UNIVERSITY OF LIVERPOOL

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STAFF AND EDUCATIONAL DEVELOPMENT ASSOCIATION

Educators' guide to multimodal learning and Generative AI

The Original Redbrick

An Educators' Guide to Multimodal Learning and Generative AI

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Acknowledgements

We would like to offer our thanks to the following partners, who were instrumental in helping the project team put this Guide together. First, to the Staff and Educational Development Association (SEDA), both for funding to get the project off the ground, and for the development of connections and for opportunities to publish interim updates on the project as it progressed. Relatedly, we would like to offer SEDA Mentor, Professor Jennie Winter, for offering her continuing support and advice on the project, and for organising introductions with potential collaborators and for spotting dissemination opportunities.

We would also like to thank all our student research assistants, from both our partner institution, Xi'an Jiaotong Liverpool University (XJTLU) and the University of Liverpool, who were all pivotal to the creation of this guide. Our students were key in helping with the initial scoping literature review (and its associated write-up), as well as organising and running focus groups and generally providing excellent student perspectives at our project team meetings. We would also like to thank Tianyu Zhang of XJTLU for their help with supporting our student research assistants.

Thanks also to those who authored and submitted their Case Studies for incorporation into this guide as examples of GenAI-enabled multimodal practice. These have helped develop both the advice and ideas we are presenting in this guide, and provide useful examples of it in action for readers to contextualise.

We would like to thank everyone who participated in one of our focus groups and survey who provided us with a rich qualitative dataset on which to base our recommendations, and those who participated in our Beyond Text: Generative AI in Multimodal Learning, Teaching and Assessment Symposium in January 2025.

1. Introduction

This guide presents strategies and techniques for the incorporation of Generative AI (GenAI) in multimodal forms of teaching, learning, and assessment. It focuses on the intersection of multimodal learning and Generative AI (GenAI) and is written for both educators and educational developers, who play a pivotal role in modelling pedagogical innovation and guiding colleagues through evolving landscapes of teaching and learning.

The guide is a product of a 2024/25 SEDA Small Grants project, conducted between academics and researchers spread across multiple higher education institutions across Britain and beyond. The project drew on our own experiences with Generative AI in multimodal contexts, as well as data from an extensive literature review, a case-study collection exercise, a survey, and a suite of focus groups with educational developers, educators, and students conducted during a collaborative research project in 2024–25.

At this initial stage, it is important to outline our position on the presence and use of GenAI in higher education. Whilst 'Artificial Intelligence' has existed in different forms for decades, the appearance and accessibility of GenAI since the release of the first iteration of OpenAI's ChatGPT in 2022 have enhanced its usability in learning and teaching contexts, and has solidified GenAI as an emerging frontier in the application of AI in education (Feng et al., 2025).

However, in this Guide, we opt for a pragmatic approach to the technology. We are not uncritical 'techno-fixers' or over-enthusiastic adopters of GenAI, and nor do we view Generative AI technology as the ultimate destroyer of higher education. Rather, and as Vallor (2024) eloquently puts it, we contend that AI is a 'mirror machine' that reflects ourselves back at us, and, just like Vallor, we wish to provide educators, educational developers and students with an approach that gives them:

> "a middle way between passive resignation to AI technology as a replacement for human agency and rejecting AI as an existential threat that must be opposed and defeated" (Vallor, 2024).

Part of the challenge of examining GenAI in educational contexts is the tension between its speed of development and evolution, and its already-entrenched position in pedagogy, as well as its endorsement by national and educational institutions. On the one hand, even as we write this guide, GenAI is advancing rapidly – indeed, in the final stages of editing, OpenAI released GPT-5, the very latest model embedded in the company's flagship ChatGPT platform, and which supposedly represents a significant step forward. On the other hand, Generative AI is already 'here to stay'; students, staff, professionals, lay-users, and the public all use Generative AI in their daily lives – sometimes without realising it. Simply ignoring the reality of GenAI – or, even worse, actively rejecting that reality – and its potential impact on universities and higher education, will not help

students understand the machines better, nor will it help them to make better choices about what technologies to use, and when.

However, we should state that we do not believe that talking *about* Generative AI is the same as uncritically *endorsing* the use of Generative AI. Again, we do not necessarily endorse Generative AI in educational contexts, and we do not argue that it should be used at every opportunity. Rather, we contend that wilfully ignoring it and/or actively rejecting it does students a disservice, and will ultimately make them more likely to misunderstand the technology, either accidentally or deliberately, in future contexts. As a result, educators can, and should, support students in critical about their GenAI use.

Digital technologies have both intensified and shone a light on the inherently multimodal nature of modern society — where learning and communication extend beyond text and speech to include the visual, aural, or tactile (Kress, 2009; Cope & Kalantzis, 2024). As Generative AI technology becomes increasingly embedded in everyday life, it is vital for higher education to design multimodal learning, teaching, and assessment approaches that foster students' ability to think both critically and effectively in a digitally mediated context (Lim, 2020; Lacković, 2020; Li et al., 2024; Zawacki-Richter et al., 2019). Hitherto, the discourse on GenAI has focused on concerns around maintaining academic integrity, critiquing AI, or unquestioningly celebrating or actively promoting its integration in education spaces. Indeed, there have been calls to fundamentally and entirely re-align our assessment practices for the era of GenAI (Furze, 2024). In this guide, we turn our attention to understanding GenAI's multimodal pedagogic potential, whilst remaining critical and cautious in our appraisal and suggestions for GenAI-enabled multimodal learning designs.

In a multimodal learning environment, educators aim to move beyond text-dominant formats, and instead incorporate and combine a variety of communication forms to better support student learning. Digital multimodal learning involves designing learning activities that draw on multimodal artefacts and utilise a combination of 'semiotic technologies' (see Lim & Tan-Chia, 2023, Lacković, 2020, and Lacković & Olteanu, 2023). These technologies help to combine image, sound, touch and other modes into multimodal artefacts that are better than single-mode artefacts for meaning-making (Kress, 2009; van Leeuwen, 2017), commonly a combination of verbal and some other mode of expression.

Examples of digital multimodal artefacts might include infographics, digital posters, videos, presentations, virtual simulations or any visual media applied in an educational dialogic context. A key aspect of multimodality is the way that different modes are assembled (e.g. text and image in an infographic or in an inquiry graphic (Lacković, 2020)). This assembly (by machines, producers, students or educators) provides extra

meaning beyond the sum of its parts, and informs interactions and discussions in the higher education context.

1.1 What do we mean by Generative AI, and how it is developing?

Before proceeding, it is perhaps useful to explain what we mean by Generative AI. In fact, this is a useful question to discuss with colleagues and students before using it any way, as there are many common misconceptions. For example, there is a common belief that GenAI technology can function efficiently as a 'search engine', while, in fact, it is notoriously unreliable as a means of searching for information, given that it prioritises relevance based on the prompt over accuracy or impartiality of information retrieved (Hemsworth et al., 2024).

GenAI employs deep machine learning techniques to process information contained within huge datasets to generate outputs based on human prompts inputted by the user. Most GenAI we refer to are Large Language Models (LLMs) trained on vast amounts of text data to decode, generate, and manipulate human language. However, GenAI is increasingly capable of producing multimodal content, including (but not limited to) text, speech, audio, image, video and even three-dimensional models (Fui-Hoon Nah et al., 2023). GenAI technology enables users to create, manipulate, and adapt content and integrate different semiotic forms to produce multimodal artefacts, and thus can be embedded into pedagogical practices that already emphasise diverse modes of engagement.

GenAI's rapid development has been accompanied by suggestions on how to define and use this technology. For example, Mollick suggests we should consider it to be a 'co-intelligence' (Mollick, 2024), while Cope & Kalantzis (2024) suggest that we should understand it as a unique 'co-creator' that works alongside users in an assistive but unique role. They call this *cyber-social learning* – a collaborative partnership between human and machine intelligences, each with distinct, but complementary, strengths for completing an activity (2024; see also Galla et al., 2025). They suggest that this collaboration 'enables new processes for knowledge creation', where educators and students learn by evaluating, refining and re-imagining AI outputs, assembling them into multimodal artefacts. In other cyber-social contexts (Galla et al., 2025), we have also recently seen several LLMs claiming the ability to engage in 'Socratic dialogue' with users (Leoste et al., 2025).

However, while human and artificial intelligences can work together and have a unique role to play within a cyber-social partnership, the term 'intelligence', taken as part of 'Generative AI' can, and perhaps should, be challenged in favour of more specific computer-science-driven terminologies, such as LLMs (large language models). 'Intelligence' implies 'consciousness' that AI simply does not have, despite its (and their

parent companies') attempts to lead users into believing it does. Debating whether GenAI can legitimately be described as 'intelligent' is beyond the scope of this guide, but it is an important consideration when thinking about LLMs and their position in the learning process – particularly in cyber-social contexts. Indeed, it is GenAI's very lack of 'intelligence', either emotional or intellectual, that highlights how it operates in the cyber-social relationship with a human, whereby both parties occupy unique but symbiotic positions and consequently complement each other. While GenAI can generate and transform multimodal content at scale and with (sometimes extreme) efficiency, it lacks understanding, spontaneity, interpretation, emotional nuance, or critical and ethical judgement – the very qualities that characterise human intelligence. In other words, GenAI can offer some raw material – drafts, artefacts and prototypes - but educators and learners are needed to bring vision, purpose, nuanced critique and meaning-making.

The guide's aim is to encapsulate strategies for the effective incorporation of GenAI in multimodal teaching, learning, and assessment and to position Generative AI most effectively within the cyber-social relationship with human users to maximise the potential of the technology to produce, interpret and engage with multimodal artefacts and thereby improve meaning-making. We therefore interpret 'multimodal GenAI' in all these different ways:

- Multimodal GenAI can refer to platform capabilities that utilise modalities beyond text-to-text (e.g. text-to-image, text-to-speech, text-to-video, speech-to-text etc.), or;
- We can refer to a multimodal learning or teaching activity itself (e.g. a lecture or a virtual simulation) that utilises GenAI within its process (whether GenAI itself is text-to-text or multimodal), or;
- Using GenAI to convert one artefact/modality (e.g. slides or images) into another modality (e.g. text or sound).

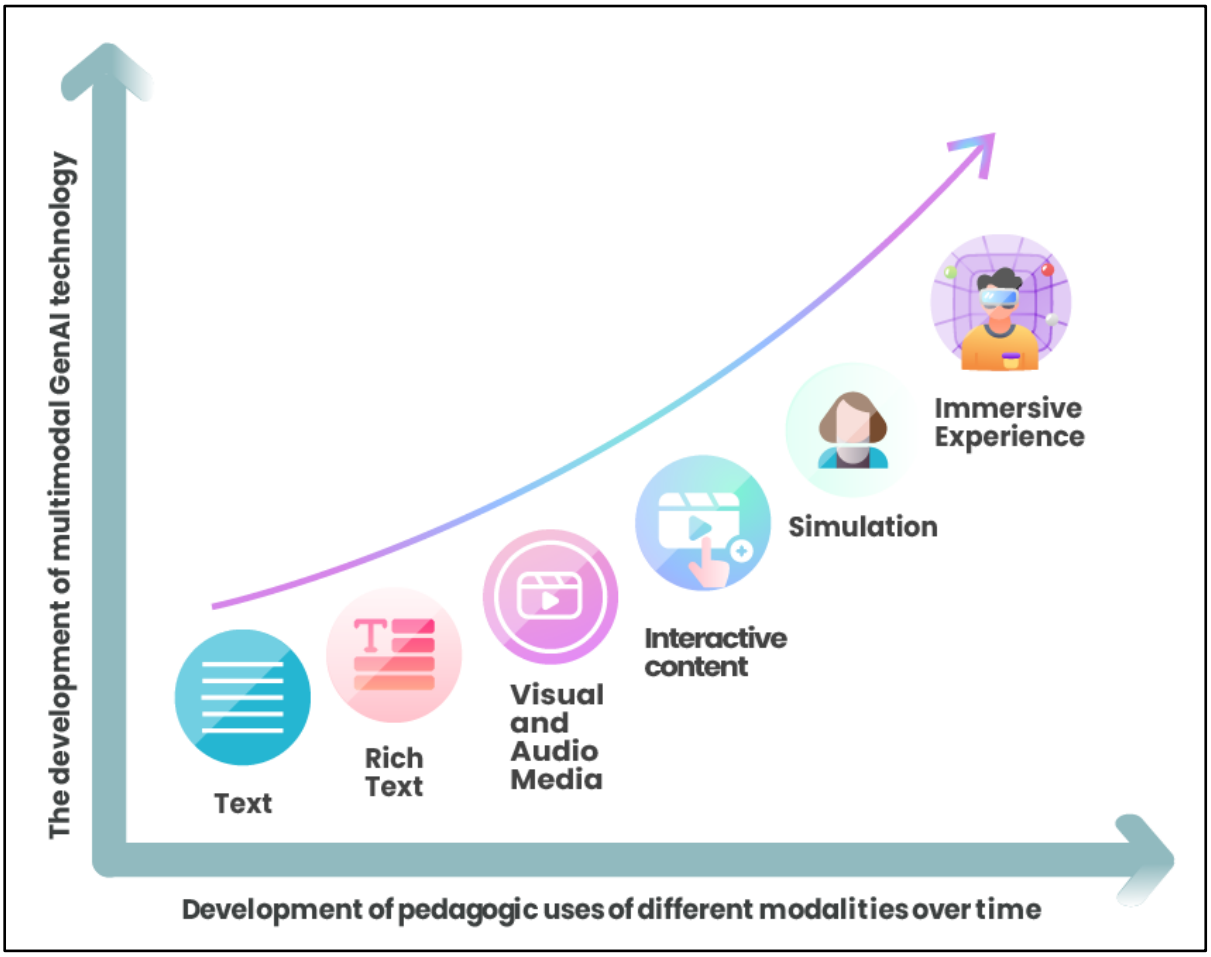


Figure 1. The multimodality continuum of learning modalities and experiences supported by GenAI (from text, visual text, audio/video, interactive audio/video, avatars and immersive simulations).

This guide offers broad principles and approaches rather than platform-specific suggestions to ensure relevance across disciplines and learning contexts. This was largely necessary; even during the lifespan of this eighteen-month project (2024/25), GenAI's multimodal capabilities have evolved so rapidly that listing very specific concrete examples, using specific apps or platforms, risks the information becoming quickly outdated. Indeed, Figure 1 illustrates GenAI capabilities' development in terms of educators' uses of multimodal resources from text to immersive simulation. We might contend that GenAI currently offers interactive content to learners and educators, via real-time interactivity with avatars or personas. However, just a year ago, this would perhaps have been closer to static textual, or perhaps audio/visual, content.

1.2 What do we mean by multimodality, key terms and links to GenAI?

As this guide is about multimodal learning, it is worth briefly outlining what we mean by 'multimodality' in the context of this guide and, particularly, in relation to its connection

with Generative AI (GenAI) technology. We also offer a few key terms, building on the MODE project (see below), that one might expect to see when reading about multimodal pedagogies and some useful definitions for them.

Gunther Kress's seminal 2009 book "Multimodality: A Social Semiotic Approach to Contemporary Communication" provides the basis for this guide's understanding of multimodality. Kress contends that forms of communication are, inherently social, driven by the context in which they appear to help observers to make meaning, and that artefacts that combine multiple semiotic forms – text, image, sound, touch, smell, etc. – create greater degrees of expression and meaning in both communicator and communicatee than single-mode artefacts (2009).

This is relevant in the context of the appearance and proliferation of GenAI, given the different forms of information that it can create. GenAI has the potential to fundamentally transform the way we both create content such as text, image, video and sound, but also the way we combine these forms together into new artefacts that work to develop a greater understanding of a given topic, or deeper meaning concerning it, than either single-mode artefacts or entirely human-created ones. This is not without its dangers, as the content created can serve all sorts of purposes, even identify theft, when someone's facial features are used to create fake videos or images. GenAI might be able to create and even combine semiotic forms, but the decisions about what to combine, where to place it, size, shape, volume, etc., are all *human* choices, which helps to exemplify the symbiotic relationship between the two intelligences – human and artificial, or coined as 'cyber-social' by Cope and Kalantzis (2024).

To define multimodality further, there are specific terms associated with this theory worth outlining here, particularly in terms of their relationship to GenAI. The following explanations either use or adapt the exact wording of the 'Glossary of Multimodal Terms'. You can use this resource for further information on multimodality terminology, information and authors' details, but here are some of the key terms we make use of throughout this guide:

Mode (multimodality) of GenAI: Mode classifies a 'channel' of representation or communication for which previously no overarching name had been proposed (Kress & van Leeuwen, 2020). Examples of modes include writing and image on the page, extending to moving image and sound on the screen, speech, gesture, gaze and posture in embodied interaction. GenAI inputs or outputs can be multimodal as they consist of more than one mode, but it can be said that all communication/expression is multimodal. Multimodality can also be conceived in terms of the difference of modes between inputs and outputs (e.g. text-to-image, image-to-text).

Multimodal Affordance of GenAI: Adapted from Gibson's (2014) theory of affordances by Kress (2009), the term 'modal affordance' has particular currency in multimodality. It refers to the potentialities and constraints of different modes – what it is possible to express and represent or communicate easily with the resources of a mode, and what is less straightforward or even impossible – and this is subject to constant change in environments or interactions. With regards to GenAI and learning, it refers to the various ways in which meaning is made with GenAI to form part of teaching, learning and assessment. It invites educators and learners to consider how GenAI makes meaning from its database, training and through various prompts. It also means that we need to consider what potential and challenges there are for reflection and critical thinking when learners engage with GenAI and its outputs. GenAI affordance is neither something that GenAI contains, nor does it refer to perceiving it (perception) – it is somewhere in-between as an evolving potential in between what the technology offers and whether and how this is perceived. It is about how GenAI can function in a learning context and what activities it can be part of, depending on users and the platform. In a basic example, we might argue that text-to-image GenAI platforms (e.g. DALL-e) have an 'affordance' to create images from the inserted prompt words. This affordance can be used differently in learning activities and for learning.

Multimodal discourse of GenAI: All multimodal texts, artefacts and communicative events are always discursively shaped; all modes, in different ways, offer means for the expression of discourses. For example, GenAI representations have been found to be biased in different ways, as aligned with the broader discourse that is circulating on the internet as well as human data and training input. What this means is that learners need to understand that the data used to train GenAI carries a specific discourse that may reinforce certain hierarchies and power dynamics in societies. This is why it is important to discuss GenAI production with students critically.

1.3 Structure and how to use this guide

As we have said, we fully recognise the importance of *responsible* use of GenAI. We are aware that frivolous, uncritical, unquestioned and ignorant use of the technology is, at best, unlikely to be of much use to the user in producing the response they want, and at worst both irresponsible and in some cases dangerous. Consequently, we initially provide a section on the responsible and ethical use of GenAI in multimodal educational contexts (Section 2), before then summarising some perspectives on developing GenAI literacy in both students and staff in a multimodal educational context (Section 3).

Once we have established these important contextual perspectives, we then move to offer practical and applicable learning designs for integrating GenAI tools for multimodal learning. The guide is organised into three strands: *Teaching* (Section 4), i.e. how GenAI can be used to represent subject knowledge multimodally and create activities/resources for students; *Learning* (Section 5) i.e. how students could encounter, explore, evaluate, critique and express ideas and artefacts via multimodal GenAI to improve their knowledge and skillsets; and *Assessment and Feedback* (Section 6), i.e. how students or educators can use GenAI to create or critique/reflect on multimodal artefacts in formative or summative assessment capacities, or use the technology to create or engage with feedback in multimodal ways, or else self-reflect using conversational Generative AI.

Each of the three sections contains sub-sections on *what* it is, *why* do it and *how* the idea or practice might work in-situ, as well as further ideas and selected cases studies on how educators might put some of these ideas into practice for themselves. We gathered these case studies from across the sector as a data-gathering exercise to determine what kinds of practices were already occurring, and we have included all the case studies in full as a separate Appendix (Appendix A) at the end of this guide. Section 7 includes some advice and considerations for choosing GenAI platforms when designing multimodal GenAI activities. Finally, Section 8 presents a unifying model for designing multimodal learning with GenAI.

2. Responsible use of AI in a multimodal context

Despite the way GenAI is often marketed as efficient, trustworthy, innovative and invaluable to boosting users' productivity, integrating GenAI into multimodal learning brings substantial pedagogical, social and ethical challenges. The responsible use of multimodal GenAI in higher education requires a careful balance of ethical, pedagogical, legal and practical factors. Concerns include AI's accuracy, reflection of entrenched social bias(es), and the potential for over-reliance, which may weaken student voice or diminish their capacity for critical thinking. Additionally, some educators and students feel uncertain about how to use GenAI tools effectively, ethically, or correctly within the context of (sometimes vague or ambiguous) institutional policy. Ensuring AI-enhanced teaching is informed, equitable, and values-driven requires deliberate strategies and a strong foundation in AI *literacy* (Saunders et al., 2024).

These issues can potentially be addressed by employing curriculum design(s) that foreground the development of AI literacy and criticality. Another general strategy is to introduce the complexities of the 'costs' of AI and GenAI in both environmental and social contexts – issues which are often ignored or examined only superficially in publications from GenAI 'enthusiasts', and which are often concealed by companies that produce Generative AI software. A useful starting point for educators seeking to take this approach is Beckingham and Hartley's (2025a) article that suggests four areas to consider when looking at the cost of using GenAI: cost to the individual, cost to the environment, cost to knowledge and cost to future jobs. In each of these areas, we can consider both quantitative and qualitative factors; for example, individual costs include the quantitative costs of subscribing to different apps, alongside more qualitative factors such as the impact of Generative AI on users' mental health.

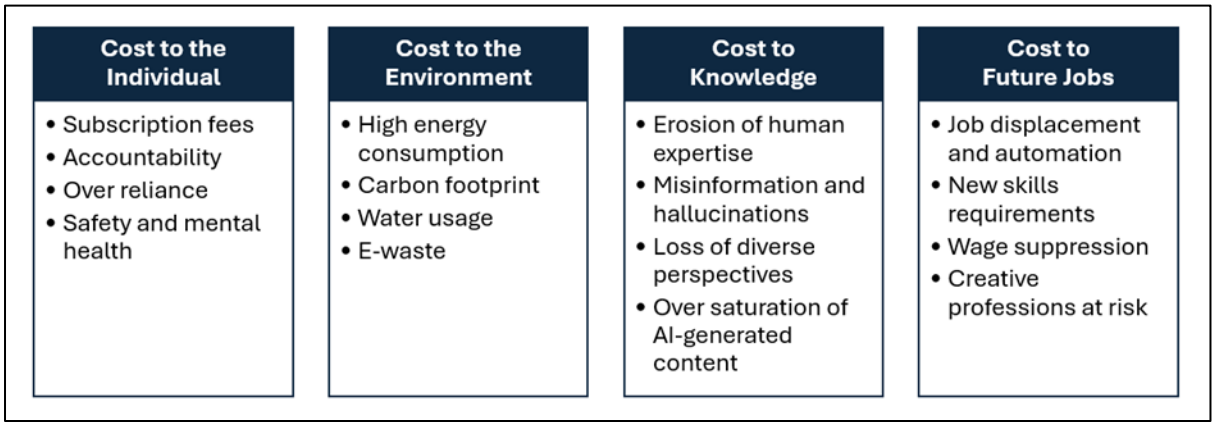


Figure 2. Cost of Generative AI to the individual, environment, knowledge and future jobs

Discussion of each, or a combination of, these areas can generate action plans for both staff and students to develop their understanding of using GenAI responsibly, as the following examples illustrate.

2.1 Costs to the Individual/Individual Responsibility

As 'accountability' is an important theme here, we can begin by promoting clarity on what is acceptable use and transparent authorship. Assessment design, for example, should make explicit when GenAI can and cannot be used. Providing a pedagogical purpose for using GenAI needs to be scaffolded. Students need to learn how it can be used to enhance learning. Tools should be selected with purpose based on the specific learning outcomes they enhance. It is important to recognise that every GenAI will be biased in its outputs and is therefore likely to amplify stereotypes, misrepresent information or be inaccurate – and it is rare, if not unprecedented, for a Generative AI platform to recognise that it has done so, let alone inform the user. Given that the platform has no sense of social justice or any kind of consciousness, it cannot know when it has reinforced an existing prejudice or biased perspective. Indeed, it cannot 'know' *anything*. Consequently, we need to encourage students to engage critically with outputs from GenAI rather than passively consume them and assume they are simply correct and free from prejudices.

From a legal perspective, privacy, data protection and consent should also be considered with respect to what is uploaded to and how this data may be used by GenAI platforms, e.g. for further training.

A further consideration is equity of access. There are an enormous number of GenAI tools now available, with different specific purposes. There is also a growing trend for GenAI to be embedded into existing technologies or applications, opening new ways of working with existing tech. But many GenAI apps carry a financial cost, while embedded GenAI is often placed behind a 'premium tier' paywall, disallowing access to either the app, or to certain features of it, to users unless they are willing to pay extra for it. Consequently, educators need to work to ensure all students have an equitable experience; whilst free access to some tools is available, this is constantly changing. Having an approved tools list of recommended GenAI platforms can be helpful in this regard, but this does need to be regularly reviewed.

2.2 Costs to the environment

There is mounting evidence that using GenAI – especially generating images, video and audio (or, particularly, artefacts that combine these) – requires significantly more computational resources and energy compared to pure text-based generation. A fruitful study by Luccioni *et al.* (2024) highlights this, and she is developing an AI energy score model that will guide individuals in choosing models (and ways to run them) for different tasks based on their energy efficiency. Unfortunately, and as Luccioni et al. note, precise information on the exact energy costs of different GenAI platforms is very difficult to extract from the producers and suppliers (2024). This makes it very difficult to devise clear guidelines on responsible use based on the amount of GenAI use, although it does provide

a solid basis to confirm that their energy use is generally substantial and should, at least, be considered by all users before choosing to engage with a GenAI platform.

2.3 Costs to knowledge

GenAI has the potential to help students to acquire knowledge and develop their critical capacity, although this tends to be short-term. That said, there are also a significant number of studies which demonstrate that over-reliance on GenAI can potentially have a negative or damaging impact on the ways students acquire knowledge as it removes the process of *sourcing* that knowledge that is often integral to retention, as well as retention itself (Yan et al., 2025). Indeed, a recent study from MIT demonstrated that students who start by clarifying their own understanding before they consult GenAI can experience major benefits (Naughton, 2025).

2.4 Costs to future jobs

In 2025, some employers specifically attributed decisions on reducing staff numbers to the growth of Generative AI. For example, the CEO of Anthropic warned that 'AI could eliminate half of all entry-level white-collar jobs' (Morris, 2025). In addition, several research reports also appeared, suggesting that particular job roles or tasks were under threat from GenAI. To help make sense of this, Tomlinson et al. (2025) devised an 'AI applicability score' for specific occupational roles. The higher the score, the more vulnerability to GenAI, and they ultimately found that:

> "the highest AI applicability score for knowledge work occupation groups such as computer and mathematical, and office and administrative support, as well as occupations such as sales whose work activities involve providing and communicating information" (Tomlinson et al., 2025).

2.5 Implications

The main implication for higher education in relation to any use of Generative AI is to encourage users to engage in critical reflection in both the context of starting the task and the context of completing it – users should consider asking themselves: is the use of GenAI *necessary* for the task? Would other 'less-damaging' alternatives suffice? If I 'out-source' this task to GenAI, does this help me develop my own capacities and abilities?

Reducing the cost of using GenAI can also be approached through small but manageable microtasks by students, educators and institutions. These can help to build awareness, reduce unnecessary usage, and promote more energy-efficient practices. Consider the following suggestions (Welsh & Milne, 2025):

- Use GenAI mindfully – ask ‘do I really need GenAI for this task?’
    - Consider using the technology for idea generation or creative reflection. For example, if you need an image, could royalty-free sites like Pixabay or Pexels that offer free-from-copyright images serve your purpose better?
- Limit iterations
    - Work to provide GenAI platforms with clear and detailed prompts in the first instance to get the result you want/need more quickly, instead of excessive ‘trial and error’ multiple attempts that use up more energy.
- Digital decluttering
    - Delete unwanted generated images and text. Download and store only the final versions.
- Run GenAI demonstrations as a group activity rather than each student generating outputs individually.

3. Developing AI literacy in a multimodal context

In the previous section, we emphasised the importance of the critical and responsible use of GenAI in education. This tied to developing AI literacy, enabling educators and learners to /question) GenAI in a multimodal learning context. Indeed, developing AI literac(ies) is of critical importance in the context of *either* engaging or disengaging from the technology, because if one does not understand the platforms, their functions, contexts, impacts and perceptions, one cannot justifiably use it, or justifiably reject it.

Below are some strategies to consider in developing your learners' GenAI literacy, whether they are staff or students. It should be noted that these are not some ultimate definitions of AI literacy in multimodal learning, as the terms 'literacy' and 'literacies' have been interpreted in myriad ways. Rather, these are some basic approaches that may help educational developers and educators begin fostering GenAI literacy in their staff and student audiences.

3.1 Different levels of AI Literacy in multimodal learning

There are several 'levels' of GenAI literacy, which can be characterised by particular activities or abilities in users. However, we should say that this is not an exhaustive or comprehensive list, but rather a basic benchmark for identifying differing levels of literacy with the technology that may be useful as a starting point:

- **Basic literacy**: Awareness of multimodal GenAI platforms, their capabilities, and appropriate uses in educational context (e.g., creating prompts, generating visual outputs).
- **Intermediate literacy**: Ability to co-create multimodal content, critically evaluate multimodal AI outputs, and scaffold uses (e.g., transforming lecture notes into visuals or podcasts).
- **Advanced literacy**: Designing activities or assessments that incorporate multimodal uses of GenAI, fostering critical analysis and engagement, and leading ethical and philosophical discussions on AI implications in academia and wider contexts.

3.2 Key teaching competencies for GenAI in multimodal learning

Similarly, there are some key teaching competencies and activities that can perhaps be used in a classroom setting that can help develop AI literacy *in-situ*:

- **Scaffolded prompting**: Advising students how to craft and iterate on prompts to refine multimodal GenAI outputs (e.g., generating diagrams, podcast scripts, or video summaries) – if possible, with help from dedicated technology experts.

