The initiative used active methodologies and the STEAM approach to provide an interactive, innovative, and modern-world-aligned teaching environment.

The experience highlighted that tools like the LEGO™ Spike Prime kit are effective in facilitating the learning of programming languages. Throughout the project, participants developed essential skills, such as logical reasoning, problem-solving, and teamwork, moving towards a final competition that reinforced their autonomy and creativity.

However, the project also unveiled important challenges, such as the need for additional support for students with less technological knowledge and assistance in the transition to text-based programming. This change between block-based and text-based programming brought to light the importance of a gradual and contextualised approach, especially for younger students. Support strategies, including the use of everyday examples and analogies, were fundamental to reduce these difficulties and should be improved in future editions.

For the organizers – graduate students and coordinators – the experience provided a better understanding of planning, execution, and adaptation of teaching methodologies in challenging and innovative educational contexts. The feedback from students and monitors reinforced the positive effects of the project, also pointing out the importance of continuous and collaborative evaluation to adjust the planning to the specific needs of each class.

As a next step, "Minds of The Future" seeks to expand its reach, exploring new contexts and integrating emerging technologies. This expansion may facilitate a deeper analysis of the long-term impact on student education, reaffirming the central role of interactive educational practices in teaching computing. Also, the project can bring forward to the world the importance of initiatives that promote inclusion and innovation in high school, showing how projects of this nature can transform the educational reality of public high school students in Brazil and offer a more aligned education with contemporary demands.

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Early career researcher spotlight

Innovation in clinical training: Virtual reality's role in expanding peritoneal dialysis access

Patrick Jolomba

In a period where technological innovation influences the future of clinical training and education, most African countries face unique challenges in delivering essential healthcare services. As the world's second-largest continent grapples with significant healthcare inequalities and disparities, the provision of kidney replacement therapy (KRT) often remains beyond the reach of priority healthcare interventions in many African nations (Thurlow et al., 2021). Recent studies by Okpechi et al. (2021) highlight how resource limitations and infrastructure challenges continue to restrict access to essential renal services across the continent. This disparity is particularly evident in peritoneal dialysis (PD), a crucial home-based treatment for kidney failure that accounts for approximately 11% of global dialysis provision (Li et al., 2017; Jain et al., 2022). Although PD is available in 96% of high-income countries, its accessibility plummets to merely one third in low-income regions (Bello et al., 2022).

Virtual reality (VR) technology seems to be emerging as a promising solution to bridge these healthcare gaps through innovative medical upskilling sessions. By creating immersive, computer-generated three-dimensional (3D) environments, VR allows healthcare professionals or trainee practitioners to engage in realistic training scenarios that simulate clinical procedures (Mistry et al., 2023). This technological advancement offers promise for resource-limited settings, where traditional training opportunities may be scarce.

This case study from Botswana exemplifies the transformative potential of VR in medical education, specifically in PD catheter insertion training. Through the lens of this implementation, the author explores how innovative pedagogical approaches using VR as a supplementary training tool can enhance clinical skills development in resource-constrained environments. The experience not only demonstrates the practical application of VR technology in medical training but also suggests a reasonable pathway towards expanding access to essential kidney replacement therapeutic support across Africa.

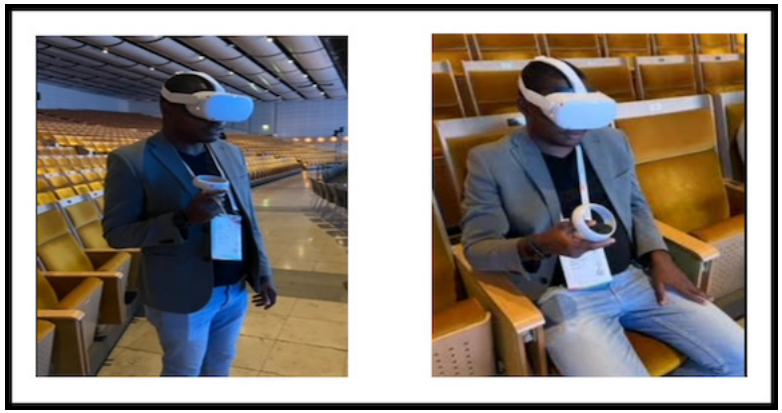
The innovation: virtual reality in PD catheter insertion training

The initiative of VR-based training for PD catheter insertion represents a significant advancement in medical education technology. The system utilises the Oculus Quest 2 headset, combined with specialised software developed for PD catheter insertion training. This innovative approach merges cutting-edge VR technology with carefully designed medical training protocols to create an immersive learning environment for clinicians involved in PD care.

The training system's development benefitted from collaborative input between medical and technological experts, including contributions from the author in their role as Medical Science Liaison. This practical application of VR technology is a key part of the ongoing doctoral research at the University of Northampton, evaluating VR's effectiveness as a supplementary training tool for PD catheter insertion.