- **Evaluation frameworks**: Encouraging students to critique GenAI content for accuracy, bias, and coherence. For instance, having students examine and annotate AI-generated essays or visual outputs.
- **Ethical protocols**: Establishing clear boundaries on acceptable use (e.g., 'do not use AI to write reflections'; 'do use it for brainstorming visuals') to ensure academic integrity and data protection.

3.3 Strategies for developing AI Literacy across different levels

3.3.1 Individual Level

- **Students**: Participate in workshops on GenAI use in creative multimodal tasks, practice prompt crafting, and document AI usage in reflective assignments.
- **Educators**: Engage in professional learning, experiment with low-stakes uses of GenAI, and reflect on ethical practices.
- **Educational Developers**: Curate examples, develop guidelines, and coach staff on GenAI-enabled pedagogies.

3.3.2 Module Level

- Embed GenAI literacy into learning outcomes (e.g., 'critically evaluate AI-generated design concepts').
- Offer optional multimodal tasks that include GenAI use with clear rubrics and support.
- Include creative and reflective components where students analyse and critique their own, or others' GenAI use.

3.3.3 Programme Level

- Develop cross-module policies and examples on GenAI use.
- Promote consistency and transparency in how AI-integrated tasks are introduced and assessed via workshops, cross-staff activities and discussion tasks.
- Align GenAI practices with graduate attributes such as criticality, creativity, and digital fluency.
- Consider embedding AI literacies on academic skills and/or literacies modules shared across programmes within departments or schools.

3.3.4 Institutional Level

- Provide clear policies on GenAI use in learning and teaching, with checklists for permissible uses.
- Offer vetted tools and ensure data privacy protocols are enforced.

- Create professional development pathways, support communities of practice (e.g., AI innovators groups), and showcase successful implementations to build confidence and capability.
- Offer platforms for debate and critique on the role and uses of GenAI in education.

4. Multimodal Generative AI in Teaching

Generative AI (GenAI) tools significantly broaden the possibilities for multimodal teaching by enabling educators to design, adapt, and deliver content across a range of media (Bond et al., 2024; Yun et al., 2025). These technologies support not only the creation of multimodal artefacts such as images, audio, video, and interactive simulations, but also the transposition of content from one format to another. For instance, GenAI might be used to convert lecture notes into podcasts, diagrams into explanatory narratives, or seminar discussions into visual summaries (Prinsloo et al., 2024). This ability to work fluidly across modes introduces new opportunities for educators to make complex or abstract concepts more tangible, and to design learning experiences that better accommodate the diversity of students' learning preferences and needs (Fui-Hoon Nah et al., 2023).

In a multimodal teaching-learning environment, GenAI allows educators to move decisively beyond text-dominant approaches. Text-to-image and text-to-video tools can generate diagrams, animations, and explanatory visuals in minutes; audio synthesis can create narrated explainers or podcasts to accompany slides; and large language models can rapidly produce draft quiz questions, scenario descriptions, or alternative explanations pitched at different levels of complexity (Koppam et al., 2024). By embedding these outputs within teaching activities, educators can enrich their teaching repertoire while saving time on labour-intensive production tasks (Alasadi & Baiz, 2024).

The role of GenAI in this context is best understood as amplification rather than substitution; it does not replace the pedagogical expertise or creativity of educators, but instead augments their capacity to respond flexibly to students' needs (Walter, 2024; Hall, 2024). Educators can focus on higher-order aspects of teaching such as sequencing, framing, and critical discussion (Tay et al., 2025), while delegating lower-level production tasks to AI (Kim et al., 2025). This shift enables more responsive and iterative teaching design, where materials can be refined in real time to reflect emerging learning needs or student feedback (Li et al., 2024).

At the same time, embedding GenAI into multimodal teaching demands a critical and ethical orientation. AI-generated outputs are shaped by the datasets on which they are trained, meaning they may reproduce biases, inaccuracies, or stereotypes (Pinski & Benlian, 2024). Educators therefore have a dual responsibility: to model the critical interrogation of AI outputs within their own teaching practice, and to scaffold students' ability to do the same. This is especially vital where AI is used to represent disciplinary knowledge visually or narratively, as inaccuracies can be less immediately visible than in text (Chen et al., 2023).

Considerations of equity and sustainability must also inform multimodal AI use. Access to high-quality AI tools is uneven across institutions and student populations, with premium

features often gated behind paywalls. Image and video generation carry significant computational and environmental costs, so purposeful adoption is essential, ensuring that multimodal AI is used where it genuinely enhances learning rather than as a novelty (Bolick & da Silva, 2024).

Integrating GenAI into multimodal teaching also creates opportunities to develop future-facing skills. As workplaces increasingly demand fluency in interpreting, critiquing, and collaborating with AI-generated content, students benefit from encountering these practices within their studies (Hsiao & Zhang, 2023). Educators who intentionally model transparent AI use, explaining prompts, evaluating outputs, and reflecting on limitations, can nurture these literacies while simultaneously enriching disciplinary teaching (Ng et al., 2024).

This section explores how educators can use Generative AI (GenAI) to support and enhance multimodal teaching practices across diverse disciplines in higher education. Multimodal teaching involves engaging students through multiple forms of media—such as text, visuals, audio, video, and interactive elements—to better support different learning styles, deepen understanding, and foster creative expression. GenAI offers a powerful set of tools that can facilitate the design, delivery, and co-creation of such multimodal content, even for educators or students with limited technical or design expertise. The section provides concrete examples of how GenAI can be used to create visual materials, assist in the delivery of engaging content, and support collaborative and creative learning processes. It also highlights ways in which GenAI can be integrated into teaching activities that explicitly promote AI literacy and critical thinking, as well as strategies for co-creating content with students to foster participatory learning environments.

In addition to practical applications, the section critically examines both the opportunities and limitations of using GenAI in education. It discusses the potential for GenAI to enhance pedagogy, lower barriers to multimodal creation, and increase student engagement and creativity, while also addressing risks such as over-reliance on AI, the loss of reflective learning processes, and concerns around ethics, sustainability, and academic integrity. To support thoughtful and responsible use, the section offers practical strategies and pedagogical tips for integrating GenAI into multimodal teaching. These include approaches for saving time, modelling AI use transparently, embedding ethical guidelines, designing for human–AI collaboration, and treating AI literacy as a core graduate capability. Finally, the section features case studies that illustrate how educators in different subject areas are using GenAI in innovative and contextually relevant ways. These examples provide inspiration and insight into how AI can be meaningfully embedded in teaching practice to enhance learning, creativity, and digital fluency in a rapidly evolving educational landscape.

4.1 What is it? GenAI in multimodal teaching

In this section we offer examples of educators using GenAI to create or adapt teaching materials.

4.1.1 Using AI for creating visual content

Educators might use Generative AI to:

- Generate images to help produce diagrams, icons, or images/visuals for different purposes, such as academic posters or presentations - this is especially useful for analysing such GenAI products critically to enhance students' critical awareness.
- Create multimodal elements or icons to be used within infographics - using text-to-image tools – from financial concepts or data, demonstrating understanding visually.
- Create visual metaphors using GenAI-generated images to represent abstract concepts in relation to teaching context, combining visuals with reflection.
- Generate short educational videos or animated explainers from written prompts, making complex ideas explained in different modalities that are more experiential and sensory, such as through motion graphics and narration.

Sample GenAI Prompt:

I'm a university lecturer preparing an academic poster on *[insert topic, e.g., 'neural network architectures' or 'comparative political systems']*. Please suggest a list of AI-generated image ideas - such as conceptual diagrams, icons, or illustrative visuals - that can help convey the idea of *[insert idea or message to be depicted in poster]* visually, minimising the need for dense text. The visuals should be intellectually rigorous, clear, and appropriate for a higher education audience. Feel free to include suggested labels or annotations.

(Note: for the prompt to work well, it may need more context and specificity to minimise the requirement for iterative refinement.)

Case study summary: Teaching – Improving engagement with eLearning by creating multimodal video-explainers by Vivien Shaw, Northern College of Acupuncture – Biomedicine

In response to student feedback on long, hard-to-navigate eLearning materials, a series of short, multimodal 'explainer' videos were created to link digital content more clearly with in-person learning outcomes. Using tools like Microsoft Word's transcribe function and ChatGPT, she summarised hour-long online learning sessions, mapped them to relevant learning outcomes, and generated slide decks. These were then developed into 10-minute narrated videos, illustrated with selected slides to support clarity and revision. This approach, grounded in Universal Design for Learning, significantly reduced student anxiety and helped clarify expectations for assessment. While some students engaged less with the full online content, the explainers were highly valued for their accessibility and structure. The model is easily transferable, using free or low-cost tools and adaptable prompts, offering a practical way to enhance digital learning design and student confidence.

(Full case study is included in Appendix A.)

4.1.2 Integrating GenAI into teaching delivery

Educators might use Generative AI to:

- Deploy an AI-powered Q&A chatbot trained on course materials to provide students with interactive, conversational text-based support.
- Use AI to generate multimedia components for lectures, such as visuals, analogies, or quiz questions, making sessions more engaging and develop particular skills and competences.
- Experiment with AI to create multimodal activity briefs or learning materials, adding diagrammatic or audio explanations to traditional text.

Sample GenAI Prompt:

I am designing a university-level task or activity brief for a course on [insert subject, for example, 'environmental policy analysis']. I want to create a multimodal brief that includes a clear written description of the activity, together with a supporting diagram and a short audio explanation to enhance student understanding.

Please help me:

- Draft a clear, academically appropriate description of the activity.
- Suggest a concept diagram or flowchart I can generate with an AI image tool to visually represent the activity or workflow.
- Write a 1–2-minute script I can use to create an audio explanation using a text-to-speech tool.

Case study summary: Teaching – Perk Up Your Academic Journey: A Coffee Shop Adventure by Dr Laura Sharp, Eric Davies, Mia Wilson & Ailsa Foley, University of Glasgow – Academic Values, Originality, and Plagiarism

'Choices at the Coffee Shop' is a gamified, AI-supported learning tool that engages students with academic integrity through an interactive 'choose your own adventure' experience. Embedded in the University of Glasgow's asynchronous module Academic Values, Originality, and Plagiarism, the game presents real-world scenarios to help students understand the consequences of their academic decisions in a safe, engaging space. Using AI tools for image generation, animation, and voiceovers, the project team created diverse characters and immersive experiences. Feedback shows strong student endorsement, with 96% reporting improved understanding of plagiarism. The design process involved collaboration across academic and digital teams, iterative feedback, and careful handling of AI's limitations in representing diversity. This accessible, cost-effective approach demonstrates how AI can enhance active learning, support diverse learners, and humanise complex topics in online education

(Full case study is included in Appendix A.)

4.1.3 Using GenAI in collaborative and creative processes

Educators might use Generative AI to:

- Auto-generate ideas, documents, or simple images for brainstorming and design thinking within collaborative digital environments (such as a Miro board).

Sample GenAI Prompt:

I'm facilitating a collaborative session with university students/researchers on a Miro board for a [design sprint / group research project / seminar workshop] focused on [insert topic, e.g., 'climate justice frameworks' or 'AI ethics in healthcare'].

Please help generate:

1. A set of conceptually rich ideas or discussion prompts related to the topic.
2. Academic-style sticky notes or text snippets we can use to structure the board (e.g., themes, questions, frameworks).
3. Suggestions for simple AI-generated images, diagrams, or icons to visually represent theoretical models, key concepts, or tensions.

The output should support higher-order thinking and collaborative knowledge construction at a university level.

Case study summary: Teaching – Peer Conflict Resolution in Group Work: Using GenAI to Represent Subject Knowledge Multimodally by Rob Lindsay, University of Liverpool – Interactive Group Work

This interactive activity helps students navigate common interpersonal conflicts in university group work through realistic, AI-generated scenarios. The resource uses avatar videos, synthesised voices, and branching dialogue to immerse students in challenging situations—such as miscommunication or unequal workload. Teachers can facilitate student learning about groupwork that helps explore different responses, receive immediate feedback, and reflect on their choices, supporting the development of communication, collaboration, and cultural competence. Designed using tools like ChatGPT, ElevenLabs, Adobe Express, and H5P, the multimodal design supports authentic, transferable skill development while enhancing engagement in asynchronous settings. Educators can customise the content by tailoring the scenarios to suit their subject-specific contexts.

(Full case study is included in Appendix A.)

4.1.4 Activities explicitly teaching AI literacy and criticality

Educators might use Generative AI to:

- Design tasks where students use various multimodal AI tools (image identifiers, audio identifiers, text generators) on a topic and then critically evaluate the accuracy and quality of the AI outputs. This helps them understand AI's limitations and biases and develops evaluative judgement.
- Design (potentially dialogic) activities focused on experimenting with prompt variations to understand how prompt input affects multimodal outputs and bias.
- Engage students in documenting and critically reflecting on their use and/or rejection of use of AI.

Sample GenAI Prompt:

I'm designing a university-level activity where students will explore a topic of their choice (e.g., climate change, medical misinformation, historical events) using a range of GenAI tools - such as image recognition tools, audio transcription or identification tools, and text generators.

Please help me:

1. Draft a task brief that instructs students to use at least two different GenAI tools to gather or generate information on their topic.
2. Include prompts that guide students to critically evaluate the accuracy, relevance, and potential biases in the GenAI-generated outputs.
3. Suggest reflection questions that help students consider the capabilities and limitations of AI, and how this impacts trust, validity, and academic use.

The task should support the development of evaluative judgement, digital literacy, and critical thinking at a higher education level.

4.1.5 Co-create multimodal output/delivery

Educators might use Generative AI to:

- Generate short video snippets from lecture content for VLEs.
- Summarise documents and convert them into different formats for accessibility (e.g., podcast scripts).

Sample GenAI Prompt:

I'm working with a university-level text/document on [insert topic, e.g., 'quantum computing policy' or 'feminist literary theory']. I'd like to:

1. Summarise the key arguments or findings in clear, accessible language suitable for a non-specialist audience.
2. Convert that summary into a podcast script (around 3–5 minutes) that could be used for educational outreach or student engagement.
3. Include a short introduction and closing statement for the podcast, and suggest a tone (e.g., conversational, formal-academic, journalistic) appropriate for the audience.

The goal is to develop both understanding and communication skills by translating complex ideas into multimodal formats.

Case study summary: Teaching – Enhancing Engagement through Streaming Avatars and Synchronous AI Assistants in Online Education by Dr Ioannis Glinavos, University of Westminster

This case study explores the use of streaming avatars and synchronous AI assistants to enhance learner engagement in online legal education. Dynamic avatars and AI tools were created to facilitate an interactive and supportive learning environment that offer real-time assistance, enhance social presence, and reduce the sense of isolation common in online study. By incorporating multimodal elements such as image, sound, space, speech, text, and video, the approach aims to foster a greater sense of community and personalisation. The use of avatars also helps mitigate presentation fatigue and privacy concerns. This strategy offers an adaptable, inclusive model that supports learner satisfaction and well-being. Educators can adopt this approach by selecting appropriate platforms, developing context-sensitive prompts, and iteratively refining the experience based on learner feedback.

(Full case study is included in Appendix A.)

Case study summary: AI Visual Metaphor Activity by Elora Marston and Jonathan Rhodes, University of Wolverhampton – Teacher Education

This activity invites participants on the *SEDA Learning to Tutor Online* course to create an AI-generated visual metaphor that captures an aspect of their experience as online learners—such as a key emotion or challenge. Using tools like Adobe Firefly, participants generate an original image and post it to a shared discussion space with a short, written explanation and a suggested application for their own teaching. Tutors model the task by sharing their own visual metaphor and actively engage in the discussion. This multimodal, formative activity promotes critical reflection, creativity, and empathy, supporting participants to develop socially constructivist and compassionate online teaching practices. The focus on generating rather than sourcing images encourages deeper personal engagement and connects AI use to meaningful learning design.

(Full case study is included in Appendix A.)

4.2 Why do it? Benefits and opportunities of multimodal teaching and GenAI

Integrating multimodal teaching strategies and GenAI into higher education presents opportunities for enhancing learning and fostering creativity. We identified specific themes from our data-gathering (survey, focus groups, case-study collection). Our sample of educators identified the following range of compelling benefits, both pedagogical and practical.

4.2.1 Enhancing pedagogy through new diverse modalities

Multimodal teaching can expand pedagogical possibilities by moving beyond traditional, text-centric formats (Hall, 2024). Introducing varied media, such as video, podcasts, infographics, interactive simulations, and performance-based tasks, can make learning more inclusive and engaging (Yun et al., 2025). These modes support different learning preferences and may foster deeper, more authentic engagement with content (Prinsloo et al., 2024). As participants in our focus groups noted, students responded positively to tasks that felt 'real-world,' such as building websites or designing exhibitions, which also better prepare them for future professional contexts. GenAI can amplify these possibilities by enabling faster content transposition e.g., summarising texts into visual formats or adapting materials into different media, which allows educators to more easily offer diverse entry points for learning. It also offers opportunities for showing any imagined things that were not previously possible.

4.2.2 Lowering barriers to multimodal creation

While utilising multimodal learning resources can be exciting, they often require skills in design, media production, or communication that educators or students may lack (Walter, 2024). GenAI can help level this playing field. For instance, educators who might have little experience with graphic design or visualisation can use GenAI tools to generate imagery, reducing reliance on costly software or specialist knowledge. Similarly, educators can use AI to prototype materials or experiment with new formats without needing advanced production skills (Koppam et al., 2024). This allows a wider range of educators to participate confidently in rich, multimodal tasks.

4.2.3 Boosting creativity and idea generation

One of the most consistently praised aspects of GenAI across our data-gathering was its role as a creative partner. Whether brainstorming potential user personas for a design brief or offering variations of a visual identity, AI can prompt new directions that may not have occurred otherwise (Bolick & da Silva, 2024). This ideation support was seen especially valuable in early stages of student projects, encouraging divergent thinking and experimentation. Educators also found GenAI helpful in breaking out of habitual patterns – generating fresh and different perspectives or formats that inspired them to try new pedagogical approaches.

4.2.4 Increasing efficiency to enable human-centred teaching

Time is an endless constraint for educators. GenAI can offer tangible efficiencies in planning, content creation, and feedback preparation (Pinski & Benlian, 2024). Participants described how AI helped them generate quiz questions, reformat content for different media, or produce draft scripts and case studies. These efficiencies can potentially free up educator time for more personalised interactions, such as mentoring, formative coaching, or supporting struggling students. In this way, GenAI can create space for what one participant called 'relationship-rich pedagogy', where educators invest more in the human dimensions of teaching and learning (Kim et al., 2025).

4.2.5 Enhancing student interest and engagement

Multimodal tasks, especially those involving creative output, often sparked student interest and engagement. From collaborative use of Post-It notes and diagrams to science students designing exhibitions, educators observed that alternative formats energised classroom participation (Yan et al., 2024). While not all students immediately embrace novel media, scaffolding, choice, and visibility of value helped overcome hesitation. In addition, when students are supported in using GenAI to enhance their outputs (e.g., improving visuals or experimenting with tone), they often gain a sense of empowerment and ownership over their work (Hsiao & Zhang, 2023). Equally, our role as

educators lies in engaging students in the wider discourse on GenAI use within disciplinary contexts. This requires developing students' agency and evaluative judgement of the utility of GenAI within specific contexts.

4.2.6 Preparing students for a digital and AI-augmented future

By incorporating Generative AI into multimodal learning, educators are better positioned to equip students with crucial skills for the future. These include prompt engineering, critical evaluation of AI outputs, ethical decision-making, and reflective use of digital tools (Tan et al., 2025). In professions where creativity, adaptability, and communication are increasingly mediated by AI, familiarity with these tools is a valuable and relevant skill. Exposure within educational settings allows students to explore and question AI's role in a safe, guided environment.

Alongside these potential benefits, we recognise that there are naturally some challenges that also come with using this approach. We have collected these together in a dedicated part of this guide; please see Section 7.1 for further challenges of using GenAI in multimodal teaching, learning, and assessment & feedback.

4.3 How to do it? Practical tips for educators using GenAI in multimodal teaching

Figure 3 suggests five key practical areas for educators utilising Generative AI in multimodal teaching. It offers 'Time-Saving Tips' with strategies for streamlining teaching processes using AI tools and explores 'Human-AI Collaboration', providing tips for effective teamwork between humans and AI. The infographic also delves into 'Mirror Cases', showcasing examples of AI use by teachers for student demonstration, and provides an 'Evaluation Checklist' with criteria for assessing AI's impact on education. Finally, it addresses 'AI Literacy Teaching', outlining methods to enhance students' understanding and critical thinking about AI.

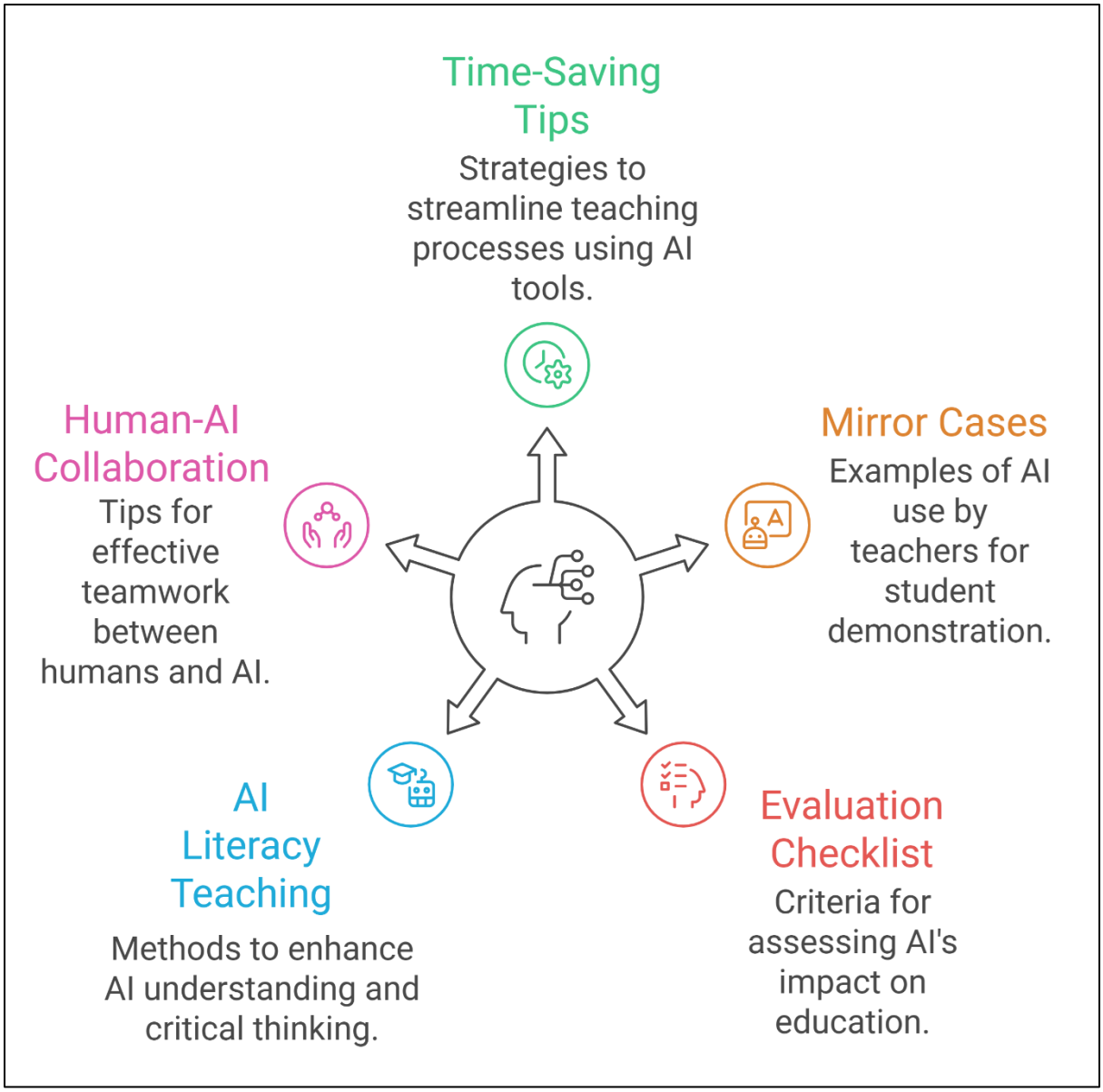


Figure 3. Five key practical areas to consider for educators utilising Generative AI in multimodal teaching.

4.3.1 Save time with smart use of AI tools

Educators may be able to free up valuable time by using GenAI to streamline resource creation and administrative tasks. Your institution potentially offers access to general tools such as Microsoft Copilot or Google Gemini, which can be used to generate training blurbs and lesson plans. Need visuals? Use text-to-image GenAI applications to create copyright-free images, or build slides quickly. For more engaging content, there may be opportunities to create short explainer videos using animated characters. If you're planning a lecture, other systems can help you build curriculum content or assessment materials efficiently. These tools may help you shift your energy from repetitive tasks to more impactful teaching activities.

Tip: If you're short on time, GenAI software can potentially convert existing documents into study aids or activities, such as FAQs, quizzes, or even dedicated study guides automatically.

4.3.2 Mirror AI use: Show your process

Model transparency by showing students how you use GenAI tools in your own workflow. Whether you are drafting questions or designing graphics, narrate your steps and decision-making process. Invite students to do the same—ask them to reflect on how they used GenAI in their assignments and why.

Tip: Use class time to compare AI- vs human-created content. This sparks rich discussion and teaches students to evaluate outputs critically.

4.3.3 Use checklists to guide ethical and sustainable AI use

Before sharing or submitting AI-generated materials, ask yourself:

- Does this content include sensitive or copyrighted information?
- Could this image or text unintentionally reinforce a stereotype?
- Is this the best use of AI, or is it just the most convenient?

Avoid feeding personal data into public GenAI tools like ChatGPT. When creating images, especially of people or identities, use platforms that allow more ethical control. And consider sustainability— avoid elaborate or purely decorative image generations - these can have a surprising carbon cost.

Tip: Develop a simple checklist for yourself or your team covering ethics, inclusion, factual accuracy, and relevance. Use it every time you generate content.

4.3.4 Design for Human-AI collaboration, not substitution

Think of AI as a co-pilot, not a chauffeur. Encourage students to engage with their work multimodally by using GenAI tools. For instance, using tools to process and present information in diverse formats. A student working on a research project could upload their notes and then generate a mind-map to visualise key themes, create a report to summarise their findings, or even produce a short video to present their project's conclusions.

For interview preparation, guide them to go beyond text: after inputting a job description into ChatGPT to generate potential questions, they can use the GenAI's voice feature to rehearse their responses out loud. This interactive, audio-based practice simulates a real conversation, allowing them to refine not only their content but also their delivery and tone.

Tip: Frame GenAI as a 'thinking partner'. Make it clear that students must do the intellectual heavy lifting – they can use GenAI to get help getting from A to B, but not to skip from A to Z.

4.3.5 Teach AI literacy as a core skill

Don't assume students (or colleagues) know how to use AI effectively or responsibly. Build in activities to practice prompt engineering – the clearer the input, the better the result.

Highlight the strengths and limitations of different tools. For example, you can show how some tools provide sources, or demonstrate how AI can 'hallucinate' facts, especially in images.

Tip: Incorporate tool-specific training into assignments. For example, when asking students to build digital field notebooks, teach the platform first and check for accessibility needs.

Bonus Tip: Ask students to document how and why they used AI in their work. This builds reflection and reinforces responsible habits.

5. Multimodal Generative AI in Learning

Multimodality in higher education that explicitly focuses on student learning can consist of formats, such as students encountering, exploring, critically evaluating, creating and expressing their learning through multimodal artefacts (Lim & Tan-Chia, 2023; Lacković & Olteanu, 2023). This could include students being asked to bring a multimodal artefact to the classroom for discussion, or a critical analysis of a new concept. For example, see Lacković's (2020) inquiry graphics method for analytical and critical thinking about students' digital images with their conceptual interpretations, and Varga-Atkins and O'Brien's (2009) work in 'elicitation techniques' in research that are applicable in learning - eliciting reflection through multimodal artefacts, such as diagrams. Students can also be encouraged to evaluate and compare information provided on the Internet and various GenAI platforms, such as discussing a published blog post or GenAI outputs with peers and teachers.

For *multimodal* learning to be realised in this case, it is important that students express their learning by creating a multimodal artefact (e.g. a poster, a multimedia presentation, an inquiry graphic or an infographic) or else experience that artefact multimodally. To illustrate, students could be undertaking their learning in multimodal environments, whether it is a physical classroom with the lecturers and peers drawing on the modalities of spatial arrangements, movement, gestures for communicating, or virtual classroom utilising semiotic technologies (technologies and platforms with multimodal capabilities) or immersive learning environments (augmented or virtual reality). GenAI can potentially make meeting this necessity much easier; there are ample opportunities to engage students in multimodal learning designs with current technologies, and particularly with GenAI platforms. However, as we have argued, these technologies are not to be embraced at face value and adopted uncritically.

There are numerous reasons why educators and educational developers need to embed multimodal learning designs in their practice. The rapid development of multimodal technologies creates an ever-evolving technological landscape that engages our senses through visual, audio, tactile and other modalities in addition to linguistic communication. Most students actively use highly audiovisual platforms for communication and entertainment on daily basis, such as YouTube, Instagram, Snapchat, Netflix, WhatsApp, etc. in Western contexts, and platforms such as Xiaohongshu, Bilibili and WeChat in China, and a plethora of GenAI platforms globally. Through their usage, students are overwhelmingly positioned as – and are occasionally deliberately forced into becoming – fast consumers of information, without many opportunities to pause, create and reflect on digitally created and co-created information and artefacts. Finding time to create and reflect is particularly important with regards to students' creative engagement with technologies and their critical thinking skills and the nurturing of criticality in general.

Furthermore, a growing body of research evidences the value of grounding what are commonly termed 'abstract' concepts across disciplines to sensory experiences that are best expressed through multimodal artefacts. As we have emphasised earlier, this means engaging students to create such artefacts to discuss and evaluate their own learning with peers and teachers. For example, authors have provided empirical evidence and case studies showing how diverse media can be used with image-salient platforms and artefacts (see Lacković (2020) for embedding digital images in learning design that evidence both the value and challenges of such a design). Lacković and Olteanu (2023) provide case studies on various multimodal artefacts for higher education learning as applied by diverse teachers in Part 3 of their book, while Tzirides et al. (2024) suggest a coupling of educational concepts with GenAI images for student reflection, akin to the creation of *inquiry graphics* with GenAI.

The point of embedding multimodal designs is not simply to use any digital platform and then evaluate it, as these kinds of studies may obscure the fact that technology implementation depends on good pedagogic design. The importance is placed on how technology is implemented and how technology affordances are used by students to benefit student learning and in what way.

All in all, pedagogy should lead technology (rather than the other way round), as pointed out by many scholars. One of the main aims of pedagogical designs is to go beyond functional, management and efficiency uses of technology in higher education. As Selwyn, Henderson and Aston (2017) emphasise in their investigation of student technology uses, students may still not be using varied technologies for creative and reflective tasks but more for management and assistance tasks, which are functional rather than creative and innovative uses. Certainly, there is merit in functional uses, and there is some innovation there too, but higher-order thinking skills such as creative and critical engagement are at the forefront of desirable student growth in higher education.

The rise of GenAI tools that offer a wide range of visual, audio, linguistic and hybrid outputs has ushered a new era of opportunities and challenges for multimodal learning designs. For some students, GenAI can lower technical barriers in multimodal tasks (e.g., designing infographics or generating voiceovers), enabling them to focus on ideas and meaning-making rather than format limitations. In the section that follows, we will report on examples from our research study on how GenAI can be utilised in these multimodal learning processes that can support personalised, adaptive and critical learning.

5.1 What is it? GenAI in multimodal learning

These ideas for multimodal uses of GenAI for learning are written in a way that either students can initiate or undertake these activities or that educators can design these activities for students to undertake.

5.1.1 Personalised learning and self-paced study

GenAI could be used for personalised learning and self-paced study, such as for revision or goal setting. This could mean using GenAI tools to help students create schedules and 'to dos', and the advantage is that whatever the format of the original material, digital or handwritten text or visuals, GenAI can quickly convert one format to another, and is adept at re-arranging the materials in a newly required format (table, visual, timeline etc.), or according to a new organising principle. Examples here also include students (or educators) creating flashcards and quizzes to help self-assess students of their learning (e.g., at time of writing, NeuralConsult is an example of specifically aimed at medical students), or creating explainer videos using GenAI platforms (e.g. Heygen for video characters). Other examples include educators creating personalised podcasts with help of GAI for each learner depending on their subject area or level of knowledge.

5.1.2 Just-in-time support and study help

GenAI can also be used for just-in-time support, explanations and study help as a resource that is accessible to students 24/7 to break down complex ideas, conceptual questions and explain them according to the level of current understanding of the students. GenAI can also offer explanations by applying and demonstrating it to contexts the student would understand or demonstrate concepts in different ways that scaffold student learning. As above, from a multimodal perspective, GenAI can be 'fed' multimodal artefacts such as diagrams, maps, concept maps, infographics, equations, and calculations to produce explanations, and vice versa, the produced explanations can be asked in different formats (e.g. 'create an image to help me visualise X/concept') (that said, the outputs may depend on the multimodal affordances of the GenAI platform used and the underlying model).

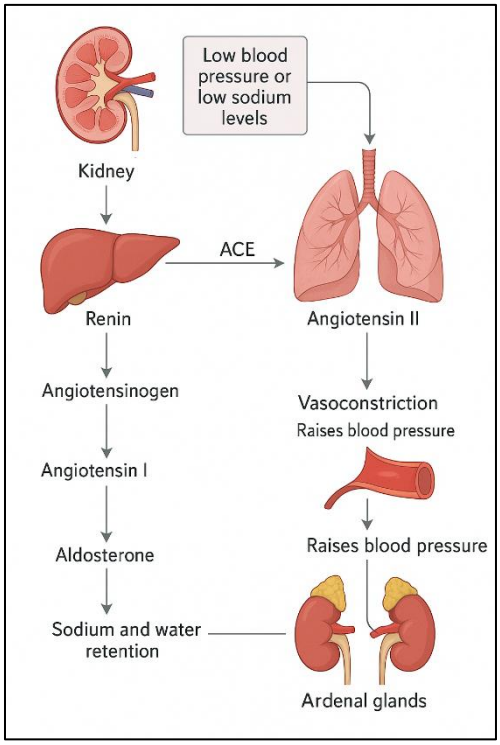
An advantage of using GenAI for explanations is that it can be easy to prompt GenAI to create or mock up some data if, for instance, the concept would benefit from generating worked examples, or take students through learning sequences and/or supported guided practice.

Sample GenAI Prompt:

I'm struggling to understand what a "normal distribution" is in statistics. I kind of get that it's a bell curve, but I don't really understand what it means in real life. Can you explain it simply, like I'm a first-year nursing student? And could you also show me a diagram or make up some data to help me see how it works in a real example?

Case study summary: Learning – Using Generative AI to Aid Studying and Learning for Medical Students by Ayaat Jaway, University of Liverpool – Medicine

This case study explores how medical students can use generative AI, specifically ChatGPT, to support students' revision and understanding of complex topics. The approach utilises text and image generation to make studying more comprehensive and personalised. Students can input their own notes or topic keywords to generate simplified explanations, tailored diagrams, and exam-style questions, supporting a process of scaffolded learning that builds in complexity over time and helps enhance comprehension, engagement and retention. The key benefit of this method lies in its adaptability: by using prompts, learners can direct the GenAI platform to explain topics at varying depths, visualise processes and practise with AI-generated exam questions. Although the case study is in medical education, the method is easily transferable to other disciplines where complex, content-heavy material presents a barrier to learning.



(Full case study is included in Appendix A.)

5.1.3 Critical thinking, metacognition and reflection

GenAI can also be used for prompting critical thinking and metacognition, prompting deeper reflection and learning. This may also take the form of challenging students' current assumptions or helping them consider multiple perspectives and take them through structured reasoning. GenAI can be used, for instance, to offer up different user types, scenarios or requirements so students could build on these different perspectives in

their reflections. The advantage of GenAI here can also be that these requirements can be dynamically acted out in a conversation and dialogue, so students can adapt, deepen and re-evaluate their views, discover flaws and connections in their logic, and so, learn as they go along. Conversely, students could be critically reflecting on GenAI outputs, whether fact-checking, checking for bias, inclusivity or representation, developing critical AI literacies.

Screenshot:

In the example below, visual 'character cards' are used (e.g., NGO worker, climate activist, government official) each with an embedded voice prompt or soundbite generated by AI. Students use these as stimulus to reflect or role-play with GenAI as part of a discussion on climate adaptation (or whatever the topic may be). This could add a sensory dimension to AI-driven perspective-taking, prompting emotional, cognitive and critical engagement.

Dialogue excerpt:

GenAI Climate Activist:
'Climate adaptation needs to be rooted in justice. How can we protect the most vulnerable communities if we keep prioritising economic growth over resilience?'

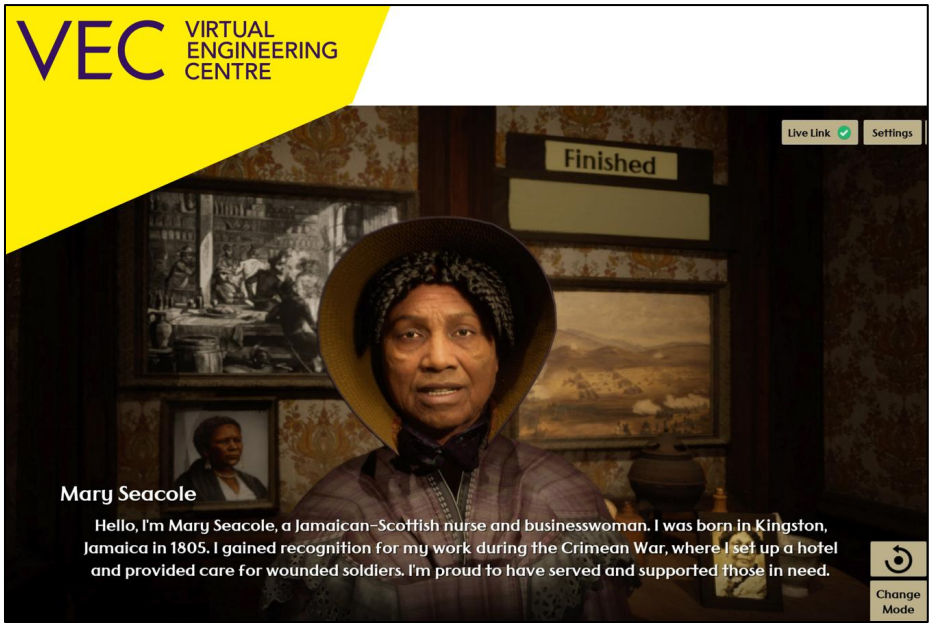
Student:
'That's a good point. But what if the government says funding is limited and some compromises are necessary?'

GenAI Climate Activist:
'Then we need to question *who* those compromises are affecting. Are we really adapting, or just delaying the inevitable for those already at risk?'

5.1.4 Collaborative and dialogic learning

Another use of GenAI in multimodal contexts is for collaborative and dialogic learning, such as enacting a peer conversation for learning, testing ideas or receiving immediate feedback that draw on multimodal resources and communication to support knowledge construction. Examples include conducting a dialogue using speech with AI to act as a patient with particular illnesses or any kind of similar Question & Answer format that can ask GenAI to adopt certain roles in different contexts. This technique can also be used by learners to prepare for a particular exam with questions that contain multimodal formats, rehearsing answers from past exam papers in ways that include either multimodal input or output (aural or visual e.g. diagrammatic questions or reasoning).

Case study summary: Learning – Live Storytelling through Generative AI-powered Avatars by Simon Campion, Radoslaw Dorociak & Georg Meyer, Virtual Engineering Centre, University of Liverpool – Engineering



This case study showcases a multimodal learning experience where learners interact with a digitally recreated historical character, Mary Seacole. Using Epic MetaHuman technologies, the team developed a visually rich, AI-powered avatar capable of text and speech interaction in 40 languages. The system draws on preloaded historical content and an adaptive Q&A database, enabling learners to ask questions naturally and receive contextually appropriate responses. The approach combines video, image, speech, and text to support experiential, accessible, and personalised learning. Originally developed for a museum setting, the method can be applied across disciplines to bring subject content to life through virtual dialogue and immersive storytelling.

(Full case study is included in Appendix A.)

5.1.5 Creating modally accessible and inclusive resources

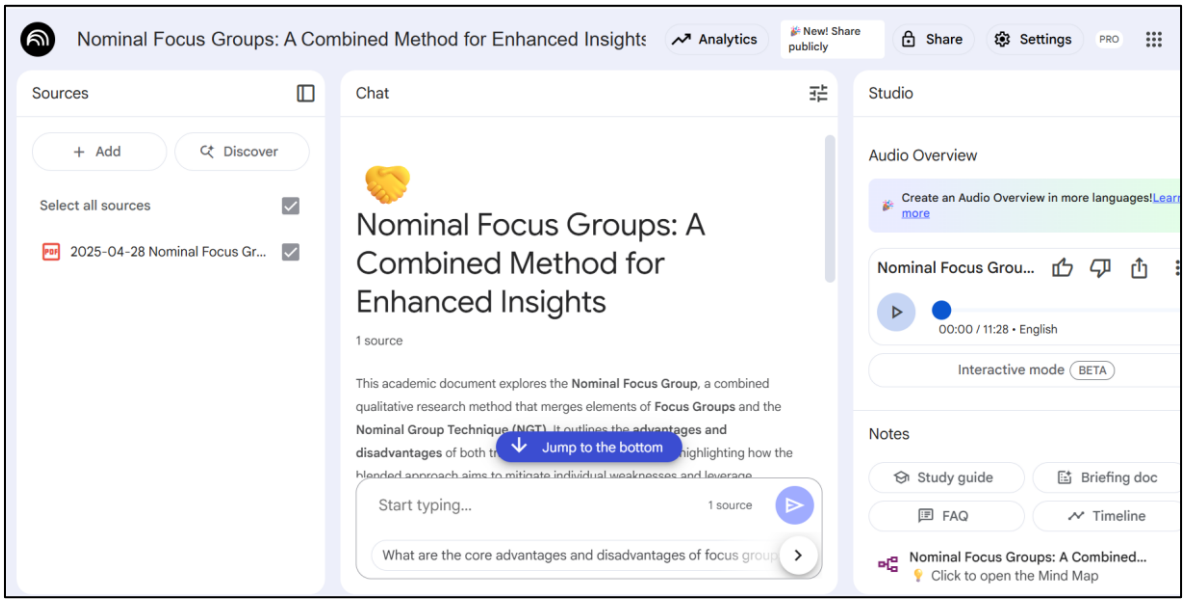
A great benefit of using GenAI platforms is that it can support students with making learning materials more modally accessible and inclusive, for instance through generating alternative formats, translations, or sensory-accessible resources, for instance by adapting the format, level, language or delivery mode. Students can translate materials into their own/another language to help understanding. Live transcription can supplement lectures; transcription and GenAI-created summaries of supervisory meetings or tutorials can support the learning process. This can be audio-to-text but with GenAI content can be quickly reformatted and re-organised based on some additional requirement or perspective. Students with dyslexia, but also any student in the spirit of Universal Design for Learning (UDL), can benefit from recreating learning materials in different formats (e.g. slides into text/audio) (Rusconi & Squillaci, 2023).

5.1.6 Creating, exploring and transposing study content in different modalities

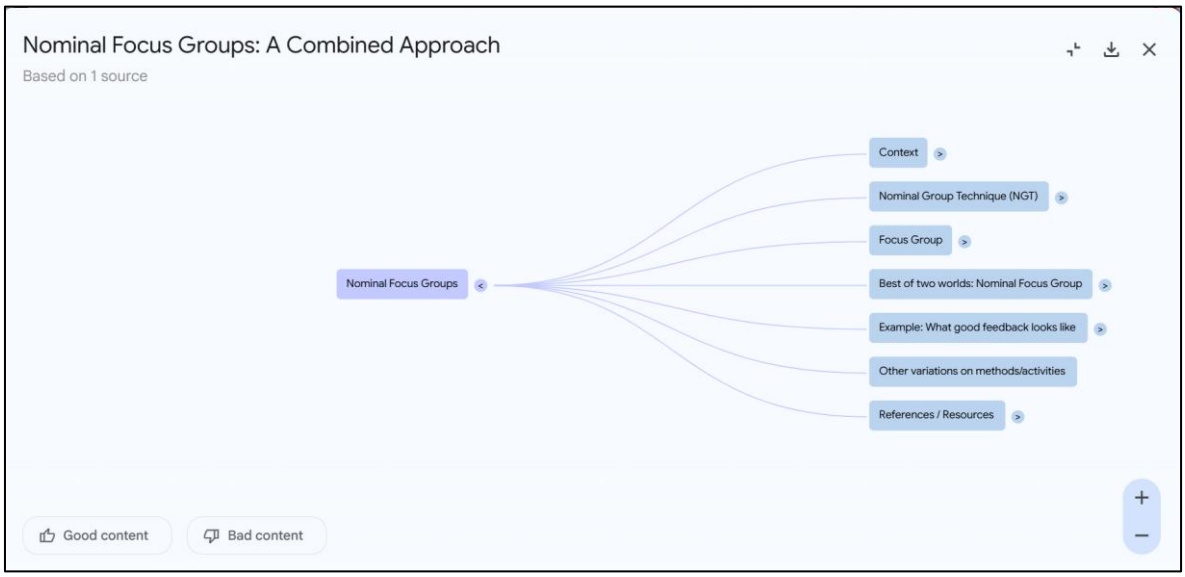
GenAI could be used for creating, exploring, understanding and engaging with study content that works with or transposes content from/into different modalities e.g. summarise, expand, clarify topics from/into diagrams, images, videos or speech/audio. An example of this would be summarising articles or presentations/slides into a podcast (e.g. using Notebook LM), or vice versa, creating a slide or presentation from an existing text or lecture notes (e.g. Gamma), or creating multimedia, websites, designs. Other examples include students documenting their learning process in a visual/comic strip style using prompts or using AI voice to narrate their own presentation if they are less confident in speaking. There are examples of AI-functions within existing platforms that students can use for learning, e.g. PowerPoint presentations/MS Teams that offer personalised, immediate feedback to students such as a public-speaking coach to help students practise presentations with immediate feedback (Rehearse Coach) or reading (Reading Coach).

Screenshot:

Example of taking a set of slides (e.g. on the Nominal Focus Group technique) and creating an audio overview or podcast using NotebookLM (or similar GenAI platform) to engage with learning in different modes and formats



Another format could be mindmaps, so learners could prompt the GenAI platform to turn the slides or content into a mindmap - see below.



Case study summary: Learning – Creating inquiry graphics with GenAI: learning with images by Maede Seyedeh Mirsonbol, University of Torino, and Nataša Lacković, Lancaster University

This case study showcases a multimodal learning activity where learners created (co-created) images using GenAI. The purpose was for learners to share their own interpretations of one aspect or characteristic of the concept through an image that they imagined and then instructed GenAI to create. Learners then shared their images and interpretations (narratives) about how the image represents something about the concept with other learners.

Learners can apply different activity designs, such as a 'gallery talk' where all the generated images are shared with the whole group or within groups, including the teacher's interpretations/input. In this particular case, the concepts tackled were: UN Sustainable Development Goals (SDs), inclusivity, and developing an inclusive classroom. Originally developed as part of a pedagogic activity termed 'inquiry graphics pedagogy' or 'image-based concept inquiry' (Lacković, 2020), this method can be applied across disciplines to surface learners' interpretations, prior knowledge and experiences, linked to key educational (programme/course) concepts.

(Full case study is included in Appendix A.)

5.1.7 Advice provision – GenAI as assistant

Another way students reported using GenAI in our focus group exercises was seeking advice in the case of interpersonal conflicts or study-related challenges from a neutral viewpoint and in confidence, without any other persons involved. When conducting our research, a number of students reported utilising GenAI Chatbots as a counsellor or

advisor in their given life situation, or even for social, personal benefits such as creating shopping lists, helping with recipes or seeking advice in friendship or relationship issues or when in conflict with other people. Such uses can also apply in a study context. For instance, when students come up against conflict during group exercises, they may want to seek advice on next steps or strategies that may work in the given situation and with particular characteristics, as the AI might act as an impartial arbiter in a conflict scenario – although students should always remain critical of GenAI outputs.

5.1.8 Emotional support for study

GenAI could be used for emotional study support, such as helping students stay motivated and engaged, for instance by eliciting encouragement or providing a confidence boost. Students could ask for tailored responses on educational topics that suit their mood or ask for daily reminders. Or, when students get negative feedback or a low mark on an essay (or when PGR students may get rejected by reviewers after submitting manuscripts), they could use GenAI to break down the feedback into actionable pieces and a table, which they can revisit when feeling emotionally ready to tackle feedback. This could also be used in the pre-submission context, where students get an AI to examine their draft work ahead of sending it in to ensure that they have met the required criteria, which may act as a confidence boost.

5.1.9 Help with organisation and admin tasks

GenAI can perform well with supporting students with organisational and administrative tasks that support their learning. For instance, repetitive tasks such as formatting references, documents or making schedules, checklists, suggest a timeline or actions, or breaking down larger pieces of learning into component parts and smaller tasks, and present it effectively in a given format, perhaps highlighting critical/important tasks and working towards given assessment or task deadlines. These outputs then can be asked in multimodal formats, such as timelines, maps, or diagrams.

Sample GenAI Prompt:

Create a visual timeline for producing this guide by the 31 August 2025 deadline, starting today (10 June 2025) including tasks such as drafting, internal review, student advisor review, revisions, find edits and accessibility checks, design work.

5.1.10 Specialised, disciplinary support for learning

Finally, there are disciplinary use cases for multimodal learning with AI where LLMs/chatbots have been used - see two examples below from marketing and architecture. In some cases, GenAI platforms have been custom-built and pre-trained to suit disciplinary epistemic practices and artefacts. Hsiao and Zhang (2023) for instance, customised models in architecture so that students develop a deeper understanding of design aesthetics and enhanced their design thinking abilities. These examples also show the links to employability skills.

Case study summary: Learning – Enhancing Learning with AI Tools for Idea Generation
by Katherine Geer, et al., Liverpool John Moores University – Marketing

This case study explores how AI tools were integrated into a design thinking framework to support multimodal learning in a 'Media Production Management' module. Across three stages - *Understand, Explore,* and *Materialise* – 198 students used Generative AI tools. including ChatGPT, MS Copilot, and NotebookLM, to develop and refine digital content ideas for real-world clients. Students engaged with text prompts to research inclusive campaign ideas, generated visual storyboards to communicate concepts, and created audio narrations to test podcast content. These multimodal interactions (text, image, and sound) supported creativity, critical thinking, and collaborative learning. Importantly, students were encouraged to critically evaluate AI outputs, building essential AI literacy. This approach not only enhanced idea generation but also equipped students with relevant workplace skills, offering a practical model for using AI in content-rich, creative disciplines. The case highlights how multimodal AI supports deeper engagement with both process and output.

(Full case study is included in Appendix A.)

Case study summary: Learning – The Role of GenAI in Design for the Disassembly of Emergency Shelters, by Farhondeh Vahdati, University of Liverpool – Architecture

This case study explores how multimodal GenAI supports architectural education and humanitarian training by generating visual step-by-step disassembly guides from annotated shelter diagrams. Using tools like GPT-4 with vision, students upload structural sketches of vernacular-inspired shelters and receive AI-generated visuals that illustrate disassembly sequences, joinery, and material hierarchy. This enhances students' understanding of spatial relationships, modularity, and design for disassembly (DfD) – concepts often difficult to grasp through text alone.

The approach aligns with constructivist learning, promoting active exploration and iteration. It also has real-world applications: simplified, language-free guides could support non-specialists in emergency contexts. This demonstrates how AI can be a co-creative learning partner, transforming complex 3D concepts into accessible 2D visuals. Multimodal interaction (image + text + interaction) makes learning more inclusive and adaptive, offering a scalable model for integrating GenAI in both academic and disaster-response settings.

(Full case study is included in Appendix A.)

5.2 Why do it? Opportunities and Benefits of GenAI in Multimodal Learning

GenAI offers a range of benefits that align with multimodal learning. Drawing on recent research and insights from our project, the key advantages and challenges are included below.

5.2.1 Lowers technical barriers

- GenAI can enable students and educators to produce multimodal artefacts (e.g. videos, infographics, scripts) without needing advanced technical or media production skills, reducing reliance on specialist tools or support (Lee & Li, 2024).
- This opens up multimodal learning for a wider range of students, especially those who may have previously lacked the confidence or tools to express ideas beyond text.

5.2.2 Enhances content production efficiency and scalability

- GenAI can rapidly convert content across modalities (text to image, notes to audio, slides to summaries), allowing students to focus more on conceptual understanding than formatting or transcription tasks (Bolick & Da Silva, 2023).

- This makes multimodal learning more time-efficient and scalable for both students and educators, particularly in resource-constrained settings that have GenAI access.

5.2.3 Supports personalised, cross-media and adaptive learning

- Through dialogic interaction, GenAI can tailor content explanations, examples, and resources to suit a learner's knowledge level or preferred modality of expression (Alasadi & Biaz, 2024; Liu et al., 2024).
- Students can also revisit and reshape AI-generated responses in different formats, enabling adaptive and self-paced learning suiting their personal preferences.

5.2.4 Fosters reflective and critical thinking

- Multimodal GenAI activities have been shown to prompt deep reflection and metacognition (Milesi et al., 2024). Students can consider how best to express and structure their ideas across different modalities and formats.
- Critically engaging with AI outputs also helps build AI literacy, as students learn to prompt, evaluate, and refine outputs (Tan et al., 2024).

5.2.5 Promotes inclusion and neurodiversity

- GenAI can provide alternative formats that reduce cognitive load, particularly for neurodivergent learners or those with sensory preferences (Jafarian & Kramer, 2024); for example, by converting dense reading into audio summaries or visual maps.

5.2.6 Deepens disciplinary understanding

- In subject-specific contexts, such as design education, the ability to quickly generate and iterate on visual artefacts supports students in developing disciplinary thinking (e.g. aesthetic reasoning, visual storytelling) (Hsiao & Zhang, 2023).

5.2.7 Encourages experimentation and practice in a low-stakes environment

- GenAI offers a non-judgemental space for exploration, where students can test ideas, take creative risks, or pose 'silly' questions without fear of embarrassment—valuable for building confidence and creativity.

5.2.8 Can support wellbeing and social situations

- Some students report using GenAI for emotional and motivational support, such as seeking encouragement, breaking down feedback into manageable parts, or asking for help when overwhelmed or in problematic situations. While not a

replacement for human support, GenAI can supplement wellbeing or conflict resolution strategies in educational contexts 24/7.

Alongside these potential benefits, we recognise that there are naturally some challenges that also come with using this approach. We have collected these together in a dedicated part of this guide; please see Section 7.1 for further challenges of using GenAI in multimodal teaching, learning, and assessment & feedback.

5.3 How to do it? Practical tips for educators and students using GenAI in multimodal learning

These ideas have been written either for you as educators to embed into your curricula, or for your students to try directly.

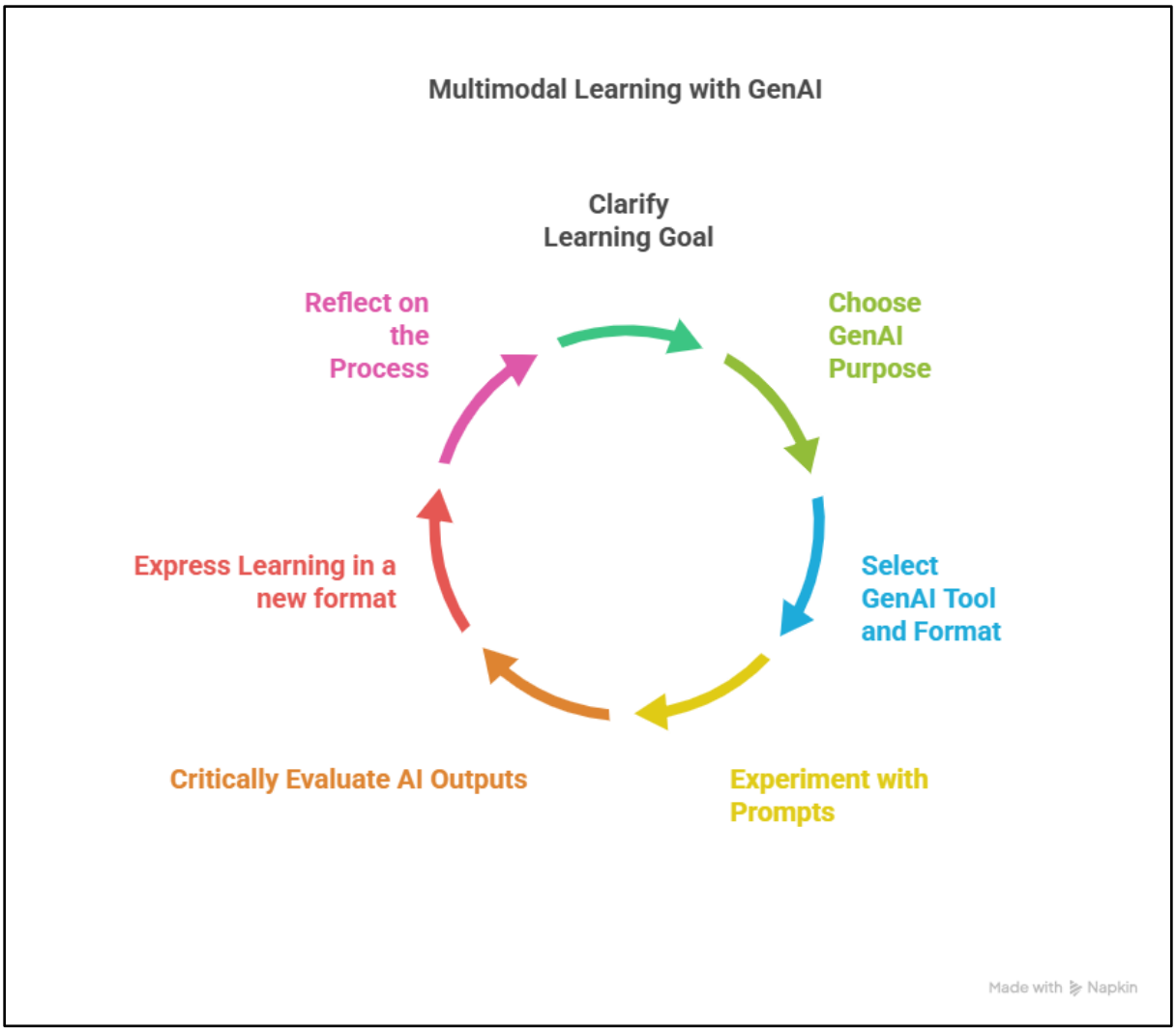


Figure 4. A model for a cycle of multimodal learning using Generative AI, starting with clarification of the learning goal and leading through selection, experimentation, evaluation, expression and ending with reflection.

5.3.1 Clarify your learning goal (before using GenAI)

What to Do: Ask yourself: 'What am I trying to learn or communicate?

Am I trying to acquire knowledge? Investigate or research? Collaborate? Produce something? Practice something? Discuss or evaluate my learning?

Our Suggestion:

- Learners: Write down your goal in one sentence. Example: 'I need to understand how photosynthesis works for my biology exam—maybe a diagram would help.'
- Teachers: Have students articulate their goals before using AI. Example: 'In one sentence, explain what you want AI to help you with.'

5.3.2 Choose the purpose of using AI for your learning goal

What to Do: 'Am I trying to create a resource or representation with AI? Am I using AI to teach me something? Am I going to express my learning or do some action?' Also consider which tasks will GenAI be better than humans, and which tasks should remain better performed by humans.

5.3.3 Choose the right tool and format

What to Do: Pick an AI tool whose multimodal affordances match your goal. Need an animation? Try HeyGen or Canva AI. Need flashcards? Use Quizlet's AI. Would audio or video help you with this goal better?