Though VR shows promise in medical education, researchers have identified the need for robust validation of such applications (Pedram et al., 2023). The case of Dr Bots (pseudonym) provides valuable insights into this validation process. As an experienced PD practitioner based in Gaborone, Botswana, Dr Bots' engagement with the VR training system (Figure 1) demonstrated how even skilled professionals could benefit from this technology. The experience strengthened his confidence to establish Botswana's first PD catheter insertion programme in Maun, a remote region approximately 1,000 kilometres from the capital, Gaborone, thereby extending vital KRT services to previously underserved communities in northern Botswana. This initiative represents a significant milestone in expanding access to PD treatment beyond urban centres and demonstrates how VR-enhanced training can contribute to healthcare

Figure 1



Healthcare professional engaging with VR training tool for PD catheter insertion

Note: The image shows a healthcare professional using the Oculus Quest 2 VR headset and controllers during PD catheter insertion prototype evaluation for PhD data collection interviews. The system provides immersive, hands-on practice in a controlled virtual environment, demonstrating how VR technology can serve as both a training tool and a catalyst for expanding essential medical services in resource-limited settings. This image was captured during the evaluation of the VR prototype at the European Renal Association (ERA) Conference in Stockholm, Sweden, 2024. Used with permission.

Case study implementation

From virtual training to clinical practice

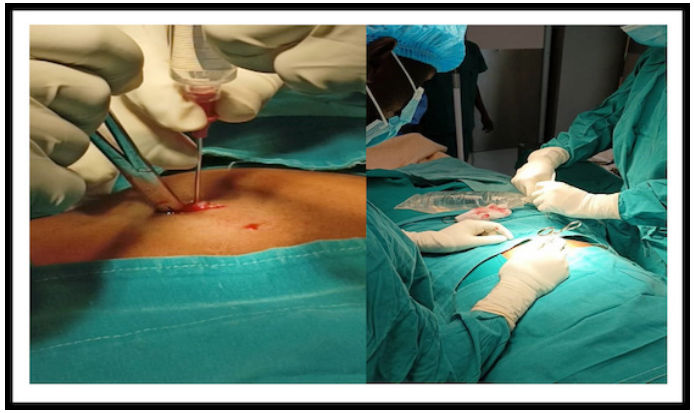
Though Dr Bots was a proficient PD catheter inserter, his solid belief and trust in the VR training tool following the evaluation led to the successful implementation of PD services in Maun, Botswana, providing a compelling illustration of how VR-based training can translate into practical healthcare delivery. This initiative, while independent of the formal research findings, demonstrates the practical application of VR training principles in resource-constrained settings.

In August 2024, following participation in the VR prototype evaluation, Dr Bots initiated Botswana's first remote PD catheter insertion programme. The service, established at Letsholathebe II Memorial Hospital in Maun, represents a significant expansion of renal care services beyond the country's urban centres. This development is particularly noteworthy given Maun's geographical isolation, situated approximately 1,000 kilometres from the nearest existing PD service in Gaborone.

Several challenges marked the implementation process:

- Limited local expertise in PD catheter insertion
- Resource constraints typical of remote healthcare facilities
- Geographic isolation from specialist support services
- Need for sustainable training approaches for local staff

Figure 2



Clinical implementation of PD catheter insertion in Maun

Note: The two images show the renal clinical implementation of percutaneous PD catheter insertion. Left: Creation of peritoneal access via the abdominal rectus

muscle approach prior to catheter placement. Right: The surgical team completing the procedure under sterile conditions at Letsholathebe II Memorial Hospital, Maun, Botswana. These images demonstrate the successful translation of training into clinical practice in a remote healthcare setting. Images captured during the first PD catheter insertion programme in northern Botswana, August 2024. Used with permission.

The immediate outcomes of this implementation are encouraging. The programme successfully initiated PD treatment for patients who would otherwise have required haemodialysis (HD) instead of PD or faced medical transfer to Gaborone for PD catheter insertion. This is in line with findings from Abu-Aisha and Elamin (2010) regarding the impact of local PD services on treatment accessibility in African settings. Also, Okpechi et al. (2020) have documented how establishing regional PD centres can significantly reduce the burden of patient transfers and improve treatment uptake. As demonstrated by Okpechi et al. (2021), such expansion of services beyond urban centres represents a crucial step in addressing healthcare disparities in the region.

This case illustrates how innovation in medical training can contribute to practical improvements in healthcare accessibility, supporting Japiong et al.'s (2023) observations about the importance of building local capacity for kidney replacement therapy.