Our Suggestion:

- Learners: Match the tool to the task. Example: 'I'll use ChatGPT for a summary and DALL-E to draw the process.'
- Teachers: Recommend tools for specific tasks. Example: 'Use Suno AI to turn poetry into songs for memorisation.'

Note: consult your institutional policy and guidance and check you are not submitting private data (see Sections 2 and 7 for more details)

5.3.4 Experiment with prompts - don't settle for the first output

What to Do: Treat prompts like a conversation. Start broad, then refine. Example:

'Explain supply and demand' > 'Now add a real-world example' > 'Turn this into a table comparing two countries.'

Our Suggestion:

- Learners: Use the 'Purpose Hack': Add 'for exam revision' or *'for a 10-year-old'* to tailor outputs.
- Teachers: Assign prompt-iteration exercises. Example: 'Improve this AI output in two steps.'

5.3.5 Critically evaluate AI outputs

What to Do: Ask: 'Is this accurate? Does it match what I already know? Does the format help?', 'Have I met my learning goal?', 'What discourse underpins this Large Learning Model?'

Our Suggestion:

- Learners: Cross-check AI with trusted sources. Example: 'This AI timeline of WWII skips a key event – I'll add it.'
- Teachers: Create 'AI Fact-Check' assignments. Example: 'Find one error in this AI-generated summary.'

5.3.6 Express what you have learned in a new format

What to Do: Use AI to transform your knowledge. Example: Turn notes into a podcast script, comic strip, or quiz. Expressing in multiple formats (e.g., explaining aloud + drawing) can help deepen your learning.

Our Suggestion:

- Learners: Try the 'Switch It Up' challenge. Example: 'I studied this via text—now I'll explain it to my dog using only doodles.'
- Teachers: Assign multimodal projects. Example: 'Explain the water cycle using AI to generate both a paragraph and a mind-map.'

5.3.7 Reflect on the process

What to Do: Ask: 'Did AI save time? Where did I still struggle? What format worked best? How would I do it differently next time?'

Our Suggestion:

- Learners: Keep a 'GenAI Learning Journal'. Example: 'ChatGPT summaries saved time, but I had to redraw the graphs myself.'
- Teachers: End lessons with a 5-minute reflection. Example: 'Share one way AI helped and one way it didn't today.'

6. Multimodal Generative AI in Assessment and Feedback

Multimodality in the assessment space can take a number of different forms. Naturally, assessment artefacts themselves can be multimodal, by asking students to create something that combines multiple semiotic forms to produce a greater meaning than if the artefact was limited to a single mode (Kress & Van Leeuwen, 2001). These artefacts might include any combination of text, image, sound, colour, movement, video, etc., arranged so that they either complement or reinforce one another, in order to produce recognisable named artefacts like posters, infographics, videos, blogs/vlogs, podcasts, portfolios, websites, social media posts or applications, among others.

But it is not only the assessment artefact that can be multimodal. Multimodal assessments can also include elements of multimodality in their *completion*, by asking students to work with multimodal resources or collaboratively work with each other over different media to ensure that the assessment is completed successfully. Live assessments, i.e. where students perform or present something in a live situation, can also be multimodal, where students must combine images often presented on a slide deck with speech and gesture to help the viewer construct the most meaning out of both forms of information.

While feedback in higher education still very much relies on text, several examples listed below demonstrate the impact and potential of multimodal feedback. This often involves feedback that combines text with audio and/or video, where teaching staff record themselves discussing the students' submission alongside the submission itself. Audio/video feedback is already in use in some contexts, but it is not particularly common – perhaps due to nerves, discomfort, or the more practical necessity to circulate examiner feedback to external moderators/examiners – often straightforward with written-text assignments, but can be challenging with multimodal feedback. In other contexts, where long-form feedback is not possible (for example, on multiple-choice question (MCQ) assessments) multimodal feedback might constitute smaller or abstract visuals, sounds or haptic vibrations to indicate when a student has got an answer correct or incorrect. These can add to the richness of feedback and go some way to provide an alternative to in-person dialogic feedback, which is not always possible to provide due to high student numbers (Martin, 2020).

Both multimodal assessment and multimodal feedback requires students to develop multimodal *literacy* – their capacity to understand the way that modes interact with each other when producing an assessment artefact, *as well as* the information that those modes convey within the context of their subject discipline (Ross et al., 2020).

As with both Teaching and Learning, Generative AI has the potential to affect the way multimodal Assessment and Feedback is conducted in the higher education space, particularly in designing multimodal assessments, completing multimodal assessments, and reflecting on multimodal assessments. In essence, GenAI can help develop academics' capacity to design more innovative, more authentic and more relevant multimodal assessments, and can also help students to complete assessments more efficiently and open up new avenues for students to access different semiotic modes when completing their assessments.

6.1 What is it? GenAI in multimodal assessment and feedback

6.1.1 Generative AI in Multimodal Assessment

Generative AI has hitherto been largely perceived as a threat to the integrity of summative assessments, particularly as it is both difficult to detect its illicit use in creating assessment artefacts, and because redesigning assessments into forms that are simultaneously perceived to be 'authentic' and that also create contexts where GenAI simply *cannot* be used has proven elusive (Kofinas et al., 2025). However, GenAI has substantial potential to enhance *multimodal* forms of assessment in a number of contexts, and multimodal assessment in of itself has the potential to create assessments where GenAI can be permitted with confidence that students cannot, and will not, attempt to use it illicitly.

At the most basic level, GenAI might simply help the student who is completing the assessment with creating and enhancing different aspects of the overall final multimodal submission. Multimodal assessments often make use of semiotic forms that are difficult or time-consuming to create from scratch, but which lend themselves well to AI-enhanced creation, such as images, videos or audio. Hitherto, students wishing to use this form would be required to create, record and edit such content, and the amount of time and energy spent on creating this aspect of the overall submission may not have been proportional to the contribution it made to the piece as a whole. In addition, such modes of information were not always accessible to students who were less digitally literate than some of their peers, which put them at a slight disadvantage. Supported by GenAI, multimodal tools can empower creative expression and have the capacity, then, to open up different modes of information to students who previously would not have considered using them, and new forms of multimodal assessment to teaching staff who want to move beyond the textual. It also helps to redress the imbalance between the time and effort to create such content vs. how much it is actually worth to the overall submission, allowing both student and teacher more time and space to focus on the content contained within the semiotic form, not the semiotic form itself.

Generative AI might also help teaching staff to conceptualise multimodal assessment ideas and help them move beyond simple text-based assessments, exams or more traditional assessment modes that are there only by sheer virtue of being well-established within the pedagogic consciousness. GenAI can be particularly useful to examine learning outcomes on modules and suggest new ideas on the most effective way to assess them, and this is particularly effective if the AI contextualises the response against wider levelling frameworks such as the Framework for Higher Education Qualifications (FHEQ) in the UK, or equivalent frameworks elsewhere. GenAI can also be particularly helpful for suggesting ways to assess outcomes *multimodally*, as well as authentically, in particular disciplinary contexts.

Thirdly, Generative AI has particular value in the research or establishment phases of an assessment artefact. Finding/organising literature for use in a final submission, for example, is often a textual process, but GenAI can help make the process more visual, particularly through the use of AI-enabled tools that iteratively map out and identify connections between authors, papers, journals or concepts. Figure 5, for example, shows a screenshot of the 'Research Rabbit' AI-powered literature search and organisation tool, helping to visually represent the field in a chosen or searched topic area.

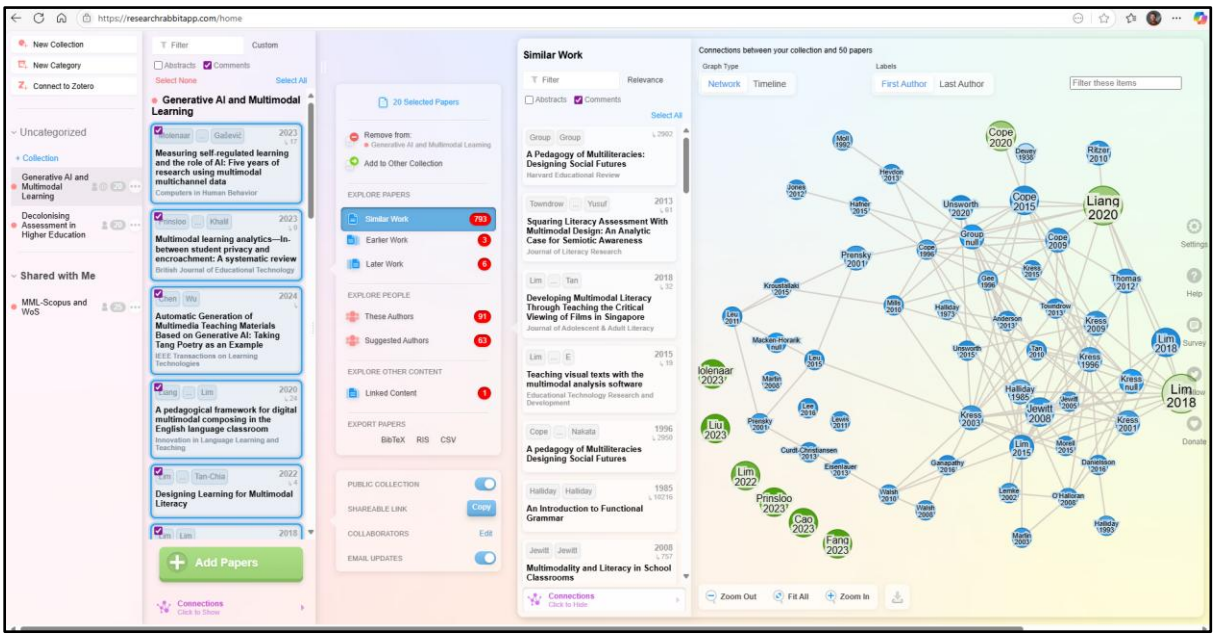


Figure 5. A screenshot of the 'Research Rabbit' tool, showing a map of the scholarly field within the multimodality and Generative AI space.

Interestingly, a recent review of literature on students' engagement with Generative AI emphasised their predominant engagement with text-to-text models like LLMs and a corresponding much lesser understanding of alternatives (e.g. systems that can present textual information as sound, speech, images, etc.), despite these latter systems having distinct advantages in developing reading comprehension, creativity and understanding of core concepts (Heilala et al., 2025). This would imply that learning to use specifically

multimodal Generative AI as part of establishing an assessment artefact could enhance both learning and assessment literacy.

Finally, GenAI might help the student access the assessment better, particularly through multimodal means. GenAI might be used to reformulate the assessment brief, marking criteria, or rubric into an audio form, for example, to help students to better understand and engage with the assessment and ultimately perform better.

Generative AI, then, has the capacity to enhance multimodal assessment at every stage of the assessment process, from conceptualisation and design, through to access and understanding, through to completion and submission.

6.1.2 Generative AI in Multimodal Feedback

Generative AI might help reformulate simple text feedback into something multimodal, in order for students to obtain something more meaningful. Audio feedback has often been touted as preferable to textual feedback, given that students often find it clearer, friendlier, and more discursive than textual feedback that simply points out errors or areas for improvement (Voelkel & Mello, 2015). However, while it is often perceived that recording audio feedback can save time for academics, this is not always the case - it often produces better *quality* feedback, but it is not necessarily *faster* (Voelkel & Mello, 2015), although audio typically generates *many* more comments than written feedback for the same time commitment - we can talk much faster than we write or type.

Utilising the smartphone has seen enhanced results in the distribution of audio feedback and efficiency timewise (Nortcliffe & Middleton, 2012). Audio has also been used for broadcast feedback, or 'generic feedback', targeted at whole cohort assignment groups (Middleton & Nortcliffe, 2010). GenAI might help with this, in that it can perhaps reformulate feedback produced in the form the tutor prefers into other (or multiple) forms, which can then be provided to the student.

Elsewhere, GenAI might act as an additional source of formative feedback for students outside of their interactions with their tutor. Students might provide draft assessments to GenAI tools that then create new artefacts based on the submission. A student might use an AI podcast generator to listen to an AI podcast of their own work, which will provide insights into their own argument, perspective, research context, focus and quality of language. Interactive AIs might also be quizzed on the quality of the draft submission in relation to a set of marking criteria also uploaded to the AI, which provides students with an additional source of guidance on completing the assessment – although it should be noted that this should not *replace* feedback from the tutor, but rather act as a supplementary source. This also creates scope for dialogue-based feedback with AIs, where the student is, in essence, discoursing with their own work.

Generative AI therefore has substantial scope to help create multimodal forms of feedback and help to create more dialogue-based, accessible and holistic forms of feedback outside of textual comments.

6.2 Why do it? GenAI in multimodal assessment and feedback

6.2.1 Assessment

Incorporating Generative AI into multimodal assessment practices has a number of potential benefits:

6.2.1.1 Increased diversity in assessment practices

A multimodal assessment is more likely to have a unique form and a specific, relevant connection to the disciplinary context in which the assessment takes place, and Generative AI provides improved access to multimodal activities.

6.2.1.2 Increased authenticity in assessment practices

The world is multimodal, and the disciplinary contexts in which students will eventually live their professional post-graduation lives will be too. Students are also likely to need to engage with Generative AI in their post-university lives, too, and so using AI to enable or enhance multimodal assessment should make it more relevant and applicable – in other words, authentic – to students.

6.2.1.3 Improved employability and professional skills

Relatedly, using Generative AI in multimodal assessment contexts should also improve students' employability, as they will have engaged with both practices and technologies that are relevant to their future professional contexts.

6.2.1.4 Increased digital literacies and capabilities

AI-enabled multimodal assessments provide opportunities for students to explore a swathe of technologies – not just Generative AI, but more holistic software – to produce assessments (Hung et al., 2012; Ross et al., 2020). They will need to draw connections between technologies to create multimodal artefacts that successfully interact between semiotic forms, thereby developing their wider digital literacies across different technologies.

6.2.1.5 Increased student engagement

Creating more relevant, applicable, authentic and technologically-enabled (yet still *purposeful*) assessments is likely to drive up students' engagement, as they will be more likely to see *why* the assessment is relevant and connected to the discipline they have chosen to study and why it will be helpful to them in future professional or social contexts.

6.2.1.6 Enhanced assessment accessibility and inclusivity

There is potential to increase the accessibility of, and inclusivity of, assessments and assessment processes, by using AI in multimodal contexts, thereby increasing students' assessment literacy/ies. Assessment briefs, rubrics, marking criteria, etc., can all be enhanced and adapted using Generative AI to make them more accessible, while Generative AI can open up practices for students that might not have previously been possible depending on their level of digital literacy and capability, or their more holistic (dis)ability.

6.2.1.7 Enhanced assessment literacy

Assessment literacy can be enhanced through multimodal use of audio and video by the teaching staff by providing the requirements of the assessment in alternative modes. Generative AI podcasting tools could create a more nuanced discussion with which students could interact.

6.2.2. Feedback

In the feedback space, Generative AI-enabled multimodality also has a number of potential benefits:

6.2.2.1 Increased feedback literacy

Using AI to adapt feedback into multimodal forms helps students engage with it in a way that works for them. As a result, students are more likely to make better use of, and get more out of, their feedback if it is presented in a form with which they connect. This also helps to make feedback more accessible, depending on the needs of the individual student. As a result, students are more likely to engage with their feedback, as it will be in a form they find helpful and meaningful.

6.2.2.2 Increased opportunity for dialogic feedback

There is an increased opportunity for dialogic feedback by using AI to create multimodal feedback: students can use AI to engage with their work directly, or create artefacts about the work to discuss with their tutor, or use AI to create an artefact to discuss with their peers, among other activities.

6.2.2.3 Saving time in creating feedback

Using AI to help create or reformulate multimodal forms of feedback can potentially save time for tutors who might otherwise find it difficult or time-consuming, particularly for large groups of students or particularly complex assessments.

Alongside these potential benefits, we recognise that there are naturally some challenges that also come with using this approach. We have collected these together in a dedicated part of this guide; please see Section 7.1 for further challenges of using GenAI in multimodal teaching, learning, and assessment & feedback.

6.3 How to do it? GenAI in Multimodal Assessment/Feedback

6.3.1 Assessment

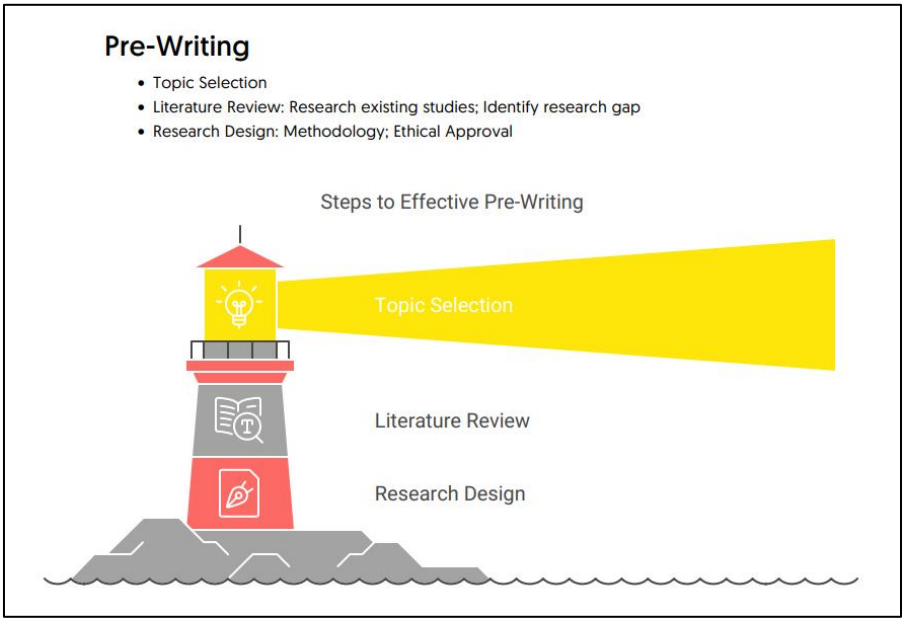
6.3.1.1 AI for Developing Assessment Literacy

To help students understand the purpose of any assessment, a scaffolded approach to develop assessment literacy is needed to help them make sense of assessment practices, interpret assessment tasks and criteria, and to use feedback to improve learning. Below are some potential ideas to try for this approach:

1. Explain the purpose of the assessment and relation to the intended learning outcomes. Consider using multimodal ways to do this including infographics and screencasts.
2. Help students need to understand the different types of assessment e.g. formative, summative, peer, self.
3. Help students make sense of the assessment criteria and marking rubric. Students need to understand what is being assessed e.g. argument, structure, critical thinking, and what this looks like at different performance levels e.g. 2.2 vs 2.1 vs 1st. Consider how an AI generated podcast may help to explain this further.
4. Use GenAI to get feedback on your marking rubrics to clarify your expectations more fully whilst ensuring the language used is clear and inclusive.
5. Review assessment briefs using GenAI acting as different student personas e.g. mature student returning to study, international student whose first language is not English, or a neurodivergent student.
6. Generate a quiz to test students' understanding of the assessment brief and what is required, providing an opportunity to clarify points. Alternatively, students could use GenAI to demystify and interrogate the brief for example by asking 'explain this assessment in plain English' or 'Give me a checklist based on this marking rubric'. Encourage students to use GenAI as a thinking partner.
7. Provide students with information on the opportunities for formative feedback and how to use this feedback effectively. Feedback could be from educators, peers or GenAI. The approach to feedback opportunities, particularly those using GenAI, should be discussed at the start of the process and revisited/evaluated to determine their effectiveness. Discuss how GenAI might be used to provide feedback and the importance of reflecting on suggested improvements.

8. Discuss appropriate and transparent use of GenAI making clear that support should complement, not replace students' thinking and academic judgement. Explicitly teach students how AI tools can be used ethically and within academic regulations. Consider using the Generative AI CHECKlist cards (Beckingham & Hartley, 2025) to engage students in an active discussion about the appropriate use of AI.

Case study summary: Assessment – A Multimodal Approach to Unpacking a Dissertation Assessment Brief by Sue Beckingham, Associate Professor, Sheffield Hallam University



This case study outlines how an AI generated infographic maker called Napkin.AI was used to create a collection of visuals based on information provided to it by students. The prompts given to Napkin.AI were to create the infographics and NotebookLM was used to create a podcast discussion based on the infographics.

(Full case study is included in Appendix A.)

Case study summary: Assessment – Formative Assessment Activities for Using Generative AI Responsibly and Ethically by Sue Beckingham, Associate Professor, Sheffield Hallam University

The Generative AI CHECKLIST is a multimodal resource that can be used as a formative assessment activity to discuss how this technology can be used responsibly and ethically. It uses an infographic poster to outline nine points for consideration which can be used as a handout. The infographic PDF was then used to create a NotebookLM podcast which discusses what the checklist is and the benefits of using it. This audio recording can then be shared with students as a summary of the checklist. To check understanding, ChatGPT is used to create a multiple-choice quiz.

(Full case study is included in Appendix A.)

Case study summary: Assessment – Strategies for Integrating AI-generated (GenAI) Technologies in Assessment by Mari Cruz García Vallejo, Digital Education Consultant and Affiliated Lecturer at the ULPGC (Spain)

This bilingual case study presents a practical design guide intended for both novice and experienced higher education lecturers. It provides strategies for integrating AI-generated (GenAI) technologies in assessment within their teaching practices. The design guide is based on the concept of authentic assessment, a practical approach that enables students to connect and apply knowledge gained in the classroom to real-world tasks or projects relevant to their academic or professional disciplines. Additionally, the guide promotes assessment for learning, particularly through the modality of assessment as learning, by shifting the assessment focus to students themselves, who take on the roles of assessors of their own work and that of their peers.

(Full case study is included in Appendix A.)

6.3.1.2 AI for Building/Transforming Assessments

When building/transforming multimodal assessments using GenAI, you should take the following steps:

1. Evaluate the learning outcome to which the assessment is/will be tied. What skill, knowledge, or ability are you seeking to assess, and what do you think is the most appropriate active task that students could do to show you that they have met that skill?

2. Consider the different stages, elements or aspects of the task you have set. The focus of the overall task will determine which of these stages is the most pronounced or vital to the assessment as a whole, giving you something to target. For example, is the assessment primarily focused on the research process? Or is it the students' ability to present information? Or is it to test their capacity to analyse an artefact?
3. In what way is the assessment multimodal, and/or could it incorporate multimodality to help them achieve the goal more effectively and/or get more out of the assessment task?
4. Ensure that multimodality is used in conjunction with the correct learning environment and with the correct resources so that students are able to complete the task effectively, and in a format that avoids creating either cognitive or assessment overload (Varga-Atkins, 2024).
5. Connect the two concepts together – the focus of the task and its multimodal format. How might the focus of the task be presented multimodally? For example, if the task focuses on the students' ability to research a topic, can they produce a pictorial representation of the landscape of the field as a result of their work?
6. The focus of the task and the multimodal elements within it provide steerage on the way GenAI might be helpful for students. The use of GenAI can take three forms.

    6.1. You can consider whether there are GenAI tools that might help with creating certain elements of the overall submission that would normally take too large an amount of time and effort to create relative to their importance to the assessment as a whole (such as images, videos, audio recordings, infographics, etc.)…
    6.2. …Or you might consider whether GenAI might be useful in either the research process or the dissemination/presentation activities, if applicable. AI might help students to construct literature reviews, bibliographies or pictorial representations of the field, create multimodal artefacts that present the findings or overall message of their artefact.
    6.3. Thirdly, you might consider whether GenAI might act as an additional source of support or information for students completing the assessment. Can GenAI be used to create datasets on which students perform analyses? Or can it act as a character or figure with which the student interacts to help complete the assessment?

7. Regardless of how GenAI is positioned in the multimodal assessment, you should provide the instructions on the assessment, and the associated use of GenAI, in clear terms to students via assessment briefs, marking criteria, rubrics, etc. These

can also be multimodal for maximum accessibility, and GenAI might help reformulate this information into more accessible or user-friendly formats.

8. Instructions for the use of GenAI in the assessment context should always include reference to specific tools that meet institutional requirements and/or adhere to institutional policies on the use of the technology.
9. Instructions for the use of GenAI should also specifically reference ways to use the technology relevantly and ethically, and should instruct students to limit their use of the technology to contexts where it is actually needed on sustainability grounds.
10. Any multimodal assessment designed that incorporates GenAI in some way should also be able to be completed without the use of GenAI, to allow students who do not wish to use it on ethical grounds, or otherwise are unable to use it, to complete the task just as effectively as those who did. Those who use GenAI should not be given an advantage over those who choose not to.

Case study summary: Assessment - How much can AI (at present) Contribute to Identifying and Writing about Classification and Nature? by Tom Hartman, Lecturer in Biology, University of Nottingham – Biology

This case study outlines an AI-enabled approach to accurately identifying wildlife species via photographs and to develop critical appraisal of Generative AI outputs as part of the process. To supplement students' training in taking high-quality wildlife photographs and accurately identifying species, they were given briefs to identify birdsong using the Merlin app, take images of different species and identify them using Google Lens and then critically evaluate text on the locality and wildlife written by ChatGPT. They were then asked to mark the AI derived essay and write a reflection on the experience.

(Full case study is included in Appendix A.)

6.3.1.3 AI for Completing Assessments

When students are *completing* multimodal assessments using GenAI, they should consider:

1. The most appropriate point at which GenAI can be used so that it is at its most helpful. For example, GenAI could be very helpful for creating background assets or imagery that would take a lot of time relative to their importance to the overall assessment.
2. The position of GenAI at every stage of the assessment process, relative to the instructions of the assessment task:

    a. In the initial stages, GenAI could be used as a tutor or research assistant to refine research questions, scaffold the approach to the assessment in the

context of the marking criteria, or perform and evaluate initial research/understand the critical field and how it interacts.

b. In the completion stage, GenAI could be used as an assistive technology to help construct different aspects of the multimodal assessment. GenAI can be very helpful to create individual aspects of a multimodal artefact, but it is up to the student to ensure that the multimodal components are integrated together to form the coherent whole in a way that makes sense, that answers the task of the assessment, and says what the student wants it to say.
c. In the post-assessment phase (or perhaps the post-completion, pre-submission phase), GenAI can be used again as a reflective tutor or assistant to reflect on how well the multimodal submission answers the task of the assessment and to compare the submission to the structural aspects of the assessment - marking criteria, rubrics, etc., in order to obtain informal, additional feedback either before or after submission.

3. How GenAI might be useful in turning a single-mode artefact into a multimodal one – if a student has worked entirely textually to create a draft, GenAI can perhaps help convert it into multimodal contexts, or vice versa.
4. How GenAI might be helpful in some of the wider aspects of the assessment that do not directly relate to its purpose or argument, but which could still be useful – for example, (re)formatting reference lists (which should be manually checked).

6.3.2 Feedback - Enhancing feedback practices

When considering using GenAI to enhance feedback practices, you should take the following steps:

1. Consider the context that you're thinking about using GenAI in the specific assessment that you have set students. Do you want AI to construct the feedback, or reformulate it into alternative forms? Or both?
2. Consider how you might encourage students to self-feedback using GenAI, or to speed up self-feedback processes that already exist, like revision. For example, students might consider making flashcards using lecture material and/or their assessments and use them for exam revision, or they might submit formative assessment tasks to a GenAI and ask it for feedback in multimodal forms.
3. Consider how you might help develop students' assessment literacy by allowing *them* to mark a GenAI-generated version of the assessment before or after completing it for themselves. This can be helpful as it would not be real student work, can be calibrated according to the level at which you want the sample assessment to be marked (i.e. asking GenAI to construct a 'good' piece of work or a

'poor' one), and can be structured to also show students specifically what their assessment could look like when they complete it for themselves.

4. Consider using AI-enabled feedback processes throughout the assessment - an AI reflection log, for example, can help students make effective use of the technology, reflect on their assessments, and also critically consider GenAI itself as they complete the assessment.
5. Consider the use of GenAI in your own processes – it can perhaps help you to reframe some of your language into more accessible formats, pictorial formats, or other multimodal contexts (and you can discuss your own reactions with students).

Case study summary: Assessment – Using NotebookLM to Develop Students' Assessment and Feedback Literacy by Samuel Saunders, Educational Developer, University of Liverpool

This case study explores how students can use NotebookLM, a Google product that is designed as a research organiser, note-taker and resource manager, to develop their assessment and feedback literacy. Students use the 'audio overview' feature of the platform to generate an AI-presented podcast of their draft assessments, on which they then reflect and use to enhance the draft ahead of summative submission. Students upload their work to NotebookLM, generate the podcast and listen to the output, and can interact with the AI presenters to determine what the assessment is doing well in terms of argument, structure, analysis or evaluation, etc., Students can ask the presenters what they need to do next to ensure it reaches the higher levels of the marking criteria/rubric. The activity is designed to both develop their literacy around their own work and what they need to do to succeed in the assessment itself. It also provide a new space for dialogic interaction concerning an assessment and feedback process.

(Full case study is included in Appendix A.)

7. Considerations

In this section, we explore the challenges and risks of using AI (7.1) as well as selecting GenAI platforms for multimodal contexts (7.2).

7.1 Challenges and risks of using GenAI in Learning, Teaching and Assessment

Above, we have listed some of the benefits of using GenAI in multimodal education. In this section, we enlist some of its challenges, complementing our earlier Section 2 on Responsible use of AI.

7.1.1 Risks of stifling creativity

While GenAI can enhance creativity by generating diverse ideas and formats, there is also a risk that over-reliance on GenAI outputs may constrain original thinking. If students default to AI-generated suggestions without critically interrogating or reworking them, they may miss opportunities to develop their own creative problem-solving skills (Chan & Hu, 2023). Educators should work to explicitly design activities that require students to extend, adapt, critique, or even abandon, GenAI outputs rather than adopt them wholesale.

7.1.2 Potential for dependency on GenAI

The convenience of AI tools may inadvertently foster dependence, where students come to expect AI to initiate or structure their work. This can undermine the development of essential skills such as independent research, critical analysis, and self-regulation (Beckingham et al., 2024). Clear guidance is needed on when and how GenAI should support learning tasks, making space for students to engage with content and ideas without technological mediation.