Impact and implications

Transforming kidney care through VR

The successful implementation of PD services in Maun demonstrates the transformative potential of VR-enhanced medical training in resource-limited settings. This real-world application extends beyond individual skill development to address fundamental healthcare access disparities in African healthcare systems. The immediate benefits manifest in three key areas:

Clinical competence enhancement

This case reinforces findings from the broader PhD research, where survey results demonstrated significant interest in VR training among healthcare professionals. The experience in Maun suggests that this technology offers valuable skill reinforcement even for experienced practitioners like Dr Bots, supporting Okpechi et al.'s (2020) observations about the importance of continuous professional development in expanding PD services.

Healthcare access expansion

This implementation demonstrates how innovative training approaches can catalyse the expansion of essential services beyond urban centres. The successful establishment of PD services in Maun exemplifies how enhanced practitioner confidence through VR training can translate into practical healthcare delivery in remote settings (Pottle, 2019).

Sustainable development

The cost-effectiveness of VR training, combined with its potential for scalable implementation, suggests a viable pathway for expanding PD services across African healthcare systems. As Khudari et al. (2022) suggest, such technological innovations could significantly contribute to wider adoption of PD as a viable KRT option in resource-constrained environments.

Whereas this single case study cannot definitively establish the long-term impact of VR training, it provides compelling evidence of how technological innovation in medical education can bridge the gap between theoretical knowledge and practical healthcare delivery. The successful implementation in Maun serves as a proof of concept for how VR-enhanced training could support the systematic expansion of PD services across African healthcare systems.

The limitations of conventional classroom-based medical education necessitate exploring complementary learning approaches, particularly for complex clinical procedures. This understanding has led to the adoption of innovative teaching methodologies that extend beyond traditional educational settings (Buehl, 2017; Folgado-Fernández et al., 2020).

This case study from Maun demonstrates the transformative potential of innovative pedagogical approaches in clinical upskilling. The successful implementation of PD services in a remote setting suggests that VR-based training could serve as a viable solution for bridging existing gaps in healthcare delivery. As evidenced by Dr Bots' experience, such technological innovations can enhance practitioner confidence and competence, ultimately expanding access to essential medical procedures like PD catheter insertion.

The implications extend beyond individual success stories to suggest a broader pathway for addressing healthcare disparities in resource-limited settings. By combining technological innovation with practical clinical application, we may be able to overcome traditional barriers to healthcare access and professional development. This case serves as a compelling example of how innovative educational approaches can translate into tangible improvements in patient care, particularly in regions where conventional training opportunities are limited.

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He currently serves as Principal Medical Science Liaison at Vantive, a global scientific manufacturer of organ replacement therapies, overseeing medical science across six European countries.

He has also spent the last four years as a member of the Health Research Authority Research Ethics Committee (REC) in the UK. His research focuses on innovative educational approaches to enhance clinical upskilling and improve peritoneal dialysis adoption in resource-limited settings.

Practitioner tips

Revolutionising learning with Trelson Focusroom: A paradigm shift for K-12 education

Sara Bruun

As a Swedish educator with a keen interest in educational technology, I am always exploring tools that can make teaching more effective and learning more meaningful. Over the past decade, digital tools have transformed the classroom, offering new ways to engage students and tailor instruction. Among the many solutions I have come across, Trelson Focusroom stands out for its potential to reshape how we manage digital learning environments in K-12 education (ages 6–18).

What is Trelson Focusroom?

Trelson Focusroom is a software tool designed to support focused, distraction-free digital learning. It enables teachers to manage students' Chromebooks during class, restricting access to only approved resources and applications. This functionality helps educators maintain a structured online environment, ensuring that students stay on task. While this level of control may limit student autonomy to some extent, especially in younger grades, the idea is to gradually increase digital freedom as students mature and develop stronger self-regulation skills.

If a teacher works with Google Classroom, he/she can keep the lesson plan and instructions in Google Classroom and just use Focusroom to lock Google Classroom and its resources down. The students can only work with the learning materials or websites that the teacher has added. When students try to use Snapchat, they will see a red sign, indicating that the page is blocked.

Practical Applications in the Classroom

Focusroom's utility spans a variety of classroom contexts. For instance, during a history project, a teacher can restrict access to specific online archives, digital libraries, or curated video content. This way, students remain immersed in the topic without the distractions of unrelated websites or social media. Attempts to deviate from the assigned resources are simply blocked.

Similarly, in mathematics, teachers can provide access only to relevant platforms—such as digital worksheets, calculators, or instructional videos—ensuring students focus solely on the concept at hand. For group projects, Trelson Focusroom can be used to support collaboration in tools like Google Docs and Slides while still maintaining boundaries that prevent straying off-task.

In essence, the platform allows teachers to create purpose-built digital workspaces tailored to specific lesson goals, helping students remain attentive and engaged throughout

Why Trelson Focusroom Matters

What makes Trelson Focusroom noteworthy is its direct response to a growing challenge in schools: digital distraction. As classrooms increasingly rely on technology, managing student attention becomes more complex. Trelson Focusroom offers a practical solution by helping educators:

- Maximise Learning Time: By limiting distractions, students can dedicate more time to core learning activities.
- Improve Focus: Reducing cognitive interruptions supports the development of attention skills essential both in school and beyond.
- Support Digital Citizenship: Structured internet use provides opportunities to teach responsible digital behaviour in real time.
- Promote Equity: Not all students are equally adept at managing digital distractions. A tool like Focusroom helps level the playing field.

Grounded in Cognitive Science

From a cognitive science perspective, the benefits of a controlled digital environment are clear. The brain's executive functions—central to managing attention and resisting distractions—are still developing well into adolescence. Trelson Focusroom creates conditions that support these executive functions, helping students focus their mental energy where it is needed most. By reducing extraneous cognitive load, the tool enhances students' capacity to process, retain, and apply information.

Final Thoughts

Trelson Focusroom is not a one-size-fits-all solution, nor does it claim to be. But in classrooms where digital distraction poses a real challenge, it offers a thoughtful and effective way to maintain focus and structure. As educators, we must balance control with student independence, and tools like this can help strike that balance while also fostering good digital habits.

In an era where digital tools are both essential and potentially disruptive, Trelson Focusroom provides a welcome layer of intentionality. It is a solution worth considering for schools looking to align pedagogy, technology, and cognitive science in meaningful ways.

Would you like to know more about Trelson Focusroom?
This is Trelson | Bringing Control & Focus to the Classroom

Follow on LinkedIn: Trelson

Author

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Sara is an experienced educator, lecturer, and author from Sweden. Sara has a strong focus on digital learning and educational innovation. She collaborates with Trelson to explore and develop tools that support focused, effective teaching in modern classrooms.

Time to embrace change: Is technology the future of outdoor education?

Sarah Earl and Matthew Berkshire, Wrenn School

Image credit: Bureau of Land Management, CC BY

Introduction

Physical activity (PA) is an essential component of health and wellbeing and is vital to be maintained throughout life (World Health Organisation, 2020). Within the UK, physical education (PE) has long been seen as the optimum vehicle for the promotion of PA due to its key developmental role in movement competence and PA behaviours (Hill et al., 2015; Wintle, 2022). However, it has been well documented and researched that PA levels continue to decline from Key Stage 3 (aged 11–14) to Key Stage 4 (aged 14–16) (Sport England, 2023). This, therefore, sparks debate within the PE teaching community regarding the possible causation of such decline and brings close attention and analysis to current beliefs, structures, and outlooks on the purpose and value of the subject. As current PE teachers, it is our duty to ask ourselves: if the subject is designed to promote healthy and active lifestyles through the potentially archaic medium of 'PE-as-Sport', then why are PA levels dwindling for our students?

Although research has been undertaken within the PE sector to assess its meaning and value in attempting to produce physically active and healthy young people (Berkshire et al., 2024), there is an existential need for PE teachers to be more self-critical and to trial new methods of engaging young people in PA and to produce meaningful PE and PA experiences that last a lifetime (Gleddie & Morgan, 2020).

A plausible solution for this could be the countrywide introduction of Outdoor Education Programmes (OEPs), whereby students get the opportunity to be outside, to learn about nature and the natural world, and to develop campcraft and orienteering skills that mainstream subjects simply do not provide access to. The pedagogy of outdoor education has been heavily steeped within Nordic PE curricula for decades (Annerstedt, 2008), with research suggesting major improvements in students' social, mental, and physical health and wellbeing in comparison to classroom-based learning (Bolling et al., 2019). Such research also suggests improved student outcomes in cognition and reading ability, thus having improvements in academic performance but also crucial life skills (Remmen & Iversen, 2023).

Allowing an educational curriculum more time to be dedicated to the outdoors has shown benefits for student learning (James & Williams, 2017; Kuo et al., 2019; Nicol, 2013; Restall & Conrad, 2015). Students who struggle in a classroom-based setting, where their only access is through teacher-led instruction and textbook content that involves a lot of sitting, reading, and writing, switch off more quickly because they cannot relate to the content provided.

Whereby an outdoor classroom provides the opportunity to demonstrate their abilities and play to their strengths (James & Williams, 2017). Nicol (2013) found that taking students outdoors not only improves mood and emotional well-being but also allows them to experience their connection to natural places instead of seeing themselves as separate from nature (Nicol, 2013).

Paulsen and Andrews (2019) suggest that including technology may strengthen young people's interest in outdoor education and thus PA levels across their lifetime. Examples include activity trackers, GPS, videography, photography, fitness apps such as Strava and AllTrails, and easily accessible navigation tools via OS Online Maps. Harnessing this type of technology, we could link outdoor education learning to the wider school and academic curriculum, such as information technology, geography, mathematics, and geology. However, we must tread carefully and exercise caution when implementing technology into an already technology-saturated world our young people live in. It has been found within research that teachers in Sweden who implement such technology within OEPs express concerns that the natural environment should be experienced within reality, with the technological tools providing a distraction rather than an enhancement (Karlsson et al., 2023).