7.1.3 Bypassing reflective processes

GenAI's speed and efficiency can compress stages of the learning cycle that are vital for reflection and metacognition (Ng et al., 2024). For instance, automated summaries or visualisations may provide answers too quickly, bypassing the deep thinking that arises from manual synthesis. Educators should intentionally build pause points into tasks that prompt students to reflect on both the content and the process of working with AI, ensuring that reflective learning is not lost amidst efficiency gains.

7.2 Selecting GenAI platforms

Selecting and using generative AI (GenAI) platforms for multimodal teaching, learning and assessment requires balancing pedagogical purpose, ethical practice and practical

functionality. This section provides principles and starting points rather than specific recommendations, recognising that platforms evolve rapidly.

7.2.1 Purpose-driven selection

Before choosing a tool, consider:

- What is the learning outcome? Clarify whether the goal is idea generation, multimodal content creation (e.g. text-to-image, text-to-audio), or critical evaluation of AI outputs.
- Which modalities are essential? Decide whether visuals, audio, video or interactive simulations are genuinely needed to meet the outcome.
- Who are the users? Reflect on students' digital skills, accessibility needs and device access.
- Is it ethical and inclusive? Check for potential bias, privacy and representation issues in the platform's design and outputs.

7.2.2 Typology of multimodal GenAI tools

Drawing on the *There is an App for that* typology (see for instance the 'There's an AI for that' website), multimodal GenAI tools can be grouped by their core function. These categories help educators map tools to learning outcomes without prescribing specific platforms:

- Text generation and enhancement – for producing written outputs, summaries or scripts (e.g. large language models).
- Text-to-image generation – for creating diagrams, visual metaphors or illustrative content.
- Text-to-audio or speech synthesis – for podcasts, narration or multimodal feedback.
- Image-to-text or multimodal analysis – interpreting images, diagrams or handwriting.
- Video and animation creation – for explainer videos, avatars or short animations.
- Music and sound generation – for background tracks, soundscapes or audio cues.
- Translation and language adaptation – converting or adapting content across languages and modes.
- Drawing and sketch-based tools – generating visuals from hand-drawn inputs (e.g. concept sketches or quick diagrams).
- Avatar and persona creation – developing characters or role-play scenarios to enhance interactivity.

7.2.3 Steps to get started

1. Check institutional policy: confirm approved tools and clarify data privacy requirements (e.g. avoid uploading identifiable student work to public platforms).
2. Create a secure account: use university logins where available and review privacy settings to manage data retention.
3. Start with one modality: begin by experimenting with one function (e.g. text-to-image) before layering multiple modes.
4. Model and scaffold usage: demonstrate your workflow to students, including prompt design and critical evaluation of AI outputs.
5. Embed reflection and critique: incorporate activities where students assess outputs for bias, accuracy and appropriateness for their discipline.

7.2.4 Key considerations

- Bias and representation: While many platforms are improving (e.g. more diverse image outputs), educators must still discuss and critique representation with students.
- Accessibility and inclusion: Multimodal formats can support neurodivergent and multilingual learners but should remain optional.
- Sustainability: High-energy tasks (e.g. image and video generation) should only be used where they add pedagogical value.
- Equity of access: Ensure tasks do not disadvantage students without access to premium features or high-spec devices.

This guide has avoided endorsing particular tools in its main sections to remain relevant as the technology evolves. Educators are encouraged to regularly review and share emerging tools within institutional communities of practice.

8. Towards a Unifying Model of Multimodal Learning Design with Generative AI (MMLD-AI)

This guide has somewhat compartmentalised Generative AI in multimodal pedagogy by organising it in discrete sections on learning, teaching and assessment. We have done so for the sake of focus rather than to position these as separate entities - they are always interconnected and interdependent. Overall, we have striven to point out how Generative AI might be useful, helpful, or fundamentally embedded into pedagogic activities across all three spaces, and offer advice, guidance and tips for implementing it alongside case studies where others have already done so. However, there is natural overlap between these three areas, and so it makes sense to consider how Generative AI might be embedded into all areas of pedagogy simultaneously and whether there may be a unifying model or way to express this.

To help facilitate this unifying approach, we contend that educators can consider multimodal learning design with GenAI guided by both the principles of Universal Design for Learning (CAST 2024), and the ABC Design for Learning approach.

Universal Design for Learning (UDL) argues that learning environments should be flexible, should accommodate the diverse needs of all students, and should focus on developing students' agency over their own learning and/or that learning should be self-constructed. Its three principles are designing options for 1) multiple means of engagement, 2) multiple means of representation and 3) multiple means of action and expression.

The ABC Design for Learning approach, meanwhile, storyboards the student's journey through a module/programme and helps educators consider the types of learning activities that students would engage with in order to progress in their learning, relating to learning purpose, structure and outcome. For more information, please consult the ABC Learning Design (Laurillard 2012; Young & Perović, 2019).

The figure below (Figure 6) shows how these two designs have been adapted and merged into a **unifying model of multimodal learning design with Generative AI (MMLD-AI)**. On the left, the model indicates that education actors need to consider multimodality when planning and engaging in: 1) instruction, 2) learning resources/representations, and 3) student action and expression, taking into account the principles of Universal Design for Learning. The model then zooms in on students' action and expression, focusing on six multimodal engagement types with Generative AI on the right, adapted from the six learning types or acts of the ABC Learning Design. In other words, it can provide a 'storyboard' of the six types of educational engagements with GenAI, in relation to the three interconnected areas of education shown on the left, with emphasis on student multimodal action and expression:

- acquisition of information,
- investigation and/or research,
- collaboration with others,
- production of artefacts (for learning, teaching or assessment purposes),
- practice of approaches/theories/principles/skills, and
- discussion/discourse, including critique/evaluation.

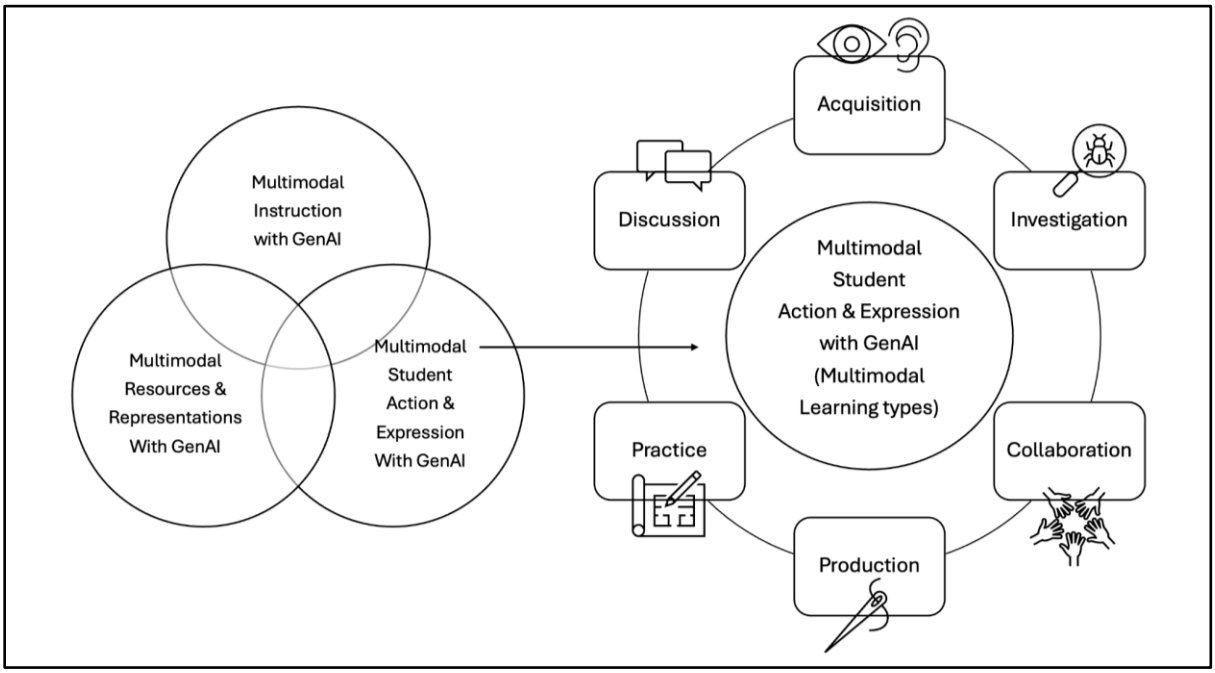


Figure 6. **MMLD-AI model**: A unifying model of multimodal learning design with GenAI

Then, once the nature of learning type has been decided, [decision making – then decide on strengths] multimodal affordances of GenAI and respective strengths of the cyber-social learning are to be explored. The MDL-AI model also includes different processes, building on the work by Galla, Cope & Kalantzis (2025), which revisits Bloom's taxonomy. We recommend that their Dual-Track Cyber-Social Learning Model is considered as complementary to the MDL-AI model, as it clearly highlights the strengths of both humans and AI in learning designs.

Galla, Cope and Kalantzis (2025) detail (Table 1) the learning process in relation to human vs AI strengths (e.g. in interpretation and analysis) and based on these how an effective cyber-social approach may look like that utilise the strengths of each (human/AI),which they call the dual-track cyber social model. The authors also suggest that effective learning design should cover key areas of exploring effective AI/human collaboration strategies (prompting, evaluation, verification), fostering metacognitive awareness (self vs AI strengths/weaknesses), and AI literacy, i.e. responsible, ethical use of GenAI (bias, privacy).

Table 1. The Dual-Track Cyber-Social Learning Model (Galla et al., 2025, pp 15-16): Human–AI strengths and cyber-social approach across processes

Process	Human strengths	AI strengths	Cyber-social approach
Knowledge & framing	Contextual understanding; Purpose-driven inquiry; Common sense & embodied knowledge; Critical verification	Rapid data retrieval across vast sources; Statistical pattern recognition; Broad topical coverage	Humans define creative purpose and frame problems; AI generates background data and inspiration; Humans filter for relevance and verify information
Interpretation & analysis	Causal reasoning; Cultural and ethical awareness; Implicit meaning recognition; Emotional intelligence	Correlation analysis; Theme/pattern identification; Feature extraction at scale; Systematic decomposition	AI identifies statistical patterns and correlations; Humans determine causality, relevance, and deeper significance; Together they build richer understanding
Application & prototyping	Situated judgement; Adaptive problem-solving; Ethical decision-making; Craftsmanship	Rapid simulation of multiple scenarios; Consistent rule application; Code/digital artefact generation	AI rapidly generates digital prototypes or models; Humans adapt designs for real-world complexity, apply physical craft, and ensure ethical implementation
Synthesis & creation	Novel conceptual blending; Purpose-driven integration; Narrative coherence; Embodied insights	Cross-domain pattern integration; Combinatorial exploration; Rapid iteration of variations	AI explores possible combinations and variations; Humans provide creative vision, ensure conceptual coherence, infuse emotional depth, and establish authentic voice

Evaluation & refinement	Ethical and aesthetic judgement; Contextual appropriateness; Holistic value assessment; Impact consideration	Quantitative assessment; Consistency checking; Comparison across cases; Anomaly detection	AI provides objective metrics and consistency checks; Humans make value judgements, assess ethical implications, and determine significance

Together with the MDL-AI model, this table provides a means of tying together all the approaches outlined in the Teaching, Learning and Assessment/Feedback sections of this guide. If it is implemented sensibly, critically, and as ethically as possible, GenAI in multimodal contexts can help students achieve all six of these steps in effective ways, across all three pedagogic contexts.

One way of progressing Galla et al.'s *cyber-social dual-track model* would be to refine and further develop it for multimodal GenAI contexts. With emerging technologies in areas such as touch perception, dexterity, human–robot interaction, as well as GenAI and multimodal data, embodied intelligence is expected to evolve further, supporting richer interactions between students and computers in both virtual and physical environments (Feng et al., 2025).

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Appendix A. Case studies

Table of Case Studies

Case Study	Author(s)	Category
Using Generative AI to Enhance Learning in Computational Chemistry	Sarvin Bahmani	Learning
A Multimodal Approach to Unpacking a Dissertation Assessment Brief	Sue Beckingham	Assessment
Formative Assessment Activities for Using Generative AI Responsibly and Ethically	Sue Beckingham	Assessment
Live Storytelling through Generative AI Powered Avatars	Simon Campion, Radoslaw Dorociak, Georg Meyer	Learning
Strategies for Integrating AI-generated (GenAI) Technologies in Assessment	Mari Cruz García Vallejo	Assessment
Experimental Practice – Using Mind Maps in Project Planning to Foster Inclusion	Gareth Ellis	Learning
Enhancing Learning with AI Tools for Idea Generation	Katherine Geer, Daniel Hsu	Learning
Enhancing Engagement through Streaming Avatars and Synchronous AI Assistants in Online Education	Ioannis Glinavos	Teaching
How much can AI (at present) Contribute to Identifying and Writing about Classification and Nature?	Tom Hartman	Assessment
Using Generative AI to Aid Studying and Learning for Medical Students	Ayaat Jaway	Learning
Exploratory Learning using GAI to support Presentations	Liam Kaye, Chris Barlow	Learning
Peer Conflict Resolution in Group Work: Using GenAI to Represent Subject Knowledge Multimodally	Rob Lindsay	Teaching

A Multimodal Groupwork Activity: Fostering Belonging Among First-Year Bioscience Students	Alice Maher	Learning
AI Visual Metaphor Activity (SEDA Learning to Tutor Online Course)	Elora Marston, Jonathan Rhodes	Teaching
Leveraging Generative AI for Enhanced Entrepreneurial Teaching	Magdalena Plesa	Learning
Using NotebookLM Generated Podcasts to Develop Students' Assessment and Feedback Literacy	Samuel Saunders	Assessment
Perk Up Your Academic Journey: A Coffee Shop Adventure	Laura Sharp, Eric Davies, Mia Wilson, Ailsa Foley	Teaching
Improving Engagement with eLearning by Creating Multimodal Video-Explainer	Vivien Shaw	Teaching
The role of GenAI in Design for the Disassembly of Emergency Shelters	Farkhondeh Vahdati	Learning

Using Generative AI to Enhance Learning in Computational Chemistry

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What is the MML Idea?

I used multimodal Generative AI tools such as ChatGPT and DALL·E alongside computational platforms like Comgen and FUSE. These tools allowed me to create learning materials that combine textual summaries, chemical diagrams, interactive code, and teaching presentations. By simplifying dense textbook theory and translating it into accessible outputs, I aim to improve learning for diverse student audiences, especially those who require more inclusive resources.

This example includes Generative AI elements of:

- Image
- Code
- Text
- Speech

Why This Idea?

Computational chemistry is inherently multimodal—it involves theoretical descriptions, visual representations of chemical structures, and the practical use of code. Traditionally, this creates barriers for students, particularly when material is abstract, inaccessible, or overly technical.

To address this, I integrate multimodal GenAI in my work to break down chemical concepts. I use NLP tools to extract and simplify content from textbooks—for example, converting explanations of "ionic charge balancing" or "SMT solving" into clear, student-friendly summaries. Visual learners benefit when I prompt tools to generate diagrams like "a lithium-rich oxide lattice showing charge balancing," making the invisible visible.

GenAI also helps me generate and debug code for chemistry software, simplifying workflows and making advanced methods more approachable. In presentations, I use GenAI to create concise, illustrated slides explaining topics such as constraint-based vs. enumeration-based composition generation. Finally, I upload molecular diagrams to receive automatically generated text annotations, improving accessibility for students who struggle with visual processing.

By combining these outputs, I create inclusive and engaging learning experiences that support student understanding across levels of familiarity.

How Could Others Implement This Idea?

Step-by-step instructions for implementing the idea.

Step 1: Input complex chemistry text into GenAI for simplification
Use the natural language processing (NLP) capabilities of GenAI (e.g. GPT-4) to simplify complex textbook explanations or technical terms.

Example prompt:

> 'Simplify the explanation of ionic charge balancing in lithium-rich oxides for a beginner student.'

Step 2: Generate a visual diagram from a text prompt
Use GenAI's visual generation capabilities to turn abstract chemical concepts into diagrams.

Example prompt:

> 'Generate a diagram illustrating charge balancing within a lithium-rich oxide lattice.'

Step 3: Input code snippets for explanation or debugging
If working with Python tools like FUSE or Comgen, paste code into the GenAI platform and request clarification or fixes.

Example prompt:

> 'Explain the following code used for SMT solving in a ternary system.'

Step 4: Request GenAI to create teaching slides
Use GenAI to develop slides that present complex information in a digestible and visually engaging way.

Example prompt:

> 'Create a clear slide explaining constraint-based versus enumeration-based composition generation in chemistry.'

***Step 5*: Convert Images into Descriptive Text**
Leverage image input features and upload chemistry-related images (e.g. molecular diagrams) and use GenAI's image recognition capabilities to produce text descriptions or annotations.

Example prompt:

> 'What is this diagram showing? Add labels and a description suitable for undergraduate students.'

This approach can be adopted by educators or students in computational chemistry or related fields to enhance learning through multimodal GenAI. Each step helps make abstract chemical concepts more accessible, supporting diverse learners and encouraging engagement through visual and interactive formats.

Links to Tools and Resources:

- ChatGPT
- Gemini

Image:

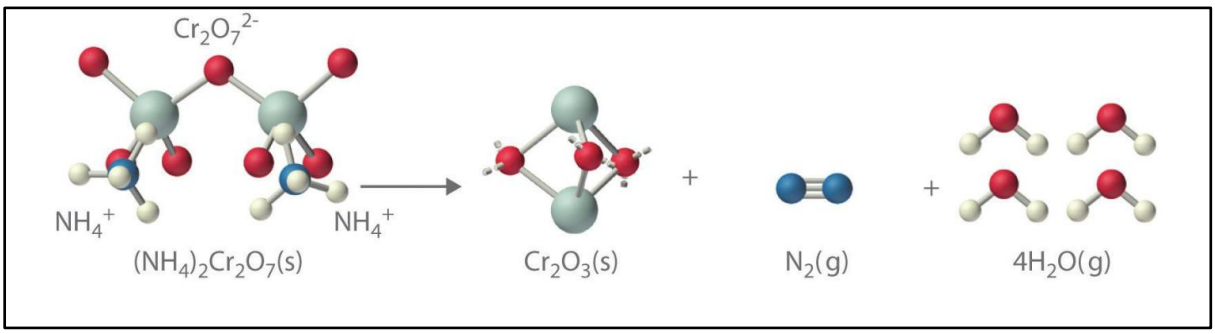

Figure 1. Automatically Generated Textual Annotation from Chemical Structure Image (output example)

Using GenAI's multimodal capabilities, an uploaded chemical reaction diagram is analysed and clearly annotated:

'This diagram shows the decomposition reaction of ammonium dichromate

(NH4)2Cr2O7(NH_4)_2Cr2O__7(NH4)2 Cr2 O7. It breaks down into chromium(III) oxide Cr2O3Cr2O__3Cr2 O3, nitrogen gas N2N_2N2, and water vapor H2OH2OH2 O. The visual clearly represents each molecule's structure: ammonium ions NH4+NH 4^+NH4+, dichromate_ions Cr2O72-Cr2O__7^{2-}Cr2 O72-, and the products formed.

Such annotated explanations help students directly interpret chemical visuals, making complex chemical reactions easier to understand.'

This type of annotated visual greatly improves accessibility for students who benefit from clear, multimodal explanations of chemical structures and reactions.

References:

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A Multimodal Approach to Unpacking a Dissertation Assessment Brief

Name: Sue Beckingham
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Contact Details: Sheffield Hallam University

Relevant Links:
Sheffield Hallam University - Sue Beckingham
LinkedIn - Sue Beckingham

What is the MML Idea?

I used an AI generated infographic maker called Napkin, which created a collection of visuals based on the information provided. The prompts given to Napkin were to create the infographics and NotebookLM was used to create a podcast discussion based on the infographics.

This example includes Generative AI elements of:

- Image
- Sound
- Speech
- Text

Why This Idea?

The dissertation is traditionally a final capstone project and possibly the biggest written assessment students will experience. Typically the students will receive an assessment brief and assessment criteria which will be used as a marking rubric. Whilst this can be presented as a very detailed Word document, it can be helpful to break up what is required into smaller chunks and summarise with visuals. Infographics can convey messages in a concise and engaging way, bringing out key points visually (Ritchie et al, 2012) Data visualisation can grab a reader's attention through four visual preattentive attributes: form, colour, spatial position and movement (Ware, 2020, 2021). For example, a simple pie chart can be used to visualise data and colour to highlight different aspects.

How Could Others Implement This Idea?

The prompts given to Napkin were to create infographics based on the following headings and bullet points:

Pre-Writing	Post-Writing
• Topic Selection • Literature Review • Research existing studies • Identify research gap • Research Design • Methodology • Ethical Approvals **Writing** • Introduction • Research problem • Objectives • Literature Review Section • Methodology Section • Results • Data analysis • Visualisations • Discussion • Interpret findings • Relate to objectives • Conclusion and Recommendations • Summarise key points and suggest future work • References using APA formatting	• Proofreading • Grammar check • Formatting compliance • Plagiarism Check **Submission** • Adhere to deadline • Upload as per guidelines **Evaluation** • Prepare for viva • Address reviewer feedback

Using Napkin

Go to Napkin

Within this app you can then add the text you wish to use or generate using AI by adding a prompt to generate text content. Once you have the text you wish to use, you can then select all of it or a specific text section you wish to generate a visual for. This app provides multiple options of visuals to choose from with options of different styles and background colours. Each visual can then be downloaded as a PNG image and added to the document of your choice.

Four stages of the academic writing process

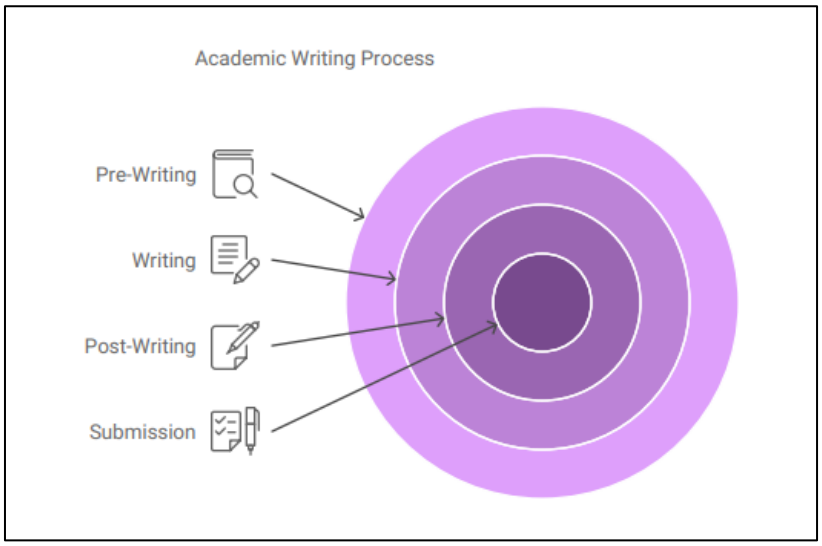

Figure 1. Infographic with four stages of the academic writing process

Pre-writing

This involves topic selection, a literature review, and research design.

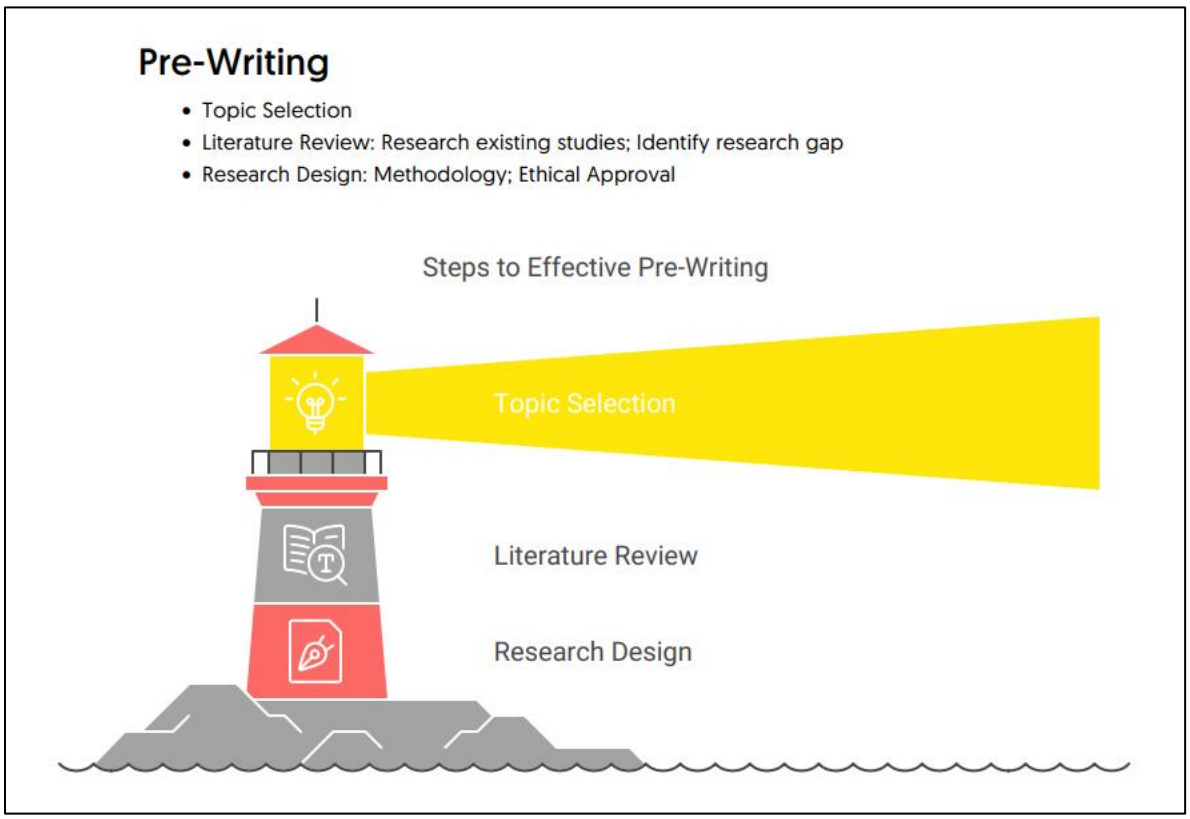

Figure 2. Infographic with the pre-writing process steps

Writing

This covers the creation of the introduction, literature review, methodology, results, discussion, and conclusion sections.

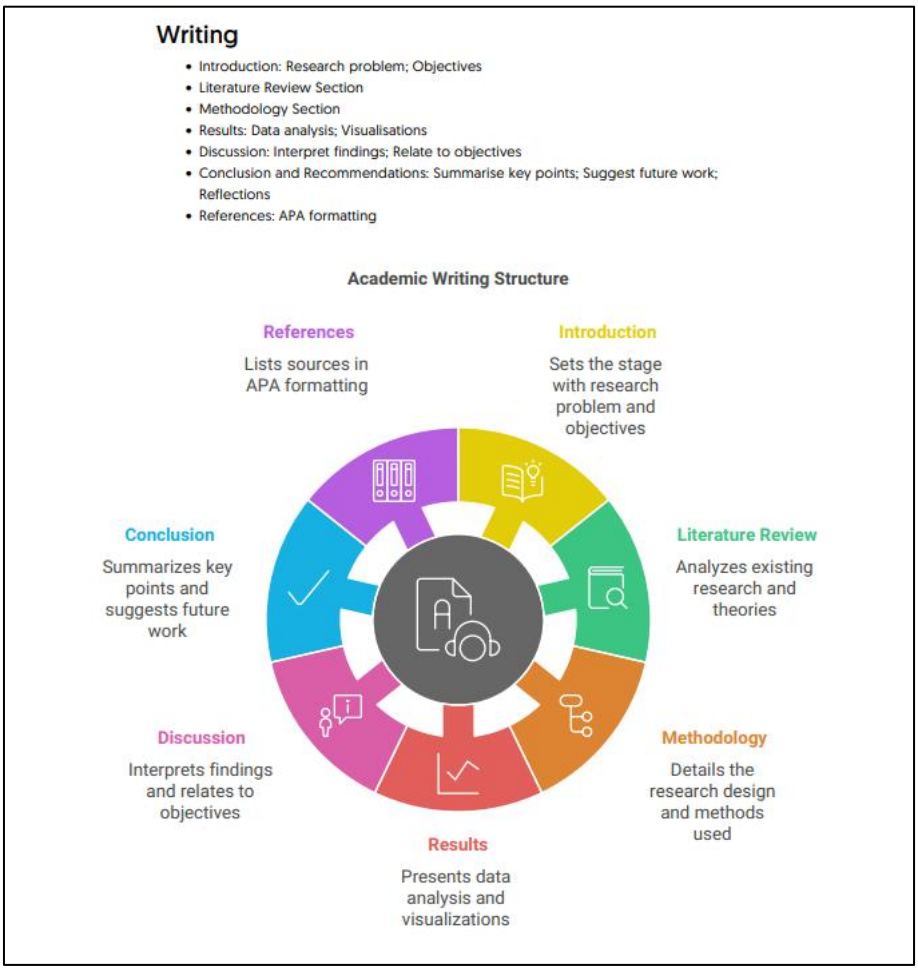

Figure 3. Infographic with the writing process components

Post-writing

This focuses on proofreading, plagiarism checks, submission, and preparing for evaluation.