Therefore, at Wrenn, we aimed to assess through application within our own environment in Wellingborough. We wanted to utilise technology within our established OEP using accessible technology such as school cameras, school social media accounts, blogs, DofE trackers, and filming software using a GoPro but to also understand the potential drawbacks this intervention may have on student outcomes. I aim to draw a conclusion as to whether technology within our OEPs can benefit students and, thus, their long-term health and wellbeing, or whether this may be another educational 'trend' or 'fad' that could provide more conflicts and negative influences on our students' education.

Benefits of Tech in Outdoor Education

At Wrenn School, we have found that the increased presence of digital technology with our outdoor programme has provided a new range of challenges and opportunities for our staff and students.

By exposing our students at Wrenn School to new technology, such as capturing images through media technology (e.g., phones, cameras, and GoPro) and understanding the importance of trackers, the use of smartwatches in a constructive manner has promoted social interaction and communication skills. This has given our students a sense of purpose, leading to positive conversations and actions with the community, for example, helping with tree planating and designing an allotment. These connections can develop their own sense of responsibility to protect the environment and develop social skills which are imperative to one's academic success.

The question of allowing or providing tracking devices on educational visits such as Duke of Edinburgh has raised a number of concerns around privacy, misuse, and trust between our teachers and students at Wrenn School. However, when placed in remote locations on educational trips such as Derbyshire or the Lake District, which we do for DofE and where there is minimal supervision, we at Wrenn School concluded that the use of a tracking device as a tool for minimising the risks to individuals and maximising group safety far outweighed the negatives associated with the use of technology. GPS trackers increased the safety of our young people by providing accurate location information when navigating independently. It also provided reliable communication between staff and, if required, the emergency services.

With GPS tracking, organisers and team leaders can:

- Track the location of each participant or group, ensuring they remain on course and stay within safe boundaries.
- Detect if someone goes off route and intervene early before the situation escalates.
- Monitor pace and progress, allowing leaders to assess whether groups

are on schedule and moving safely through the terrain.

Introducing a number of different forms of technology within outdoor education provided opportunities that engaged our young students at Wrenn School. For many of our pupils that took part in our outdoor education programme, they were allowed to use their photos and other cameras to capture their experiences. The photographs were used to bring back memories from the outdoor educational activities that they took part in, as well as use them in geography and biology lessons to relate academic content to the real world. Using photography enables pupils to capture specific content and key concepts through a more interactive learning process.

Through our outdoor education programme students watch experts in their field demonstrating rope work for climbing, compass work for DofE, and weather understanding for DofE and sailing, which has helped them better understand complex concepts and see real-world applications of course material. At Wrenn School, we have increased the use of technology through an increased use of YouTube videos to enhance students' knowledge of key concepts required for the outdoors using influential practitioners. A study by Turan et al. (2021) found that using YouTube in the classroom increased student engagement and improved their perception of the quality of instruction.

Blogging is another example of how pupils at Wrenn School have used technology to their advantage to express their creativity and innovation through the outdoors. This has addressed a number of different ways in which learning can be applied and for our students to demonstrate learning. On residential trips such as Longtown and bushcraft, they have kept a blog/diary of their experiences and the skills which they have learnt over the course of the trip. This has demonstrated digital literacy skills, enhanced their communication skills with their own emotions, and encouraged peer interaction, building a sense of community and collaborative learning within the year group.

Negatives of Tech in Outdoor Education

Although there are plentiful benefits of implementing various technologies within OEPs, it is critical to assess the potential negative impacts that such technologies may have on students physically and socially, as well as their academic outcomes and wellbeing.

Within research, some professionals raise concerns regarding technology not adding anything significant to students' learning. Stating that that natural environment should be experienced in reality, with the senses being stimulated by the environment and not distracted by digital technologies (Karlsson et al., 2023), also suggests that students may struggle to fully adapt to the natural environment if the distraction of technology is still present, thus limiting their learning potential (Karlsson et al., 2023). It is important to exercise caution, as Karlsson et al. (2023) state that the teachers were able to express their concerns but were unable to provide and explain their 'why', thus limiting the validity of such arguments. Therefore, these conclusions must be treated with caution, with additional study required to extricate such reasoning.

Systematic analysis has further suggested additional pitfalls of implementing technology within OEPs. Research suggests that the potential positive impact of technology may be limited based upon the teachers' and students' ability to use such technologies due to the often complex and rapidly improving/changing technology being used (Kraalingen, 2021). Both teachers and students must have the adequate ability to use such technologies so that they may responsibly, safely, and creatively use them to not only serve the aims of the curricula but also to maximise learning and development opportunities (Hills, 2019; Thomas & Munge, 2017). If teacher education is not provided, the students will not fully utilise the technologies' potential. Therefore, such concerns could be quelled by sufficient teaching education and continued professional development (CPD) to ensure that the skills of all teachers are continuously updated and renewed to meet the demands of the learning environment, overall improving OEP

outcomes (Kraalingen, 2021).

Becoming over-reliant on technology within the outdoors may lead to technology replacing the knowledge and skills to be able to navigate, thrive, and enjoy the natural world, therefore resulting in another technology-heavy and reliant education field (Hill & Thomas, 2020). This overall shows the importance of criticality and self-reflection within the outdoor and mainstream education world to ensure alterations and adaptations within the implementation of technology are made preemptively, to overall reduce the impact on our students' physical, social, and mental health and wellbeing.

Conclusion

To conclude, outdoor learning is evolving in schools, especially with the new OFSTED report which identifies that the curriculum "should extend beyond the academic, technical or vocational. Schools are crucial in preparing pupils for their adult lives, teaching them to understand how to engage with society and providing them with plentiful opportunities to do so" (OFSTED, 2024) by providing holistic and engaging educational experiences for students. By providing students with an outdoor education programme, we prioritise health and well-being, promote equity and inclusion, and leverage technology. We believe that outdoor learning has the potential to transform education and empower the next generation of leaders, innovators, and environmental ambassadors.

However, for this momentum to continue to grow, we need to engage the digital generation outdoors and in our school environment. We need to address how this generation connects to technology. We need to take a serious look at what engages them on their screens, what games are popular, and what apps they download, utilising that knowledge to create an outdoor experience that draws on the mechanics of those things. Technology and outdoor education offer a fantastic opportunity to improve engagement in PE lessons and ultimately lifetime PA.

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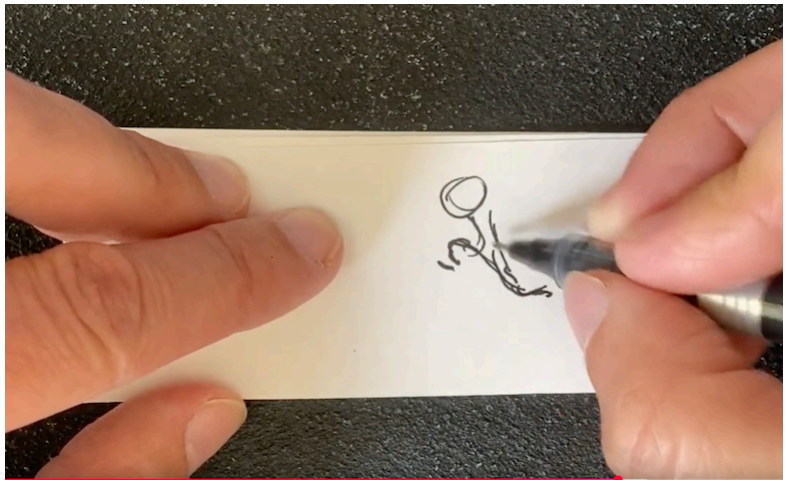
I can animate: Creating flick books with primary ITE students

Karen Woolley



This article will explain how technology has been used in primary ITS, engaging students with app technology to develop their confidence with digital creativity in Art and Design. Animation-based learning involves using animation to create videos or photographs as a visual aid, facilitating learning and improving both performance and creativity. This approach is very effective across all ages, from primary school to adult education.

It is important to ensure that primary ITE students can use a variety of technology and be confident to use these platforms both in their education and with schoolchildren. Technology usage can boost engagement, give personalised learning experiences, and prepare ITE students and children with essential skills for the future.

The original focus for the session was to create a paper flick book and develop this into an animation. An animation flipbook uses a series of static images, which progress gradually in position from one page to the next. These images then create the impression of movement when you flick through the pages in sequence. Using I Can Animate Lite (Animate It Lite by Kudlian Software), the students were able to make a Giphy that linked to the National Curriculum subject areas for older primary-aged children. I can Animate uses stop motion to capture visual data frame by frame.

Flick books can vary in complexity; they can be simple from a stick man to more. complex having various moving parts in one image.

To support their learning, the session comprised the history of animation and where this had been developed from, the role of visual technology in the Art and Design curriculum, and developing their paper flip book into an animation flick book. The students were also supported in learning how to use the app, understanding the process of taking pictures, and determining the numbers of frames that are required to produce a 3-5 second Giphy. Creating Giphys helps with digital storytelling, expressing ideas visually, and boosting communication skills. This activity can make learning engaging and fun and develop opportunities for creativity and illustration concepts.