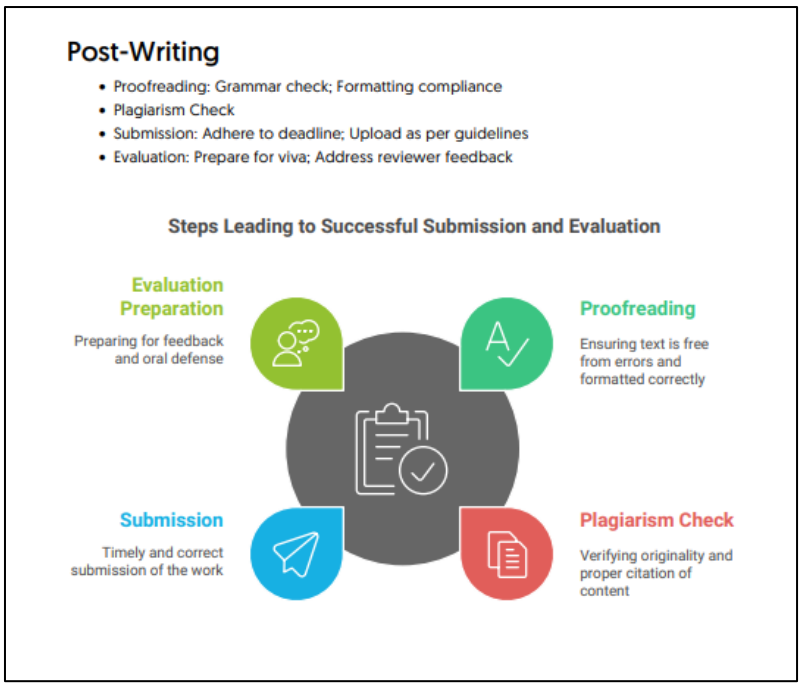

Figure 4. Infographic with the post-writing process components and steps for successful submission

The next stage was to use NotebookLM to create an informative podcast. Using the assessment brief and assessment criteria, alongside the stages of dissertation infographic, these files were uploaded as PDFs.

NotebookLM then created a podcast discussing the content of the documents uploaded. This highlighted the key components of academic writing structure, such as the introduction, literature review, methodology, results, discussion, and conclusion. It also emphasised the importance of keeping a research log, proper referencing and timely submission.

Link to the: Dissertation Writing Stages podcast

The summary of the podcast created is:

> The first source details the requirements and assessment criteria for a university dissertation, including word count, formatting guidelines, ethical research protocols, and marking scheme. It specifies the need for original research within business or IT, emphasises ethical conduct, and warns against plagiarism, especially using AI tools. The second source outlines the stages of dissertation writing, from topic selection and literature review to data analysis, discussion, and finally, submission and evaluation. Both sources aim to guide students through the process of producing a high-quality dissertation.

This case study could be adapted in part or whole for any assessment brief.

- Consider how visuals in the form of infographics could be used to capture key points in an assessment brief or any user guides relating to the assessment.
- Use NotebookLM to discuss and summarise an assessment brief and assessment criteria. This can be used to supplement the written documents you will upload to your VLE.

Links to Tools and Resources:

- Dissertation Writing Stages podcast
- Napkin – free infographic maker converting text to mind maps, flowcharts, and more.
- NotebookLM – used to create the podcast discussion

References:

Ritchie, J., Crooks, R. and Lankow, J. (2012) *Infographics: The Power of Visual Storytelling.* Wiley.

Ware, C. (2020) *Information Visualization: Perception for Design 4th edn*. Morgan Kaufmann.

Ware, C. (2021) *Visual Thinking for Information Design 2nd edn*. Morgan Kaufmann

Formative Assessment Activities for Using Generative AI Responsibly and Ethically

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What is the MML Idea?

The Generative AI CHECKLIST is a multimodal resource that can be used as a formative assessment activity to discuss how this technology can be used responsibly and ethically. It uses an infographic poster to outline nine points for consideration which can be used as a handout. The infographic PDF was then used to create a NotebookLM podcast which discusses what the checklist is and the benefits of using it. This audio recording can then be shared with students as a summary of the checklist. To check understanding, ChatGPT is used to create a multiple-choice quiz.

This example includes Generative AI elements of:

- Image
- Sound
- Speech
- Text

Why This Idea?

Research undertaken by Jisc (2023, 2024) with students has highlighted that there was a lack of clear guidance from their institutions on how to use Generative AI (GenAI) responsibly and ethically. The students wanted to understand what was considered acceptable use, develop their information literacy, how to critically evaluate outputs and also acquire GenAI skills that may be needed in future workplaces. We therefore have a duty to help support students to do this by providing a collaborative sandpit to learn how GenAI can be used appropriately (Beckingham et al, 2024).

The GenAI checklist was created to provide a multimodal formative assessment activity where the tutor and students can engage in a discussion about the responsible use of the growing number of tools available. The use of an infographic and podcast can be used to structure the discussion and serve as a resource to revisit and check student understanding. A low-stake formative test in the form of a quiz is then created to see what the students recall and provide them with feedback (Mollick and Mollick, 2023).

The Generative AI CHECKLIST infographic outlines a checklist for responsibly using generative AI. Key steps include validating AI-generated information with other sources, formulating precise prompts to elicit desired results, and critically evaluating the AI's responses for accuracy and bias. The checklist also emphasises the importance of setting clear learning goals, expanding knowledge beyond the AI's output, and developing effective learning habits that don't overly rely on generative AI tools. Finally, it advocates for responsible usage, considering both the benefits and environmental impact.

The use of NotebookLM takes the checklist and creates a podcast summarising and discussing each of the points listed. This provides users of the checklist a running commentary bringing out the key messages. The audio recording is just 6 minutes, so it is convenient to listen to.

This activity provides both a visual and audio resource to discuss the importance of critically using generative AI. Finally, the multiple-choice quiz created using ChatGPT is used as a formative low stakes test to gauge understanding.

How Could Others Implement This Idea?

You may wish to create your own checklist, guidance or a list of instructions. This is likely to be initially either captured in a Word document or handwritten in a notebook.

- **Create an infographic to outline key points.**
  Go to Piktochart or an infographic maker of your choice. Select a template, colour scheme and use the free searchable icons to reflect the information you are going to add. Once completed you can save this as a PDF and an image file. The PDF can be used for the next two resources; and the JPEG or PNG image file can be used to embed in your module VLE and/or shared with students via social media.
- **Create an audio podcast as a summary**
  Go to NotebookLM and upload the PDF of the document you want to use. It will then summarise the document in the form of a podcast.
- **Create a multiple-choice quiz to check students understanding**
  Go to ChatGPT and upload your PDF. Then adapt the following prompt which was used for the checklist:
  You are a quiz creator and I would like you to please give me a good low-stakes test based on the Generative AI CHECKLIST [add your title]. I want to check students' understanding of this infographic checklist [edit as appropriate] and set them a minimum of 10 multiple choice questions. The questions should be highly relevant and address each point on the checklist. Multiple choice questions should include plausible, alternate responses and should not include an "all of the above option." At the end of the quiz, you will provide an answer key and explain the right answer.

Links to Tools and Resources:

- Beckingham, S. and Hartley, P. (2024). The Generative AI CHECKLIST. National Teaching Repository. Educational resource.
- Beckingham, S. and Hartley, P. (2024). The Generative AI CHECKLIST. NotebookLM.
- Canva – another free infographic maker
- ChatGPT – used to create a multiple-choice quiz based on the content in the infographic.
- NotebookLM – used to create the podcast discussion
- Piktochart – free infographic maker used to create the checklist which can then be saved as a PDF and image file (JPEG or PNG)

References:

Beckingham, S., Lawrence, J., Powell, S. and Hartley, P. (2024) *Using Generative AI Effectively in Higher Education: Sustainable and Ethical Practices for Learning Teaching and Assessment*. Routledge. https://doi.org/10.4324/9781003482918

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Mollick, Ethan R. and Mollick, Lilach, (2023) Using AI to Implement Effective Teaching Strategies in Classrooms: Five Strategies, Including Prompts. The Wharton School Research Paper. http://dx.doi.org/10.2139/ssrn.4391243

Live Storytelling through Generative AI Powered Avatars

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Virtual Engineering Centre

What is the MML Idea?

Our project aimed to develop an exhibit where learners could freely interact with a historical character in a museum setting. The underlying technologies we used also apply to any environment where users interact with virtual characters—past, present or future; real or imagined.

The key components of our experience were:

- A visualisation of the character in a historical setting that users could interact with, implemented as an Epic MetaHuman character using historical photographs, as well as facial and voice capture from an actor to create language models.
- Text and speech interfaces in 40 languages, enabling users to ask questions in their preferred language and modality.
- An interface to a generative AI engine with predefined prior knowledge to ensure responses were content-rich, appropriate, and historically accurate.
- An adaptive database of common questions and answers, which helped reduce synthesis time and enabled a more fluid user experience.
- Text-to-speech, phoneme, and viseme synthesis modules to animate the character. We matched the emotional valence of speech and expression to context.

This example includes Generative AI elements of:

- Image
- Speech
- Text
- Video

Why This Idea?

Artificial intelligence-based storytelling can enhance learning by providing personalised, interactive, and accessible education, which in turn improves engagement and outcomes (Santally & Senteni, 2013). The use of experiential and self-paced learning also makes interactive experiences highly accessible to diverse student populations (Leißau et al., 2021).

Interactive AI-driven tools increase engagement by turning abstract concepts into discussions, aligning well with constructivist learning theories (Vygotsky, 1978).

We first demonstrated the model at Liverpool's St George's Hall for the UK's first Digital Heritage Symposium in April 2022. Since then, the model has been used in an educational tour during 2023 to celebrate Black History Month. During this tour, we supported children and school groups as they engaged directly with the model, becoming immersed in their learning experience.

How Could Others Implement This Idea?

Step-by-step instructions for implementing the idea.

To replicate this idea, others could follow a similar process to ours:

1. **Create the character:**
   We visualised Mary Seacole using Epic MetaHuman. We based the digital model on historical photographs and captured an actor's facial movements and voice to create the foundation for a believable digital character.
2. **Develop multimodal input and output:**
   We created both text and speech interfaces, supporting 40 languages. This made it possible for users to interact in their preferred language and communication mode.
3. **Integrate with generative AI and prior knowledge:**
   We connected the system to a generative AI engine, with predefined historical knowledge to ensure accurate responses. We also built an adaptive Q&A database to speed up interactions over time.
4. **Animate responses dynamically:**
   Using text-to-speech, phoneme, and viseme synthesis, we gave the character the ability to speak and display appropriate facial expressions. The emotional tone was set based on context, enhancing realism.
5. **Deploy in learning environments:**
   We launched the system in both public museum spaces and educational settings. In each context, we supported learners in exploring the tool and evaluated their interactions to inform improvements.

The approach is scalable and adaptable for any learning environment where interacting with virtual personas could add educational value.

Links to Tools and Resources:

- Video: Digital Humans | Making Mary Seacole
- Case study: Reliving History: Bringing Historical Stories to Life through Digital Avatars and AI Technology
- Epic MetaHuman technologies

Image:

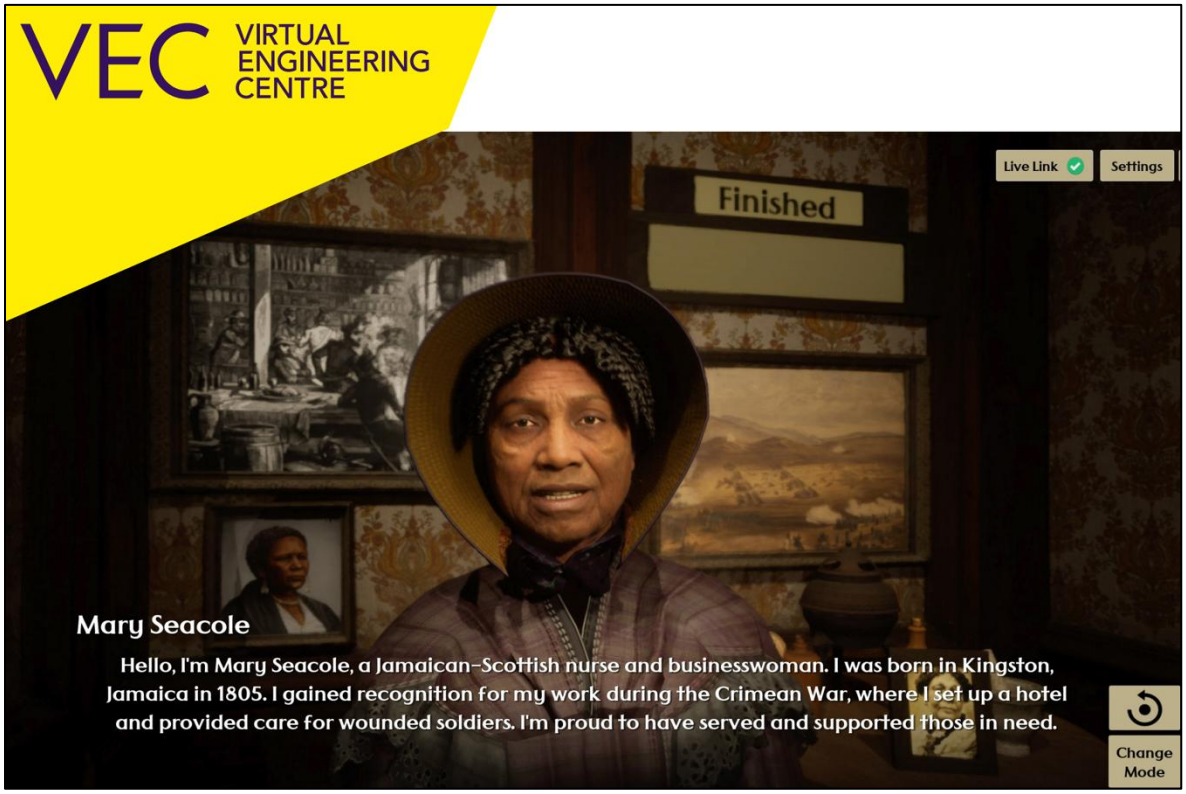

Figure 1. Avatar of Mary Seacole developed using Epic MetaHuman technology, designed for real-time interaction with learners in museum and educational settings

References:

Leißau, M., Hellbach, S., Laroque, C., Busch, C., Steinicke, M., Friess, R., & Wendler, T. (2021, October). Self-paced learning in virtual worlds: Opportunities of an immersive learning environment. In *Proc. Eur. Conf. e-Learn., ECEL* (pp. 257-265). Academic Conferences and Publishing International Limited.

Santally, M. I., & Senteni, A. (2013). Effectiveness of Personalised Learning Paths on Students Learning Experiences in an e-Learning Environment. *European Journal of Open, Distance and E-learning*, *16*(1), 36-52.

Vygotsky, L.S., 1978. *Mind in society: Development of higher psychological processes*. In: M. Cole, V. John-Steiner, S. Scribner and E. Souberman, eds. Cambridge, MA: Harvard University Press. Available at: https://doi.org/10.2307/j.ctvjf9vz4

Strategies for Integrating AI-generated (GenAI) Technologies in Assessment

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Relevant Links:
AI Pedagogy Project - Mari Cruz Garcia Vallejo

What is the MML Idea?

This bilingual case study presents a practical design guide intended for both novice and experienced higher education lecturers. It provides strategies for integrating AI-generated (GenAI) technologies in assessment within their teaching practices. The design guide is based on the concept of authentic assessment, a practical approach that enables students to connect and apply knowledge gained in the classroom to real-world tasks or projects relevant to their academic or professional disciplines. Additionally, the guide promotes assessment for learning, particularly through the modality of assessment as learning, by shifting the assessment focus to students themselves, who take on the roles of assessors of their own work and that of their peers.

From a theoretical standpoint, the design guide builds on the assessment models proposed by Villarroel et al. (2018) and Sambell (2022), enhancing and expanding these frameworks with an additional layer on "how to integrate GenAI in assessment."

The guide begins with the premise that AI integration in assessment within higher education can be addressed through three distinct approaches:

- Assessment *of* AI
- Assessment *with* AI
- Assessment *for* AI

(The guide offers further detail on each of these three approaches.)

The guide is organised into four design steps to assist lecturers in developing assessment methods tailored to their courses:

1. **Contextual Analysis**.
2. **Designing the Assessment Task**, encompassing technology selection and the chosen approach for AI integration.
3. **Developing Marking Criteria**, including the creation of rubrics and assessment standards.
4. **Feedback Process**.

Each design step equips lecturers with reflective questions, analyses of pros and cons, examples of well-designed assignments, and resources to guide them through the assignment design process. The four steps enable lecturers to assess and determine the role of students within the assessment process, taking into account factors such as student demographics, familiarity with technology and GenAI tools, and their level of assessment literacy.

The case study concludes with recommendations for the ethical use and integration of GenAI in assessment, drawing on feedback from participants in a final course survey.

This example includes Generative AI elements of:

- Text

Why This Idea?

The integration of Generative AI (GenAI) into teaching and assessment is increasingly vital for higher education (HE) across Spain, the EU and the UK. With GenAI technology advancing at a rapid pace, lecturers need a structured and strategic approach to incorporating GenAI in ways that extend beyond traditional "assessment of learning" models.

This design guide was created as a practical toolkit within the framework of the ULPGC module "CAIE24 Desarrollo de competencias en IA aplicadas a la evaluación: hacia una evaluación más inteligente" (Development of AI Competencies Applied to Evaluation: Towards a More Authentic Assessment). Part of the "Plan de Formación 2024-2025" at the Universidad de Las Palmas de Gran Canaria (ULPGC), this 1 ECTS postgraduate-level module targets ULPGC teaching staff is -roughly-equivalent to PGCAP/PGCert programmes in HE in the UK. It introduces participants to AI competency frameworks and AI literacy, equipping them with strategies for effective GenAI integration in assessment practices. This initiative supports the development of AI-related skills, knowledge, and competencies as outlined in both EU and Spain´s national frameworks for AI competencies in HE.

The guide provides a structured, theoretically grounded resource that helps lecturers new to assessment understand the purpose and role of GenAI in contemporary education. Beyond the practical benefits, the guide supports lecturers in reflecting on and reconceptualising current assessment practices to cultivate competencies crucial for new employability attributes. Endorsed by the Vicerrectorado de Innovación Educativa at ULPGC, this initiative provides a valuable resource for educators striving to integrate GenAI ethically and effectively, with preliminary applications indicating positive impacts. It stands as a scalable model for transformative assessment practices in HE institutions across the EU.

How Could Others Implement This Idea?

Step-by-step instructions for implementing the idea.

The four steps of the guide:

1. Context.
2. Designing the assessment task, which includes the choice of technology and the approach for the integration of the IA.
3. Designing how to mark the task, which includes the design of rubrics and assessment criteria.
4. Process of feedback.

This can be adapted to different contexts and academic disciplines.

This is a graphic representation (in Spanish) of how to adapt the four steps. The graphic can be adapted into other languages.

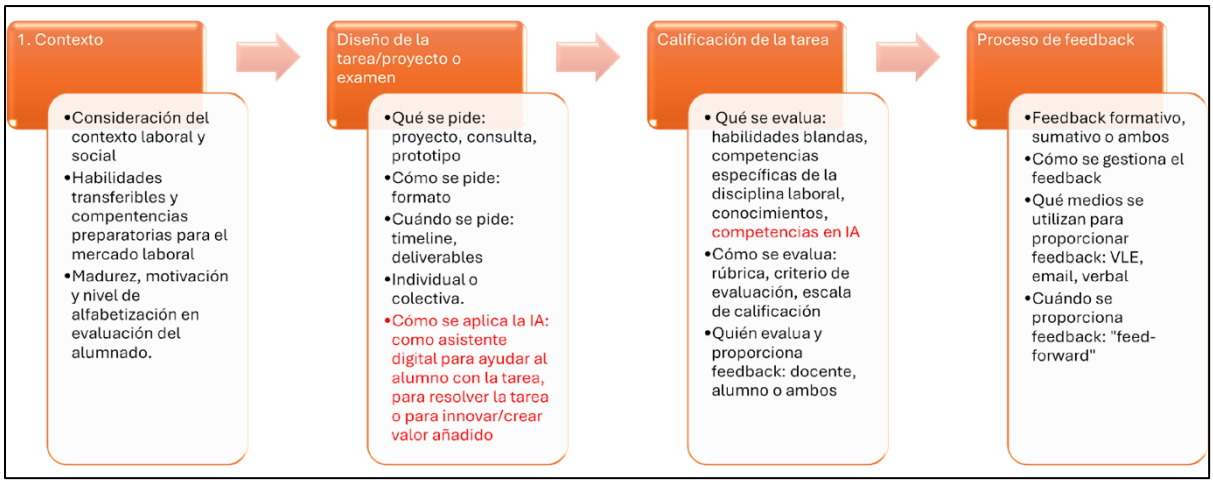

Figure 1. A graphic representation of adapting the four steps of the guide

Links to Tools and Resources:

The graphic provided in the previous section will be translated into English for the final case study.

References:

Sambell, K. (2022). *How to design assessments for learning*. Heriot-Watt University. https://lta.hw.ac.uk/wp-content/uploads/22_AFL_How-to-design-assessments-for-learning.pdf

Villarroel, V., Bloxham, S., Bruna, D., Bruna, C., & Herrera-Seda, C. (2018). Authentic assessment: Creating a blueprint for course design. *Assessment & Evaluation in Higher Education, 43*(5), 840–854. https://doi.org/10.1080/02602938.2017.1412396

Experimental Practice – Using Mind Maps in Project Planning to Foster Inclusion

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What is the MML Idea?

This approach combines AI tools with mind mapping to enhance groupwork skills through both text-based and visual learning methods. I use GenAI to support structured project planning, where students generate task lists and responsibilities using large language models (LLMs), then transform these into interactive mind maps. This multimodal strategy helps visualise elements and stages of complex group projects.

This example includes Generative AI elements of:

- Image
- Speech
- Text

Why This Idea?

Combining AI tools with mind mapping offers a unique way to enhance groupwork skills through both text-based and visual learning methods. Seminal theoretical frameworks in cognitive load theory suggest that breaking tasks into smaller, structured components reduces mental effort, enabling deeper learning (Sweller, 1988). The integration of AI and mind mapping helps students manage complex group projects by visualising elements and timelines more effectively.

Research on AI in education demonstrates its ability to boost productivity, critical thinking, and organizational skills (Essien et al., 2024). Similarly, studies on mind mapping show its effectiveness in supporting comprehension and fostering creative problem-solving (Erdem, 2017). By merging these tools, I aim to leverage the best of both, offering students a structured yet flexible way to approach group tasks.

We collected student feedback from my support sessions which highlighted that students feel more engaged and better prepared when using this method. The feedback also suggested that the process was intuitive, enabling students to quickly adopt the method with minimal technical instruction.

Students often struggle with managing group projects due to unclear task allocation, uneven participation; and unfocused, asynchronous communication. This approach addresses these challenges by creating a structured, visually accessible plan, which can

be easily explained to and shared amongst group members The use of AI-generated Markdown language facilitates accessibility for students with diverse profiles, supporting inclusion through logical, visual task breakdown. This method supports development of transferable skills in project management, digital literacy, and collaborative problem-solving—key competencies for academic and professional success.

How Could Others Implement This Idea?

1. **Introducing the Assessment Brief**
   Students are taken through the assessment brief in detail.
   A plenary session follows for resolving doubts and clarifying expectations.
2. **Customising the Prompt for the AI Tool**
   Students are introduced to the following prompt template:

   "We are a group of students working on a project for a [Course Title] course at [Course Level] in a [Context] university, titled [Project Title]. Our goal is to [Describe Project Goal]. We need help creating a project plan that includes:

   - Key tasks and subtasks
   - Roles and responsibilities for each task
   - Timeline with deadlines
   - Milestones and check-in points
   - Expected deliverables

   Please generate this plan in both Markdown format and professionally formatted DOCX format. Make the Markdown format compatible with and suitable for the creation of a mind-map."
3. **Generating the Plan**
   Students access the LLM of their choice (free or paid).
   They input the customized prompt either individually or in groups.
   They retrieve both Markdown and DOCX outputs from the LLM.
4. **Visualising the Plan with Markmap.js**
   The tutor demonstrates copying the Markdown output into Markmap.js.
   They generate a visual mind-map, showing how to expand, collapse, and edit sections.
5. **Student Practice**
   Students copy their visual Markdown output into Markmap.js.
   They view and refine the generated mind maps collaboratively.
   Once finalized, they save the mind map as an interactive HTML page for project documentation.
6. **Presentation and Reflection (Optional)**

If time allows, each group presents their mind map.

Presentations include:

- Project goals
- Key tasks and assigned roles
- Challenges faced and solutions developed during planning

Links to Tools and Resources:

- OpenAI-ChatGPT
- Anthropic-Claude
- Google-Gemini
- gera2ld-Markmap

References:

Erdem, A. (2017). Mind maps as a lifelong learning tool. *Universal Journal of Educational Research*, *5*(12A), 1–7. https://doi.org/10.13189/ujer.2017.051301

Essien, A., Bukoye, O., O'Dea, C., & Kremantzis, M. (2024). The influence of AI text generators on critical thinking skills in UK business schools. *Studies in Higher Education*, 49, 865 - 882. https://doi.org/10.1080/03075079.2024.2316881.

Sweller, J. (1988). Cognitive load during problem solving: Effects on learning. *Cognitive Science*, *12*(2), 257–285. https://doi.org/10.1207/s15516709cog1202_4

Enhancing Learning with AI Tools for Idea Generation

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What is the MML Idea?

Using a design thinking approach to generate ideas (Bustard et al., 2022; Seevaratnam et al., 2023), we applied multimodal teaching using AI tools to support a cohort of 198 level 5 undergraduate students undertaking a *Media Production Management* module. Students were tasked with designing three pieces of content for three different digital platforms, including video and podcast formats, for their real-world client.

By applying text, image and audio tools, we aimed to empower students with varied pathways to understand, explore and implement ideas for content creation. Leveraging ChatGPT, MS Copilot, and NotebookLM, students engaged in an iterative process to develop their creative thinking skills, while being encouraged to critically assess AI outputs throughout (Huang, 2023). This case study demonstrates how multimodal AI enhanced learning across three stages.

This example includes Generative AI elements of:

- Image
- Sound
- Text

Why This Idea?

We wanted students to experience a structured, creative process for content generation that mimicked real-world workplace scenarios. Applying the design thinking stages of **Understand**, **Explore**, and **Materialise**, we guided students in using GenAI tools as support systems, not shortcuts.

Firstly, students used ChatGPT to research ideas that aligned with their client's brief and would appeal to their target audience. Students were guided to use text to create open-ended prompts such as *"inclusive marketing campaign examples for students"* or *"community focused content ideas for Gen Z."* ChatGPT provided instant responses, offering diverse ideas and relevant examples for students to critically assess, before defining potential content ideas.

Once students had defined their content idea, MS Copilot was introduced to facilitate visual exploration. Through Copilot, students generated images to transform abstract

ideas into tangible visuals. Students used their AI-generated images to craft mood boards and storyboards to communicate a prototype of their content idea to the client. This stage fostered creativity through exploration, empowering students to push beyond text-based ideas and refine their vision through visual expression and criticality.

In the final stage, students used NotebookLM to generate audio narrations for their podcast. Use of NotebookLM enabled students to transform their brainstorming activities and critical thinking into professional sounding audio. Through listening to each other's audio responses, students gained exposure to different AI outputs within their team, and critically reflected on how the more successful outputs had been achieved. This collaborative exchange enabled them to refine final content in a way that met client expectations and resonated with the target audience.

Students gained current workplace design skills by learning how AI can facilitate idea generation (see Figure 1). They also learnt to think critically about AI outputs, an essential skill for successful application of AI in the workplace.

How Could Others Implement This Idea?

Below are the steps we followed:

1. **Stage 1: Understand**
   Guide students to use ChatGPT with open-ended prompts based on a client brief or topic. Encourage them to refine outputs through critical questioning. Prompts could include:
   - "Create content ideas for Gen Z that focus on community-building."
   - "Suggest marketing campaign themes for a student-focused brand."
     This stage supports early idea generation and critical thinking.
2. **Stage 2: Explore**
   Ask students to take one chosen idea and use MS Copilot (or another image-generation tool) to visualise it. They can:
   - Generate images to represent mood or message
   - Assemble mood boards or storyboards
     These visuals help clarify and pitch the concept.
3. **Stage 3: Materialise**
   Students use NotebookLM (or a similar AI narration tool) to transform their ideas into script and audio form. They can:
   - Develop podcast narration based on their storyboard and research
   - Share and critique each other's outputs
     This encourages reflection, collaboration and iterative refinement.

All tools used—ChatGPT, MS Copilot, and NotebookLM—were accessed in their free versions during this activity. The process is adaptable across disciplines where creative or campaign-based outputs are required.

Image:

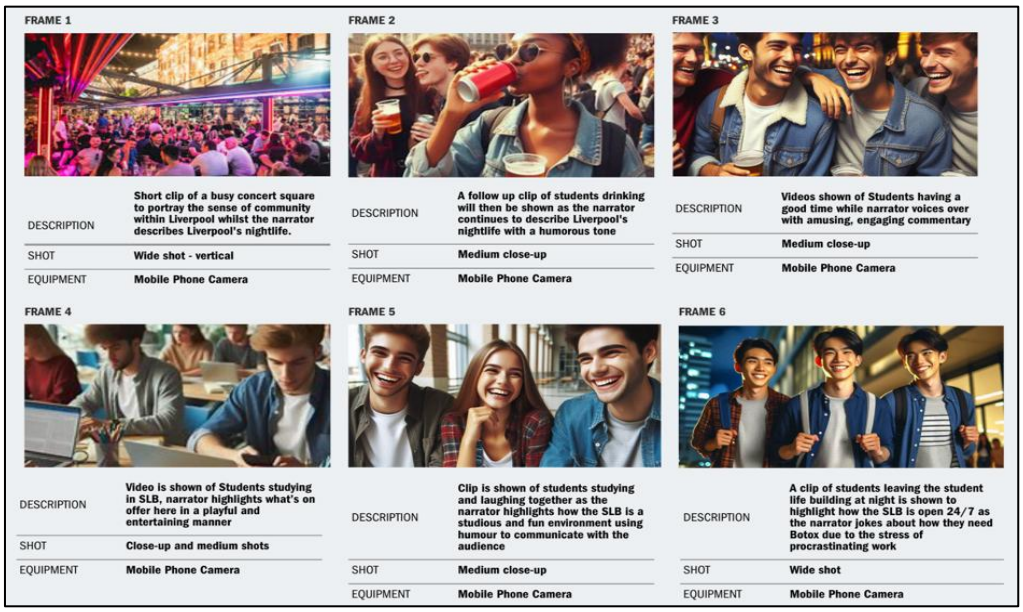

Figure 1. Example of student work (storyboard outcome)

References:

Seevaratnam, V., Gannaway, D., & Lodge, J. (2023). Design thinking-learning and lifelong learning for employability in the 21st century. *Journal of Teaching and Learning for Graduate Employability*, 14(1), 167–186.