Once the students had created their paper flick book, they used I Can Animate Lite to record their digital versions. Example of the Giphy's can be seen through a Padlet platform:

Animation year2

My Animation

These are two Padlets which hold a range of animations. I have selected these to give a range of ways in which the students interpreted the task

1. https://uon1.padlet.org/karen_woolley1/animation-year2-pb503ck3b8qg0yi1/wish/do3MQJovqmb1Z15w (time)
2. https://uon1.padlet.org/karen_woolley1/animation-year2-pb503ck3b8qg0yi1/wish/BJkrQA8BGPlOaEge (Goofy music)
3. https://uon1.padlet.org/karen_woolley1/animation-year2-

pb503ck3b8qg0yi1/wish/E1P8aXK26lXwWwA9 (Lego)

4. https://uon1.padlet.org/karen_woolley1/animation-year2-pb503ck3b8qg0yi1/wish/Xb8YaLodYMbBWyn1 (elephant material)
5. https://uon1.padlet.org/karen_woolley1/animation-year2-pb503ck3b8qg0yi1/wish/MbejW1k36BYxQNkG (worries)
6. https://padlet.com/karen_woolley54321/my-animation-gu5kw2svfj1s/wish/lkDVaK8BG7gdQPp9 (Michael Jackson)
7. https://padlet.com/karen_woolley54321/my-animation-gu5kw2svfj1s/wish/XGyBQb64X9kgQL6K (running cat)
8. https://padlet.com/karen_woolley54321/my-animation-gu5kw2svfj1s/wish/94PGWnX5JM04QLRV (skeleton)

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Karen Woolley is a Senior Lecturer in Physical Education and Art and Design. Her research interests include inclusivity, outdoor learning, and physical education.

Books and articles of interest

Technology trends

This round-up of recent publications continues our themes of changing times, learning innovations, and international perspectives.

1. Trends and topics in educational technology

This article continues an annual series of analysing trends in educational technology research and practice using large data sources and what we describe as a public Internet data mining approach (Allman et al., 2023, 2024; Kimmons, 2020; Kimmons & Rosenberg, 2022; Kimmons et al., 2021). Previous analyses have utilised a variety of sources, including Scopus, institutional websites, Facebook, Twitter, and open educational resource repositories, to show both scholarly and more practice-oriented trends in the field. Continuing this tradition, this year we chose to dig more deeply into two data sources: Scopus and YouTube. By comparing and contrasting our analyses of these two sources, we continue our aim of providing readers with a rich view of what has been happening in the field and what to expect moving forward.

Kimmons, R., McDonald, E. & Rosenberg, J.M. Trends and Topics in Educational Technology, 2025 Edition. TechTrends (2025). https://doi.org/10.1007/s11528-025-01085-x

2. Policies for the digital transformation of school education

The Policy Survey on School Education in the Digital Age collected comparative information on the digital education policies of 37 jurisdictions (OECD member countries, sub-national entities, and non-member economies), covering a range of domains: central strategies and policy co-ordination for digital education; governance and regulation; adaptation of pedagogical approaches, curricula and assessments to digital education; funding and procurement of digital resources; digital infrastructure and innovation; building educators and other stakeholders' digital capacity; aligning human resource policies with digital education; and frameworks to monitor and evaluate digital education and its impact on students. This working paper presents the complete results of the Policy Survey and an overview of key findings related to each of its domains. The results are intended to strengthen the evidence base on digital education policies, facilitate international peer learning, and support public authorities in developing policies and strategies for the successful digital transformation of school education.

Evidence from the Policy Survey on School Education in the Digital Age Policies for the digital transformation of school education | OECD (2025). https://www.oecd.org/en/publications/policies-for-the-digital-transformation-of-school-education_464dab4d-en.html

3. Innovating Pedagogy 2024

This website is home to the annual reports exploring new forms of teaching, learning, and assessment for an interactive world to guide teachers, policymakers, and others in productive innovation. The reports are collaboratively authored by researchers in the Institute of Educational Technology at The Open University, UK, together with different external partners every year.

Kukulska-Hulme, A., Wise, A.F., Coughlan, T., Biswas, G., Bossu, C., Burriss, S.K., Charitonos, K., Crossley, S.A., Enyedy, N., Ferguson, R., FitzGerald, E., Gaved, M., Herodotou, C., Hundley, M., McTamaney, C., Molvig, O., Pendergrass, E., Ramey, L., Sargent, J., Scanlon, E., Smith, B.E., & Whitelock, D. (2024). Innovating Pedagogy 2024: Open University Innovation Report 12. Milton Keynes: The Open University. https://www.open.ac.uk/blogs/innovating/

4. 2024 EDUCAUSE Horizon Report

This report profiles the trends, key technologies, and practices shaping the future of teaching and learning and envisions a number of scenarios for that future. It is based on the perspectives and expertise of a global panel of leaders from across the higher education landscape.

For this year's teaching and learning Horizon Report, expert panelists' discussions highlighted and wrestled with these present and looming challenges for higher education. This report summarises the results of those discussions and serves as one vantage point on where our future may be headed.

2024 EDUCAUSE Horizon Report | Teaching and Learning Edition (2024). https://library.educause.edu/resources/2024/5/2024-educause-horizon-report-teaching-and-learning-edition

5. Video collaboration software for teacher reflection

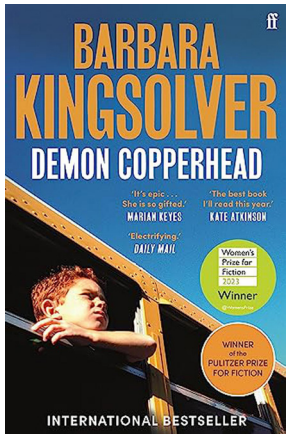
This article analyses interactions between initial teacher education students and teacher educators in a UK university when reflecting upon teaching behaviours. It trialled the use of video collaboration software in enabling reflective practice to support experienced teachers' mentoring skills and novice teachers' reflective skills. The software provided an opportunity to record behaviour and interactions in school-based and online teaching sessions. Employing an ethnographic methodology, this study analysed professional dialogues between mentors and initial teacher education students to explore the role of video collaboration software for mentoring and reflection. This study found that video collaboration software builds metacognition around teaching expertise in a peer-to-peer scenario. Through this process, mentors gained reflective skills and benefitted from the dialogue around pedagogical decisions as much as the novices. The study concludes that a process of discourse and dialogue where the agency is held with the teacher rather than the mentor improves novice teachers' reflective skills associated with dimensions of expertise.

Whewell, E., Caldwell, H., Tiplady, H., & Garrett, B. (2025). The power of pause: experienced and novice teachers developing dimensions of expertise through video collaboration software. Technology, Pedagogy and Education, 1–18. https://doi.org/10.1080/1475939X.2025.2454452

Recommended reads by Alison Hramiak

Most of you reading this journal are very busy people and so might not have time to read fiction and will definitely not want to spend time reading 'average' fiction. But, if, like me, you read fiction as an escape from full-time work (when I was working full time) and love a good read, read on. I tend to give a book 50 pages of my time, and if by page 50 I don't care what happens on page 51, then I move on to a different book. The books I'm recommending here do NOT fall into that category.

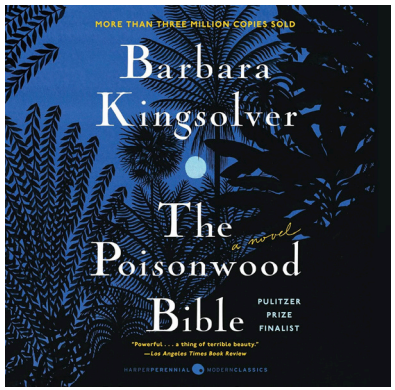
Barbara Kingsolver is an American writer that was new to me this year. She grew up in rural Kentucky and is widely travelled but now lives in southwestern Virginia, where she currently resides. She writes vividly about what she knows.



Her books are gripping, fierce page-turners that pull you in from the start. The first one I read was "Demon Copperhead" (Faber and Faber, 2022), and I bought it for my Kindle almost as an afterthought as I was trawling (virtual) shelves for something to read. I couldn't put it down. It's a heart-rending story of one boy's young but unlucky life in the Appalachian Mountains of Virginia, where poverty is king. The intense reality in the pages, particularly the reality around corporate America and education, is bleak but eye-opening, and the entanglement of family and friends within the story moves at a pace that keeps you wondering what will happen next. I won't say any more, as I don't want to spoil it for anyone. But do tell me if you read it and like it!

After I'd read "Demon Copperhead", I called my best pal Karen to see if she'd read it – we recommend books to each other and have done so for about 35 years now. Not only had she read it and thought the same as me, but she also suggested my next recommendation, which I'm about 75% of the way through

(Thank you, Kindle, for calculating that for me!). Same author, but an earlier novel, “The Poisonwood Bible” (Faber and Faber, 1998), is a completely different tale from “Demon Copperhead” but equally riveting and another page-turner for me. This story is set in what was the Belgian Congo across a number of years from 1959, when they arrived there, to the 1960s (which is as far as I’ve got at the moment) and tells the often painful yet moving tale of one family’s struggle to live in what was a very different world. The story is told from the point of view of the wife and four daughters of the evangelical Nathan Price, and it switches between their sides of the same tale to give the reader different perspectives of their lives there.



I love to read, but I love to read fiction that is engaging. Not all books (like not all frogs turn into handsome princes…) do this for me, but the two recommended above do. Try them. Use the 50-page rule. I’d love to hear from you and swap more suggestions.

Alison Hramiak

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