Bustard, J. R. T., Hsu, D. H., & Fergie, R. (2022). Design thinking innovation within the quadruple helix approach: a proposed framework to enhance student engagement through active learning in digital marketing pedagogy. *Journal of the Knowledge Economy*. https://doi.org/10.1007/s13132-022-00984-1

Huang, C.-W., Coleman, M., Gachago, D., & Jean-Paul Van Belle. (2023). Using ChatGPT to encourage critical ai literacy skills and for assessment in higher education. *Communications in Computer and Information Science*, 105–118.

Enhancing Engagement through Streaming Avatars and Synchronous AI Assistants in Online Education

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Relevant Links:
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What is the MML Idea?

The proposed case study explores how streaming avatars and synchronous AI assistants can enhance engagement in online education. I created the avatars that were used for a dynamic experience and AI assistants for real-time support, and this approach fosters an interactive learning environment. The study will assess the impact on learner satisfaction and provide insights into effective integration practices.

This example includes Generative AI elements of:

- Image
- Sound
- Space
- Speech
- Text
- Video

Why This Idea?

The integration of streaming avatars and synchronous AI assistants in online education addresses the growing need for more engaging and personalized learning environments. Theoretically, these technologies enhance social presence and reduce transactional distance, promoting a stronger sense of community among learners. Practically, avatars and AI assistants provide an adaptable, inclusive way to deliver content while mitigating privacy concerns and presentation fatigue. Empirical evidence suggests that these tools can improve learner engagement and satisfaction by offering just-in-time support and increasing interaction. This idea meets the pressing need for innovative, evidence-based approaches that foster student engagement and well-being in digital education.

How Could Others Implement This Idea?

The integration of streaming avatars and synchronous AI assistants in online education addresses the need for engaging and personalized learning environments by enhancing social presence, reducing transactional distance, and promoting community. These technologies provide adaptable ways to deliver content, mitigating privacy concerns and

presentation fatigue, and empirical evidence suggests they improve learner engagement and satisfaction. Educators can implement this idea by selecting suitable platforms and tools, developing tailored prompts, testing the setup, and adapting based on student feedback to foster an interactive and inclusive online learning experience.

Links to Tools and Resources:

- Example of a streaming avatar in class
- Example of an AI assistant capable of being embedded in a VLE

References:

Anderson, T. (2003). Getting the mix right again: An updated and theoretical rationale for interaction. *The International Review of Research in Open and Distributed Learning, 4*(2). https://www.irrodl.org/index.php/irrodl/article/view/149

Clark, R. C., & Mayer, R. E. (2016). *E-learning and the science of instruction: Proven guidelines for consumers and designers of multimedia learning*. Wiley. https://onlinelibrary.wiley.com/doi/book/10.1002/9781119239086

Hrastinski, S. (2008). Asynchronous and synchronous e-learning. *Educause Quarterly, 31*(4), 51-55. https://www.researchgate.net/publication/238767486_Asynchronous_and_synchronous_e-learning

How much can AI (at present) Contribute to Identifying and Writing about Classification and Nature?

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What is the MML Idea?

I developed a rubric which could be used for student assessment. Students were provided with various elements generated about birds and nature, and then they were asked to give a critical evaluation of the AI derived essays produced from these elements.

This example includes Generative AI elements of:

- Image
- Object
- Sound
- Speech
- Text
- Video

Why This Idea?

One of the key issues that conservation organisations deal with is the discernible lack of skills with which biology graduates have in identifying organisms in the wild. One of the aims of the MSc in Biological Photography and Imaging is to provide a basic grounding in natural history so that the students may not only take pin sharp and accurate photographs of a living organism or biological specimen, but also be able to identify it accurately. This has been achieved through training on using dichotomous keys and other guides, but recent developments have offered many new techniques. To supplement their training, students were given briefs to identify birdsong using the Merlin app, take images of different species and identify them using Google Lens and then critically evaluate text on the locality and wildlife written by ChatGPT. They were then asked to mark the AI derived essay and write a reflection on the experience. Although this is a preliminary study with low data (n=10) the universal themes that were expressed were that the AI generated text reads authentically and is well expressed. It was only when the text was probed more deeply that the flawed arguments, fictitious referencing, unlikely observations and vague descriptions became noticeable. It does score well in the breadth of scope and this was well received by this group of students. Being asked to critique an AI derived essay had a

considerable effect on their perception of the authority of generative AI text, its research parameters and how to phrase their prompts.

How Could Others Implement This Idea?

Step-by-step instructions for implementing the idea.

Follow the rubric that I developed and examine the responses using sentiment analysis. An example can be found below:

Course work on artificial intelligence and Natural History.

The BIRD.

Teaching Aims: To investigate the way in which modern technology can enhance our understanding of the natural world and whether there are limitations and restrictions that they impose upon developing the skills to do things in the wild.

Objective 1: Choose an area of the campus and sample the bird song using the Merlin app (from the App store) to work out what birds frequent this area at three different times of the day. Create a list of the birds that you hear at different times of the day and produce a graph of the number of species singing throughout the period of your evaluation. You will need to keep your device running for 15 minutes or so.

Objective 2: Photograph a number of the birds and identify them using Google Lens (from the App store) or some similar programme.

Objective 3: Use ChatGPT or Gemini to develop a 400 word paragraph to describe the area and the birds that you have identified using Merlin and Google lens. Ask it to include references.

You could even attempt to produce an opening image using image generating programmes such as DALL·E

Assessment:

1. Add the bird information and images to your other four organisms.
2. Mark the AI generated text with a few statements giving some feedback (a few words or a sentence). Look for accuracy and use of language. Check its references
3. Rewrite and augment the ChatGPT or Bard AI generated text and, using your images, develop a short article on this area of the university for inclusion in your website. Include the number of species revealed by using the Merlin app.

Assessment: Write a 500 word **personal reflection** about what it was like using these programmes and whether they will be a help or hindrance to people developing skills in Natural History and identification. This should be written as a description of your personal

experience, thoughts and understanding of your encounter and or partnership with artificial intelligence.

- Do you think that this is an asset or will be detrimental to developing field skills and field craft?
- How do you feel about technology supplementing or replacing human creativity or should we consider this to be an aid such as using a calculator or grammar checker?
- What sources are these AI programs using?
- Is this plagiarism?
- Is this an extra barrier between the original information and the user?

Marking criteria

- Selection of key organisms and criteria for diagnosing the species
- Image quality, layout and writing
- Taxonomy and species description
- Reflective commentary

Reports will be marked for:

- Photography
- Layout
- Correct ID
- Positive ID reasoning
- Writing and reasoning and reflection.

Links to Tools and Resources:

- Gemini
- ChatGPT
- DALL·E

Using Generative AI to Aid Studying and Learning for Medical Students

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What is the MML Idea?

I've found that using ChatGPT can support medical students in studying complex content by combining image and text-based learning. Generative AI is particularly helpful for breaking down difficult concepts, providing clear revision summaries, and even generating diagrams to reinforce understanding. By using multimodal prompts—both text and image—I can guide students through topics like the RAAS system in a way that builds confidence and comprehension.

This example includes Generative AI elements of:

- Image
- Text

Why This Idea?

It can often be difficult to study content provided by lecturers, and some topics are more challenging to understand, making revision an obstacle. Medicine requires consistent studying and I've seen how online tools like ChatGPT (OpenAI) can be helpful for breaking down difficult subjects and preparing for exams. In addition, the process of "scaffolding" in learning (Wood et al., 1976) can be easily applied by adapting prompts in ChatGPT to explain concepts at a basic level, and then deepening the level of detail in follow-up prompts to support progression.

ChatGPT is already being used widely by university students, and in one study it was assessed on university-level biochemistry exams (Mahat et al., 2023). It was even reported to outperform medical students in a physiology exam (Soulage et al., 2024). Now that ChatGPT is multimodal, it can also generate visual outputs, such as diagrams. This feature adds significant value for visual learners and supports more engaging and accessible revision materials.

How Could Others Implement This Idea?

1. Firstly, attach any notes taken to ChatGPT. This makes it easier for ChatGPT to generate relevant outputs at the right level. The attaching note's function should be free and can be accessed with an account. Alternatively, typing the name of the topic in the ChatGPT search bar could generate notes although these would need to be checked for accuracy before proceeding.

2. Use a prompt to help with studying the topic related to the notes taken. Here is an example prompt:

   'Summarise the RAAS system in a way that is easy to understand and in no more than 200 words.'

3. Then, to accompany the text generated, use a prompt to generate a relevant image:

   Provide an image with a diagram representing the RAAS system, at the level of knowledge required in a medical school exam. Use the text summary generated to label the diagram.

4. The prompt can also be adapted to provide exam questions for practice:

   Summarise the RAAS system in a way that is easy to understand and in no more than 200 words. Then create 5 challenging multiple-choice questions in a single best answer format so I can test my understanding of the topic.

Links to Tools and Resources:

- Open AI (2024)

Image:

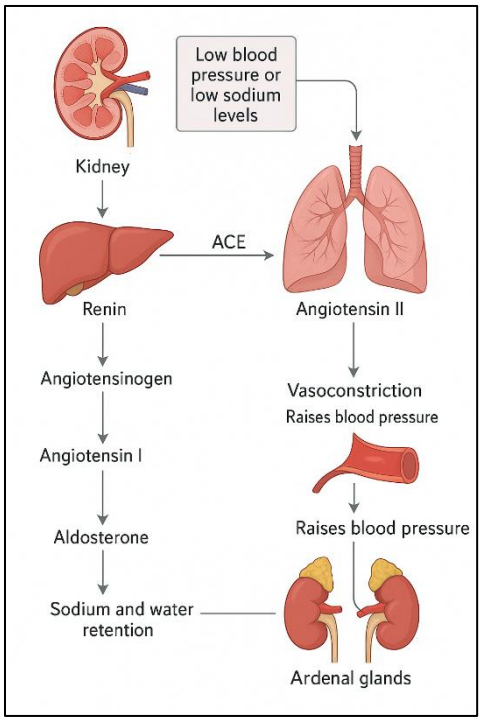

Figure 1: RAAS system diagram

Note: The diagram was produced from ChatGPT (OpenAI) using the prompts above. OpenAI. (2025). RAAS system diagram [AI-generated image]. ChatGPT.

References:

Mahat, R. K., Jantikar, A. M., Rathore, V., & Panda, S. (2023). Assessing the performance of ChatGPT to solve biochemistry question papers of university examination. *Advances in Physiology Education*, *47*(3), 528–529. https://doi.org/10.1152/advan.00076.2023

Soulage, C. O., Fabien Van Coppenolle, & Fitsum Guebre-Egziabher. (2024). The conversational AI "ChatGPT" outperforms medical students on a physiology university examination. *AJP Advances in Physiology Education*. https://doi.org/10.1152/advan.00181.2023

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OpenAI. (2024). *ChatGPT* (GPT-4o, May 13 version) [Large language model]. https://chat.openai.com/chat

Exploratory Learning using GAI to Support Presentations

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What is the MML Idea?

We introduced first-year Accounting and Finance students to Generative Artificial Intelligence (GAI) through an exploratory task with minimal tutor intervention. The idea was to allow students to engage directly with different GenAI tools, observe how they work, and assess their strengths and limitations within a real-world academic task.

We delivered the session through a short lecture, an interactive **Kahoot quiz**, group-based **presentation development**, and **verbal feedback discussions**. Students used GenAI platforms (ChatGPT, CoPilot, Gemini, and Perplexity) to research company sustainability initiatives and prepare a group presentation. Each group was also asked to evaluate their assigned tool. Modes of communication used in the session included **speech, text, and group interaction**.

This example includes Generative AI elements of:

- Image
- Speech
- Text

Why This Idea?

Generative Artificial Intelligence (GAI) is of great interest to information professionals in HE, particularly when discussing their potential impacts regarding academic integrity and information literacy (Ilieva *et al*, 2023). While there's often an assumption that students are already using these tools confidently, research shows that student familiarity and understanding vary significantly (Madunić, 2024). Many students still have only a basic understanding of what GenAI is, what tools exist, how they function, and how they can support academic work. We designed this session with these gaps in mind. We also wanted to explore evidence suggesting that **less guided, exploratory approaches**—where students manage their own error correction—can be highly beneficial in building an understanding of GenAI and large language models (Barrett & Stout, 2024).

We therefore constructed a session that introduced an overview of GAI to our students, before allowing them to explore GAI's capabilities through a given task. Students would

see first-hand how GAI functions and where its strengths could be applied to the module (*Skills for the Professional Accountant*), which had a focus on skills development, including relevant resource usage, presentation, and communication skills.

We first introduced the general concepts of GAI using an *Introduction to GAI* Kahoot quiz (2024), giving students a basic understanding underpinning how GAI works. This helped equip them with the knowledge to approach the tasks with more confidence, as we wanted them to explore the capability of GAI with as little guidance as possible. The Kahoot covered what GAI are, their development, their reliability in different situations, how their information is updated, and whether or not they can be used in the University.

Once this base understanding was covered, we split the classes into four groups and directed each to a different GAI (ChatGPT, CoPilot, Gemini, or Perplexity) and a different company to focus on (Coca-Cola, Apple, Microsoft, or Starbucks). They were then given 40 minutes and told to use their GAI to help them create a 5-minute presentation answering the question:

"What are your companies' main sustainability initiatives and how impactful have they been to the business and society?"

They were also asked to include a short review on the strengths and weaknesses of their GAI. This would then allow for discussion among the group.

How Could Others Implement This Idea?

Step-by-step instructions for implementing the idea.

1. Give an introductory overview to ensure students have a basic understanding of GAI
2. Split the class into groups and assign each a GAI
3. Assign a task all teams must complete using their GAI (tailor this to fit the learning outcomes of the module)
4. Have each group feedback to the whole class, providing their assessment of the GAI and open for questions/ discussion
5. End by summarising the strengths and weaknesses of GAI in regards to this module specifically. Also take time here to error control, clear up any obvious misunderstandings.

Links to Tools and Resources:

- Kaye, L. (2024) Introduction to GAI. Kahoot.
- ChatGPT (Free version) - ChatGPT
- Copilot - Microsoft Copilot
- Google Gemini - Gemini
- Perplexity - Perplexity

Image:

Figure 1. Example of Student-created visual from a group presentation exploring Coca-Cola's sustainability initiatives using Generative AI tools.

References:

Barrett, L. and Stout, D. (2024). Minds in movement: embodied cognition in the age of artificial intelligence. *Philosophical Transactions of the Royal Society B: Biological Sciences*, 379(1911). https://doi.org/10.1098/rstb.2023.0144

Ilieva, G, *et al*. (2023). Effects of Generative Chatbots in Higher Education. *Information*, *14*(9), 492. https://doi.org/10.3390/info14090492

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Peer Conflict Resolution in Group Work: Using GenAI to Represent Subject Knowledge Multimodally

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What is the MML Idea?

I created an activity which is the Peer Conflict Resolution activity and it is an interactive resource designed to help students navigate common conflicts in university group projects. This resource uses multimodal GenAI elements, including avatar videos, synthesised voices, and reflective prompts, to create realistic conflict scenarios. In each scenario, students are presented with options, receive feedback on their choices, and are provided with the opportunity for reflection.

This example includes Generative AI elements of:

- Image
- Speech
- Text
- Video

Why This Idea?

This activity addresses the frequent challenge of managing interpersonal conflict in group work, which is essential for academic and professional collaboration. By immersing students in realistic scenarios with immediate feedback, the tool encourages self-reflection on communication and conflict resolution strategies, promoting cultural competence (De Vita, Carroll, & Ryan, 2005; Asgari, 2019). Research indicates that effective conflict resolution is crucial for positive team dynamics and outcomes, especially when managing the varied types of conflict that can arise in team environments (Behfar, Peterson, Mannix, & Trochim, 2008). The use of multimodal, interactive elements in this tool—such as avatar videos and synthesized voices—aligns with established methods that have proven effective for assessing and developing conflict resolution skills in realistic settings (Olson-Buchanan et al., 1998).

How Could Others Implement This Idea?

Scenario Design

- **Task**: Use Generative AI to create scenarios about group work conflicts and refine them based on feedback.
- **Prompt Example**: "Create a set of brief group project scenarios (3-5 sentences each) that feature common issues such as unequal contributions,

miscommunication, clashing personalities, and scheduling conflicts. In each scenario, ensure diversity of perspective and have one team member express their frustration or thoughts about the conflict in a short transcript. For each scenario, generate three possible responses as multiple-choice options, where each choice represents a different way to address the problem. Include constructive feedback for each choice, explaining why it's effective or not in resolving the conflict."

- **Refinement Prompt**: "Modify this scenario to focus more on cultural communication breakdowns."
- **Output**: Export all final scenarios and resources into one document for easy access.

Audio Creation

- **Task**: Use text-to-speech to upload each transcript and produce character voices.
- **Prompt Example for Voice Selection**: "Create a calm, assertive female voice for the team leader character."
- **Export**: Download each audio file as an mp3 for future steps.

Create Video Avatars

- **Task**: Use Adobe Express Avatar Creator to create avatars.
- **Process**: Upload the generated audio files and choose an avatar that represents a university student, with a suitable background.
- **Export**: Download each video avatar.

Interactive Setup in H5P

- **Task**: Embed scenarios in your virtual learning environment (VLE) or use H5P. Add question sets and reflection prompts.

Feedback Survey Creation

- **Task**: Use Generative AI to create relevant feedback survey questions, adjusting these based on the project's focus.
- **Prompt Example**: 'Consider this interactive resource. Create a feedback survey for students, asking how effective they found the scenarios and what improvements they suggest.'

To adapt this concept to your academic discipline, adjust the scenario and dialogue prompt in the design stage to reflect any relevant challenges. Whether in healthcare, business, education, or another discipline, swap in typical issues like communication, decision-making, or policy dilemmas. This small change makes the learning experience practical and transferable, keeping the core structure while tailoring content to your teaching and students' learning needs.

Links to Tools and Resources:

- Peer conflict resolution activity – hosted on the H5P platform and can be embedded.
- ChatGPT – for refining scenarios, dialogue and feedback (free plan available)
- ElevenLabs – GenAI text to speech with customisable voices (free plan available)
- AdobeExpress – Free avatar creator with audio upload
- H5P.com - Interactive resources platform for hosting (requires licence)
- University VLE – for alternative hosting to H5P e.g. Canvas or Blackboard (free institutional access)

References:

Asgari, S. T. (2019, July). *Multi-cultural group work*. University of Liverpool, Centre for Innovation in Education. Retrieved from https://www.liverpool.ac.uk/media/livacuk/centre-for-innovation-in-education/staff-guides/multi-cultural-group-work/multi-cultural-group-work.pdf

Behfar, K., Peterson, R., Mannix, E., & Trochim, W. (2008). The critical role of conflict resolution in teams: A close look at the links between conflict type, conflict management strategies, and team outcomes. *Journal of Applied Psychology, 93*(1), 170–188. https://doi.org/10.1037/0021-9010.93.1.170

De Vita, G., Carroll, J., & Ryan, J. (2005). Fostering intercultural learning through multicultural group work. Teaching International Students: Improving Learning for All, 75–83.

Olson-Buchanan, J., Drasgow, F., Moberg, P., Mead, A., Keenan, P., & Donovan, M. A. (1998). Interactive video assessment of conflict resolution skills. *Personnel Psychology, 51*(1), 1–24. https://doi.org/10.1111/j.1744-6570.1998.tb00714.x

Image:

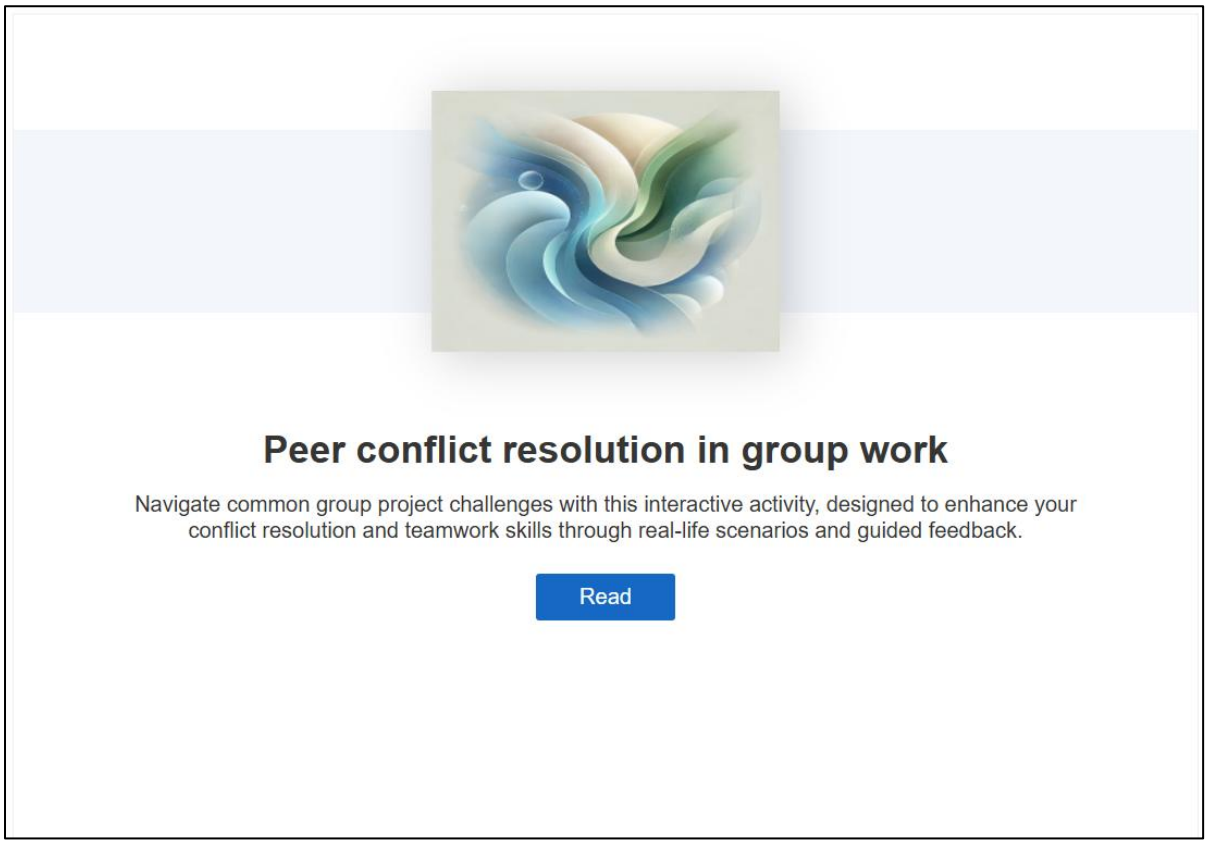

Figure 1. The peer conflict resolution activity landing page

Note. The peer conflict resolution activity landing page with introductory text “Navigate common group project challenges with this interactive activity, designed to enhance your conflict resolution and teamwork skills through real-life scenarios and guided feedback.”

A Multimodal Groupwork Activity: Fostering Belonging Among First-Year Bioscience Students

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What is the MML Idea?

We asked students to work within their tutorial group to design an organism and present it collaboratively. Each group was given three future Earth scenarios, all grounded in the context of the climate emergency. Their task was to imagine what kind of organism—plant, animal, or bacteria—might evolve under those conditions, while staying within realistic physical and evolutionary constraints.

To bring their organisms to life, students were encouraged to use a range of creative outputs including drawing, painting, physical models, and generative AI tools. By doing so, they explored how multimodal tools can help represent biological adaptation and speculative evolution in a future Earth setting.

This example includes Generative AI elements of:

- Image
- Text

Why This Idea?

We designed this activity to meet several learning objectives:

- Encourage students to think critically and creatively about how organisms might evolve under different climate-change scenarios, grounded in biological reality.
- Provide experience in working effectively in groups, contributing to shared outputs and communication.
- Give students the opportunity to practise delivering group presentations.
- Introduce students to generative AI as a tool for creatively visualising their ideas and supporting multimodal learning.

How Could Others Implement This Idea?

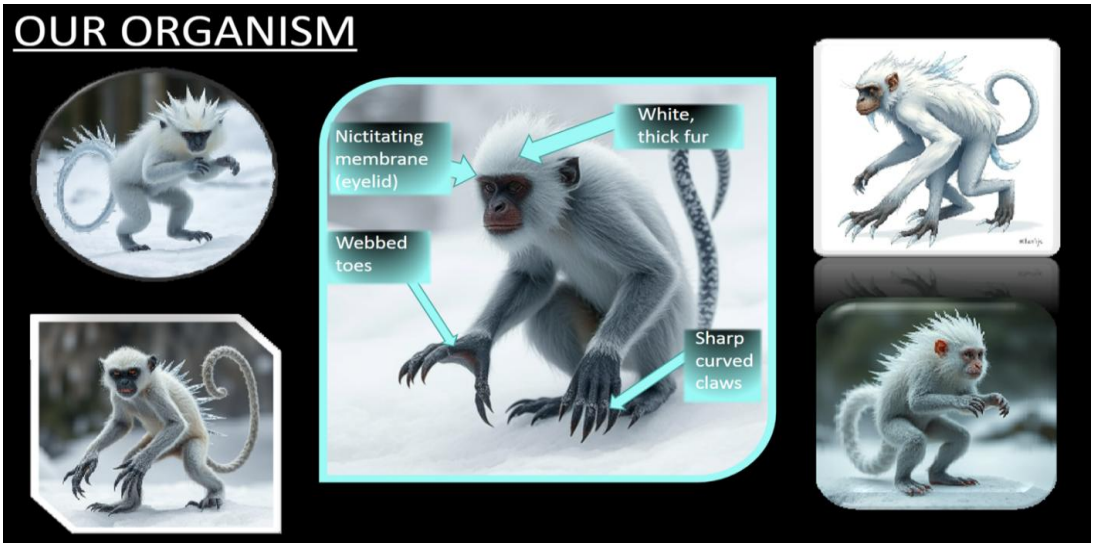
Step-by-step instructions for implementing the idea.

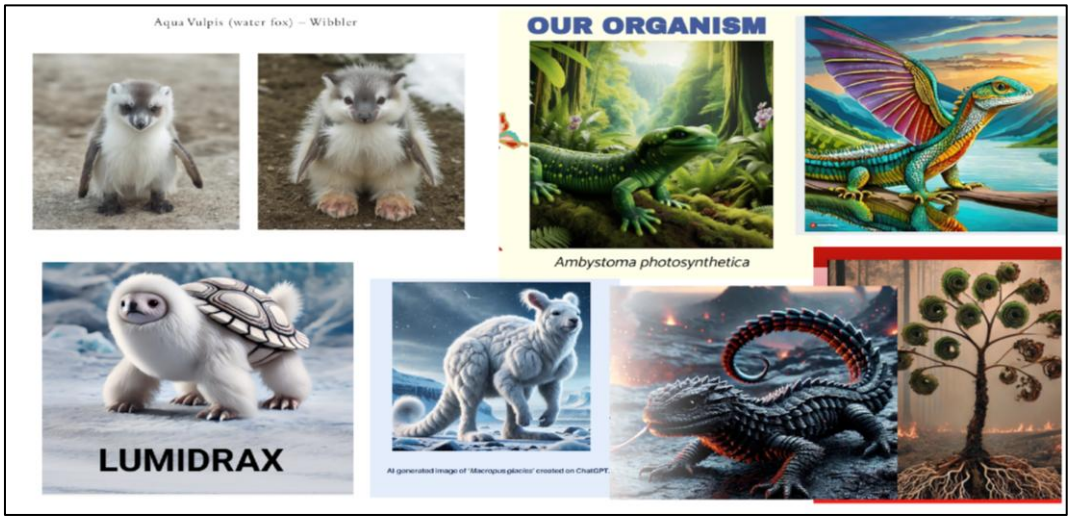
1. **Scenario Design:**
   Present students with a selection of future Earth scenarios shaped by climate

change. These could vary in temperature, rainfall, or atmospheric conditions. Students choose one and begin brainstorming.

2. **Organism Development:**
   In groups, students design an organism that might plausibly evolve under their chosen conditions. They research current organisms living in similar environments, identifying useful biological adaptations.
3. **Creative Output:**
   Students create a visual representation of their organism using any medium—hand drawing, painting, 3D models, or generative AI image tools. They must include their organism in the final presentation and explain how each adaptation helps it survive in the scenario.
4. **Presentation:**
   Groups present their work in an 8-minute talk. Every member is required to speak. The presentation includes:
   - Background: Environmental context based on the chosen scenario.
   - Inspiration from existing organisms: What adaptations already exist that inspired their design.
   - Final design: A walkthrough of their organism's features, based on evolutionary logic.

Image:





Figures 1, 2 and 3. Examples of GAI created organisms from the 2024-25 year 1 BIOS105 communication skills module.

AI Visual Metaphor Activity (SEDA Learning to Tutor Online Course)

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LinkedIn - Jonathan Rhodes
University of Wolverhampton - Jonathan Rhodes

What is the MML Idea?

Our idea is that SEDA Learning to Tutor Online participants (academic/academic related colleagues) can create an AI generated visual metaphor image based on their experience of being an online learner.

Participants choose one aspect of their learning (or an emotion - negative or positive) that they have experienced on the course and generate an appropriate image (or other visual media) to represent this in the form of a visual metaphor. Participants post this to a shared discussion space, including a brief written explanation of their choice and a proposed approach/solution that could be adopted for use with their own students.

This example contains Generative AI elements of:

- Image

Why This Idea?

Having successfully utilised a visual metaphor task in the SEDA Learning to Tutor Online for many years, in 2024 tutors adopted the use of AI image generation to enhance this multi-modal, formative activity (CAST, 2024). The process of image creation (Watson & Barton, 2020), rather than sourcing an existing image, engenders deeper personal reflection (Schön, 1983) and criticality in relation to their own experience of learning online and their practice as an online tutor. Tutors encourage engagement from participants by creating their own visual metaphor and adding to the discussion space (Bandura, 1977). The insights generated from this activity supports participants to develop socially constructivist, empathetic and compassionate pedagogies (Killingback, 2024) - the foundation of our approach to online learning and teaching.

How Could Others Implement This Idea?

AI Visual Metaphor Activity

- Create a shared discussion space/forum online (utilising your institutional VLE).
    - Example: Canvas VLE: Discussion
- Clearly introduce the visual metaphor activity to participants, including links to appropriate AI tools to support the task, e.g., Adobe Firefly: institutional licence and Firefly has been trained on a dataset of licensed content, such as Adobe Stock and public domain content where copyright has expired. Also include the rationale, approximate time to complete the activity, due date and tutors' involvement in the activity.
- Tutors model approach by creating their own visual metaphor utilising Adobe Firefly, adding the image and accompanying text to the discussion space.
    - Example Gen AI image prompt: "An individual struggling to juggle too many balls. They are dropping some of the balls but show determination to pick up the balls and continue juggling."
- Tutors encourage participants' engagement and provide formative feedback to visual metaphor posts (with accompanying text). These actions foster a socially constructivist online learning experience.

Links to Tools and Resources:

- Canvas Discussions - Virtual Learning Environment: Online discussions/forums
- Firefly - AI image generation tool

References:

Bandura, A. (1977). *Social learning theory.* Prentice-Hall.

CAST. (2024). *Design Multiple Means of Action & Expression*. https://udlguidelines.cast.org/action-expression/

Killingback, C. (2024, July 9). To my students...please know that as your lecturer I care about you: the importance of compassionate pedagogy. *Advance HE*. https://www.advance-he.ac.uk/news-and-views/my-studentsplease-know-your-lecturer-i-care-about-you-importance-compassionate

Schön, DA (1983) *The Reflective Practitioner: how professionals learn in action*. Basic Books

Watson, B. and Barton, G. (2020). Using Arts-Based Methods and Reflection to Support Postgraduate International Students' Wellbeing and Employability through Challenging Times. *Journal of International Students*, *10*(S2), 101-118. https://doi.org/10.32674/jis.v10iS2.2849

Image:

Figure 1. AI Visual Metaphor Creation

Note. A university student generating a metaphor image using Adobe Firefly to share their feelings of learning online (generated using Firefly).

Leveraging Generative AI for Enhanced Entrepreneurial Teaching

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What is the MML Idea?

In this case study, I demonstrate an innovative teaching approach that integrates artificial intelligence with traditional marketing persona templates. Specifically, I use AI to generate visual depictions of target customer personas based on detailed textual inputs from a standard persona template.

In practice, I ask students to complete a customer persona template and then use an AI image-generation tool to create a visual representation of their target customer. This multi-modality strategy not only reinforces the conceptual elements provided by the template but also engages students' visual and reflective learning modes. I also build in a reflective component, where students present their personas and visuals to peers and discuss the insights gained. The multimodal elements involved include text, image, and speech (class discussion), allowing students to better understand and connect with the personas they design.

This example includes Generative AI elements of:

- Image
- Text
- Speech

Why This Idea?

This approach offers both theoretical and practical benefits by integrating AI-generated visuals with traditional customer persona templates. Theoretically, it aligns with experiential learning frameworks (Kolb & Kolb, 2005) and reflective practice (Gibbs, 1988), allowing students to engage in a multi-sensory learning experience that bridges abstract concepts with tangible representations.

Practically, it leverages generative AI to transform static information into dynamic visuals, which enhances student comprehension and engagement. Preliminary evaluations suggest this is effective, revealing that most students find the AI-generated imagery more intuitive and engaging compared to text-only templates. For instance, student feedback indicated that over half of the participants preferred the visual approach. This supports

the idea that the integration of AI fosters deeper understanding and a more immersive learning environment (Chen, Ifenthaler, Yau, & Sun, 2024).

Previous research in entrepreneurship education has also shown that incorporating innovative digital tools can improve learning outcomes and satisfaction (Béchard & Grégoire, 2005). This evidence underscores the capacity of AI-enhanced methods to meet the evolving needs of contemporary pedagogical practices. Moreover, this idea addresses a clear and pressing need in teaching, learning, and assessment. Traditional teaching tools often fall short in engaging modern learners, who benefit from dynamic, multimodal educational experiences. Traditional teaching tools often fall short in engaging modern learners. By combining structured persona templates with the creative power of GenAI, I have found a scalable, adaptable way to enhance experiential learning across diverse educational settings.

How Could Others Implement This Idea?

Step-by-step instructions for implementing the idea.

1. Introduce the Persona Template: Begin with a clear explanation of the customer persona template and its importance in entrepreneurial strategy.
2. Template Completion: Have students complete the persona template, focusing on key demographics, goals, and identifiers.
3. AI Integration: Guide students to use an AI image-generation tool (e.g., Dall-E) by providing specific prompts derived from their templates.
4. Comparison and Reflection: Facilitate a class discussion to compare the traditional template with the AI-generated visuals, encouraging students to reflect on both methods.
5. Feedback and Adaptation: Collect student feedback and iterate on the approach to refine its application in various teaching contexts.

Links to Tools and Resources:

- OpenAI DALL-E

Image:

Figure 1. AI Generated visual of modern classroom

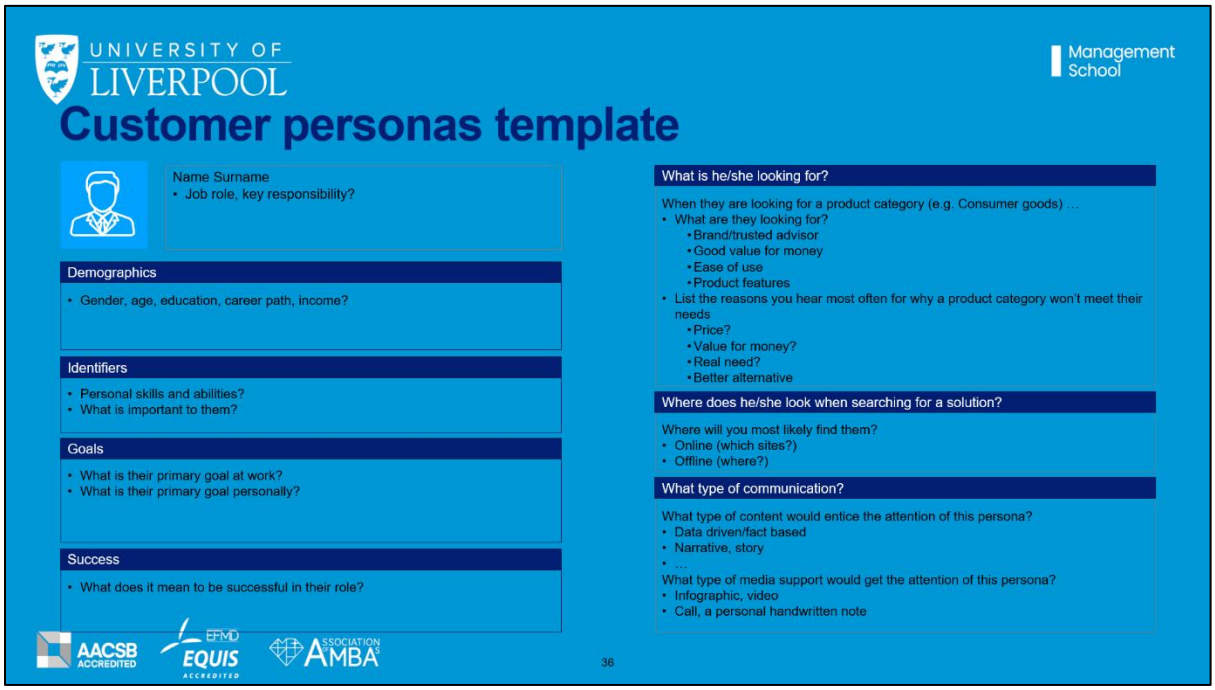

Figure 2. Customer personas template

References:

Béchard, J.-P., & Grégoire, D. (2005). Entrepreneurship education research revisited: The case of higher education. *Academy of Management Learning & Education, 4*(1), 22–43.

Chen, L., Ifenthaler, D., Yau, J. Y.-K., & Sun, W. (2024). Artificial intelligence in entrepreneurship education: A scoping review. *Education + Training*. https://doi.org/10.1108/ET-05-2023-0169

Gibbs, G. (1988). *Learning by doing: A guide to teaching and learning methods*. Further Education Unit.

Kolb, A. Y., & Kolb, D. A. (2005). Learning styles and learning spaces: Enhancing experiential learning in higher education. *Academy of Management Learning & Education, 4*(2), 193–212.

Using NotebookLM Generated Podcasts to Develop Students' Assessment and Feedback Literacy

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What is the MML Idea?

NotebookLM is a Google product that is designed as a research organiser, assistant, notes space and resource management system. It allows users to upload resources and materials that are relevant to their research project and to use a GenAI-powered chat space to interrogate, organise and interact with the uploaded content. However, NotebookLM also contains (at time of writing) the option to create an 'audio overview' of the uploaded resources, which constitutes an AI-presented podcast discussing the content and synthesising conclusions about the material.

The audio overview feature of NotebookLM has the potential to be a useful source of formative feedback for students completing assessments. A small scale pilot study was undertaken on a Level 7 module on an English Literature programme, where students were invited to upload their draft assessments to the software, generate an AI-presented podcast, and listen to the output and reflect on what it says. Students were encouraged to interact directly with the AI presenters, asking them questions and probing it for further insights, with the ultimate goal of determining whether the assessments' argument was on the right lines, whether it had met the assessment criteria, and areas for development ahead of final summative submission.

This example includes Generative AI elements of:

- Text
- Sound
- Speech

Why This Idea?

Assessment literacy is of paramount importance to ensuring that students both complete the assessment itself, but crucially that they actually learn something from the experience (Smith et al, 2011). Smith et al argue that a meta-dialogue around (and about) the assessment, its purpose and how it functions is therefore essential to help develop students' abilities to judge their own, and others, work, and thereby ensure that they effectively meet the intended learning outcomes (2011). This activity is designed to help

develop this meta-dialogue, by providing an additional space where students can both interrogate the progress of their own work by essentially interacting with it, and also obtain a new perspective on what needs to be done to the draft submission to improve it in the context of the defined marking criteria. Indeed, some students on this activity chose to upload both their draft assessments and the marking criteria for the assessment, and directly asked the AI presenters what needed to be done to the draft in order for it to reach the higher levels of the mark scheme.

In addition, research has consistently shown that students perceive feedback more positively when it is provided to them in an audio, as opposed to textual, form (Kirwan et al, 2023). Ajjawi and Boud argue that feedback is inherently a communicative and social act, charged with notions of power and emotion, and which therefore works more effectively as a dialogue between multiple parties than it does as a one-sided perspective where one party provides and the other simply imbibes (2018). It also helps to develop a sense of belonging between students and staff (Killingback et al, 2019). This activity helps to foster this sense of dialogue between students, but by adding a new party to the conversation. Rather than it be a dialogue between tutors and students, or students and each other, this activity is an example of students talking directly to their work, which, in a manner of speaking, talks back.

How Could Others Implement This Idea?

1. Provide access and instruction on the NotebookLM platform for students on the module, and show an example podcast to demonstrate how it works if necessary. Students must be familiar with the platform and sure that they are comfortable using it. Outline the platform's privacy settings to reassure students that it does not violate copyright or IP restrictions, and ensure that there is an alternative process for students who do not wish to use it - the activity should not be mandatory.
2. Embed the activity on the module - outline a point where the students should engage with the platform to the students themselves. It is an open question as to what the best point is to complete this activity is on a given module, and it will be dependent on local context, but a good rule of thumb is at a point where students should have a substantial draft of their summative submission, but still have enough time to make changes to the assessment based on the outcome of the activity.
3. Provide a space to reflect on the activity's effectiveness. This can be a short Form for students to outline the way they engaged with the podcast, or else students could be required to simply submit their podcasts for you to listen to yourself, their prompts or questions they used, or short reflective pieces on how effective or not the activity was in helping refine formative assessments into summative submissions.

Links to Tools and Resources:

- Google NotebookLM | Note Taking & Research Assistant Powered by AI

References:

Ajjawi, R. and Boud, D. 2018. Examining the nature and effects of feedback dialogue. *Assessment & Evaluation in Higher Education*. *43*(7), pp. 1106-1119. https://doi.org/10.1080/02602938.2018.1434128

Killingback, C., Ahmed, O., & Williams, J. (2019). 'It was all in your voice' - Tertiary student perceptions of alternative feedback modes (audio, video, podcast, and screencast): A qualitative literature review. *Nurse Education Today*, *72*, 32–39. https://doi.org/10.1016/j.nedt.2018.10.012

Kirwan, A., Raftery, S. & Gormley, C. (2023). Sounds good to me: A qualitative study to explore the use of audio to potentiate the student feedback experience. *Journal of Professional Nursing*, *47*(1), 25-30, https://doi.org/10.1016/j.profnurs.2023.03.020.

Smith, C. D., Worsfold, K., Davies, L., Fisher, R., & McPhail, R. (2011). Assessment literacy and student learning: the case for explicitly developing students 'assessment literacy.' *Assessment & Evaluation in Higher Education*, *38*(1), 44–60. https://doi.org/10.1080/02602938.2011.598636

Perk Up Your Academic Journey: A Coffee Shop Adventure

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University of Glasgow - Eric Davies
University of Glasgow - Mia Wilson
University of Glasgow - Ailsa Foley

What is the MML Idea?

'Choices at the Coffee Shop' is an innovative, interactive, AI-powered tool designed to educate students about academic integrity in a cost-effective way. We created real-world scenarios, which are presented in a gamified 'choose your own adventure' style format, allowing students to understand the immediate and long-term outcomes of their decisions in a consequence-free virtual environment.

This example includes Generative AI elements of:

- Image
- Sound
- Speech
- Text
- Video

Why This Idea?

The game is embedded in an asynchronous teaching module: 'Academic Values, Originality, and Plagiarism'. Feedback indicates that 96% (n=50) agreed that 'The module has increased my understanding of plagiarism and how to avoid it'.

Cultural differences in perceived academic dishonesty can lead to unintentional plagiarism (Fatemi & Saito, 2020) and unhelpful practices (Amsberry, 2009), requiring anti-plagiarism pedagogies to accommodate diverse needs (Adhikari, 2018; Tran et al., 2022). Gamification can accessibly enhance engagement through active learning (Khan

et al., 2017), positive feedback loops (Kaufmann, 2018), and a personalised learning journey.

How Could Others Implement This Idea?

AI integration was a steep but valuable learning curve with unexpected and interesting challenges. The design rationale highlights the approach's adaptability. Feedback was sought at each stage from students, ex-students, digital technology colleagues, and teaching staff to optimise the usability and value of the tool.

Process	**AI Use**	**Cost**	**Actions**
Develop Scenarios	None	N/A	Engaging and relevant scenarios were created. AI was not used but may have streamlined the process.
Relatable Characters	None	N/A	Relatable characters were developed. Jamie: from the UK, identifies as non-binary Naveed: cisgendered male with Indian heritage
Character Images	Dall-e-3 Photoshop	Paid for Paid for	AI software was engaged to create character images. Output required considerable refinement. It became apparent that generating diversity using AI necessitated the challenging and adoption of stereotypes. Refinements addressed included character morphing, removal of an earring, layering Naveed's clothing, and requesting Jamie's tattoo sleeve.
AI Voices	elevenlabs.io	Paid for	Perceived relatability and likeability of the characters were considered when creating the dialogue. The narrator was initially overly formal, and one option for Jamie's became robotic.
Animating Images	Runway Research Gen-2	Paid for	AI developments allowed images to be animated, however as Jamie lifted their cup it elevated from the elbow rather than the hand. Only a choice-point step

			was animated with Jamie talking directly to the camera.
Platform	Moodle Rise	Paid for Paid for	The game was embedded onto the Rise platform within the learning module, and this was then added as a SCORM package to Moodle.

Links to Tools and Resources:

- Advance HE Webinar: Offers an outline of the development process of the 'Choices at the Coffee Shop' game, with illustrative examples of each of the steps above.
- Academic Values, Originality, and Plagiarism: Full resource with 'Choices at the Coffee Shop' game embedded in the 'Academic Integrity and Values' section.

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Improving Engagement with eLearning by Creating Multimodal Video-Explainers

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What is the MML Idea?

I inherited an existing biomedicine course where students found the eLearning materials to be long and difficult to engage with. In response to student feedback that they were struggling to relate the eLearning to the LOs from in-person sessions and understand what to revise, I used a combination of AI tools to create a transcript of each eLearning component, then asked ChatGPT to create a synopsis including links to the learning outcomes I had written for related in-person sessions. I then used the GenAI materials to create a series of short 'explainer' videos that would allow them to navigate the lengthy eLearning sessions with more ease. This was following the principles of Universal Design for Learning (Fornauf & Erickson, 2020; Merry, 2024).

This example includes Generative AI elements of:

- Image
- Sound
- Speech
- Text
- Video

Why This Idea?

The student feedback after our in-person sessions was that they enjoyed in-person classes but were struggling to understand how the learning outcomes that I had generated connected with the inherited eLearning teaching materials. This was particularly important to them as their exam would be based on those learning outcomes and a combination of their independent learning and what we had done in class.

I therefore took each eLearning video and created a transcript using the Transcribe function in the Dictate area of Word on the web. This produced a transcript in Word, which I then was able to put into ChatGPT to ask for a synopsis. I also entered the associated learning outcomes into the prompt, and asked ChatGPT to create a structure for clearly explaining the connections between the LOs and the content of the eLearning synopsis.

I then asked the AI to generate a slide deck from which I was able to create a 10 minute 'explainer' video summarising the eLearning, and relating it to the learning outcomes for the session. The final recorded video included me talking around the topic, and was illustrated using slides from the eLearning to help students to understand where the information could be found and what elements would be particularly important as they prepared for assessments.

This worked very well to reassure the students, and provide a solid structure for them to study from. It did however also mean that some of the more strategic learners did not engage with the longer eLearning resource as fully as they had before.

The principal outcome of creating these short 'explainers' from the long and difficult to engage with video was that students stopped feeling overwhelmed and anxious, and reported that they now felt that they knew what was expected of them.

How Could Others Implement This Idea?

Step-by-step instructions for implementing the idea.

- Provide clear, detailed steps to help readers implement the idea, including specific GenAI prompts, the tools or platforms used, and whether they were free or paid versions.
- Make it adaptable for different contexts, ensuring it's simple and practical.

There were 4 different phases to going from a 1-hour eLearning class to a 10 minute 'explainer'. They involved moving through multiple modalities, and eventually produced a multimodal product including my narration and strongly edited GenAI slides/content.

1. I used the transcribe function in Word 'dictate' on the toolbar to generate a transcript of each eLearning session. This was free, but had a monthly limit of 300 minutes of processed audio. ChatGPT did volunteer various different options including Otter.ai, Sonix, Descript. I looked at Otter.ai and hit a paywall, so used Word because it was free. I did not investigate the others but think they could serve a similar purpose.
2. I then ran the transcription and the learning outcomes for associated in-person sessions through ChatGPT to get a focused synopsis. An example prompt was: "Create a synopsis of this eLearning material, and demonstrate where it fits with the following learning outcomes: - Explain the different routes through which fluid circulates from and to the heart; - Explain how fluid moves in a capillary bed; - Apply your knowledge of vascular anatomy to acupuncture points ; - Discuss the actions of core pharmaceutical drugs related to treating these conditions."
3. I asked ChatGPT to create a slide deck that summarises the eLearning material in order to create an 'explainer' video of a maximum length of 10 minutes. The prompt was "Use the transcript above to create a series of slides that will act as a

summary of the eLearning session." There was material in the eLearning that was relevant but not directly mapped onto the Learning Outcomes, so in my narrative I used this summary to make those links apparent for students in a way that the AI could not.

4. I created a 10 minute 'explainer' video based on the slide deck suggestions made by ChatGPT, where I pulled out slides from the eLearning to support my narrative. The video made regular reference to the slides in the eLearning where the topic was discussed in more detail so that students would be able to navigate easily to those sections of the eLearning.

References:

Fornauf, B.S., & Erickson, J.D. (2020). Toward an inclusive pedagogy through universal design for learning in higher education: A review of the literature. *Journal of Postsecondary Education and Disability, 33*(2), 183–199.

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The role of GenAI in Design for the Disassembly of Emergency Shelters

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What is the MML Idea?

In this project, I explored how multimodal Generative AI (GenAI) tools—particularly those capable of generating visual step-by-step diagrams from annotated structural images—can be applied in architectural education and emergency preparedness training. I used GenAI to allow students to upload simplified, annotated diagrams of vernacular-inspired shelters and receive AI-generated visual guides that illustrated disassembly sequences, joinery systems, and the hierarchy of materials and components.

By applying this process, I supported students' spatial understanding and engagement with concepts such as design for disassembly (DfD), modularity, and sustainable construction practices (Vahdati, Tedjosaputro, & Damavandi, 2025). The AI-generated visuals helped translate complex 3D structures into sequenced 2D guides, reinforcing spatial literacy and multimodal communication in architecture education.

This example includes Generative AI elements of:

- Image
- Text

Why this Idea?

I chose this approach because the use of GenAI in architectural education aligns with constructivist learning theories, where students co-create knowledge through iterative feedback and visual exploration. Tools like GPT-4 helped students better comprehend and communicate spatial relationships—skills that are often difficult to grasp through text alone. Research by Bower et al. (2022) has supported this, highlighting the ability of AI-assisted tools to enhance cognitive engagement in design education, where multimodal understanding is key.

Beyond higher education, I also considered a broader application: helping non-specialists understand how to assemble or disassemble emergency shelters during crises. Using a custom-trained AI model informed by emergency design standards (such as UNHCR guidelines), I explored how AI could produce accessible, language-free visual guides to support disaster response and recovery. This bridges humanitarian design with academic

training and makes complex architectural knowledge transferable to real-world settings (Vahdati, Tedjosaputro, & Agkathidis, 2025).

Ultimately, the multimodal nature of this approach (image + text + interaction) responded to a growing demand for adaptive, visual learning in education (Jinuntuya & Theppipit, 2007), while also demonstrating how AI can shift from automating outputs to co-creating and enriching learning experiences.

How Could Others Implement This Idea?

Step-by-step instructions for implementing the idea.

1. **Select source material:**
   Start with annotated diagrams or clear, labelled images of simple structural systems—such as vernacular shelters—that highlight joints, sequences, or material layers.
2. **Use a multimodal GenAI tool:**
   Upload these diagrams to a platform like **ChatGPT with GPT-4 & Vision** (ChatGPT Plus). Use prompts like:
   "Generate a step-by-step visual disassembly guide showing material layers, joints, and sequence, based on design for disassembly principles."
3. **Refine and compile outputs:**
   Use **Canva**, **PowerPoint**, or similar tools (free versions are sufficient) to organise and annotate the AI-generated diagrams into visual guides or slideshows.
4. **Integrate into teaching:**
   These resources can be used in architectural studios, humanitarian design modules, or emergency preparedness workshops. Depending on the audience, the material can be simplified for lay use or expanded for advanced student tasks such as critique, redesign, or reconstruction exercises.

Links to Tools and Resources:

GenAI Tools (Visual + Text-Based)

- ChatGPT with GPT-4 & Vision (ChatGPT Plus)
  Use to analyse images and generate step-by-step descriptions.
- Canva (for compiling visual guides)
  Use free version to create instructional diagrams or slide decks.

Image:

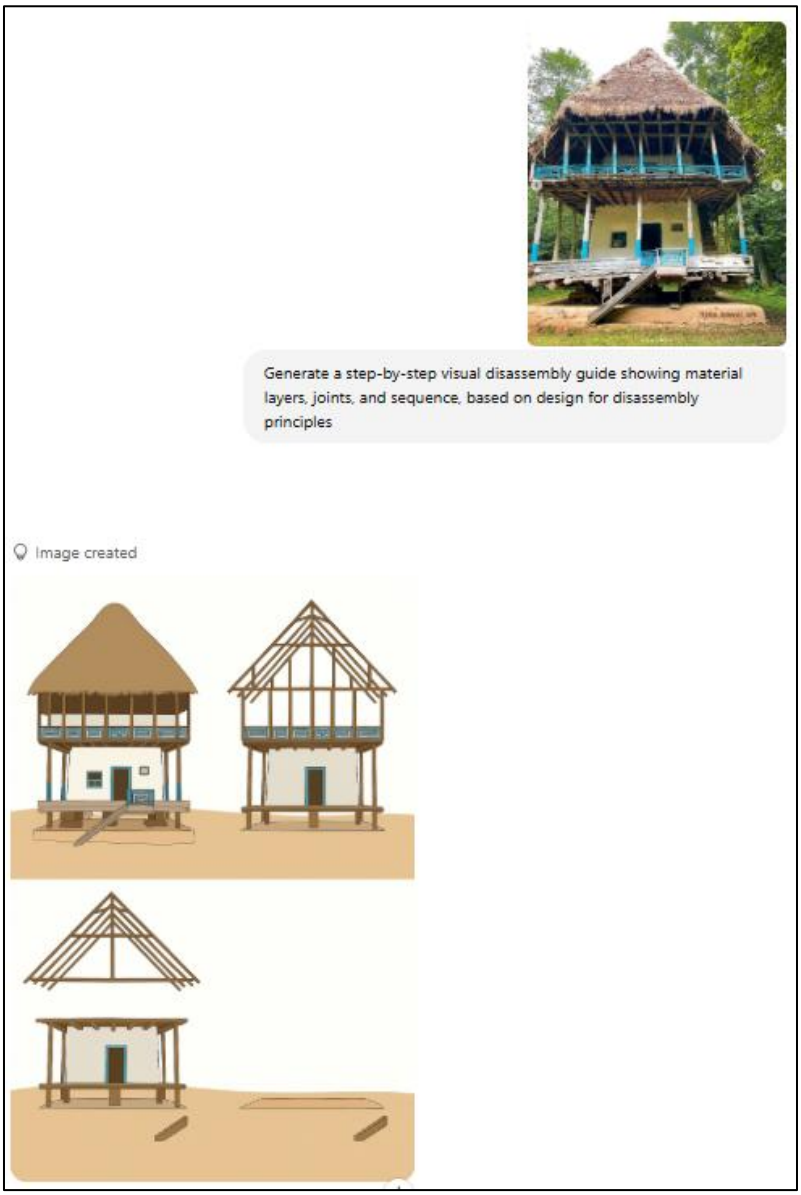

Figure 1. Screenshot of Prompt for a Step-by-step visual disassembly on ChatGPT

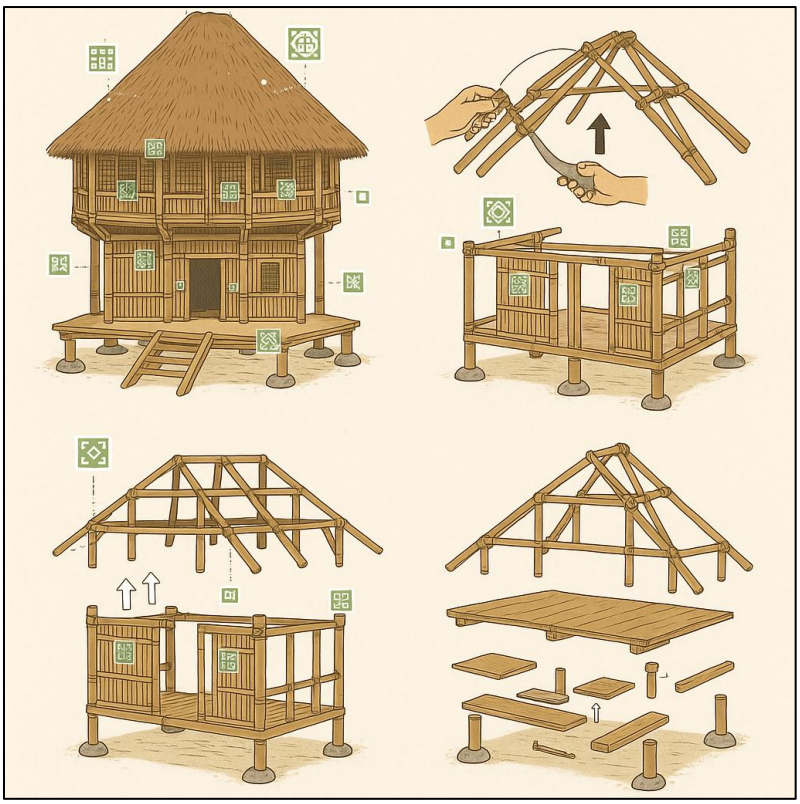

Figure 2. Step-by-step visual disassembly by ChatGPT

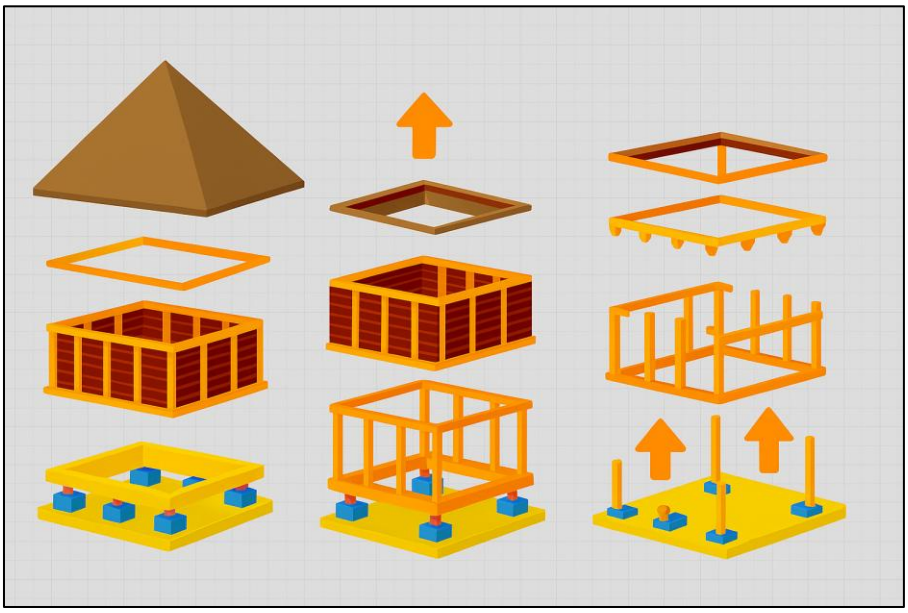

Figure 3. Design for the disassembly of a shelter using ChatGPT4o

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