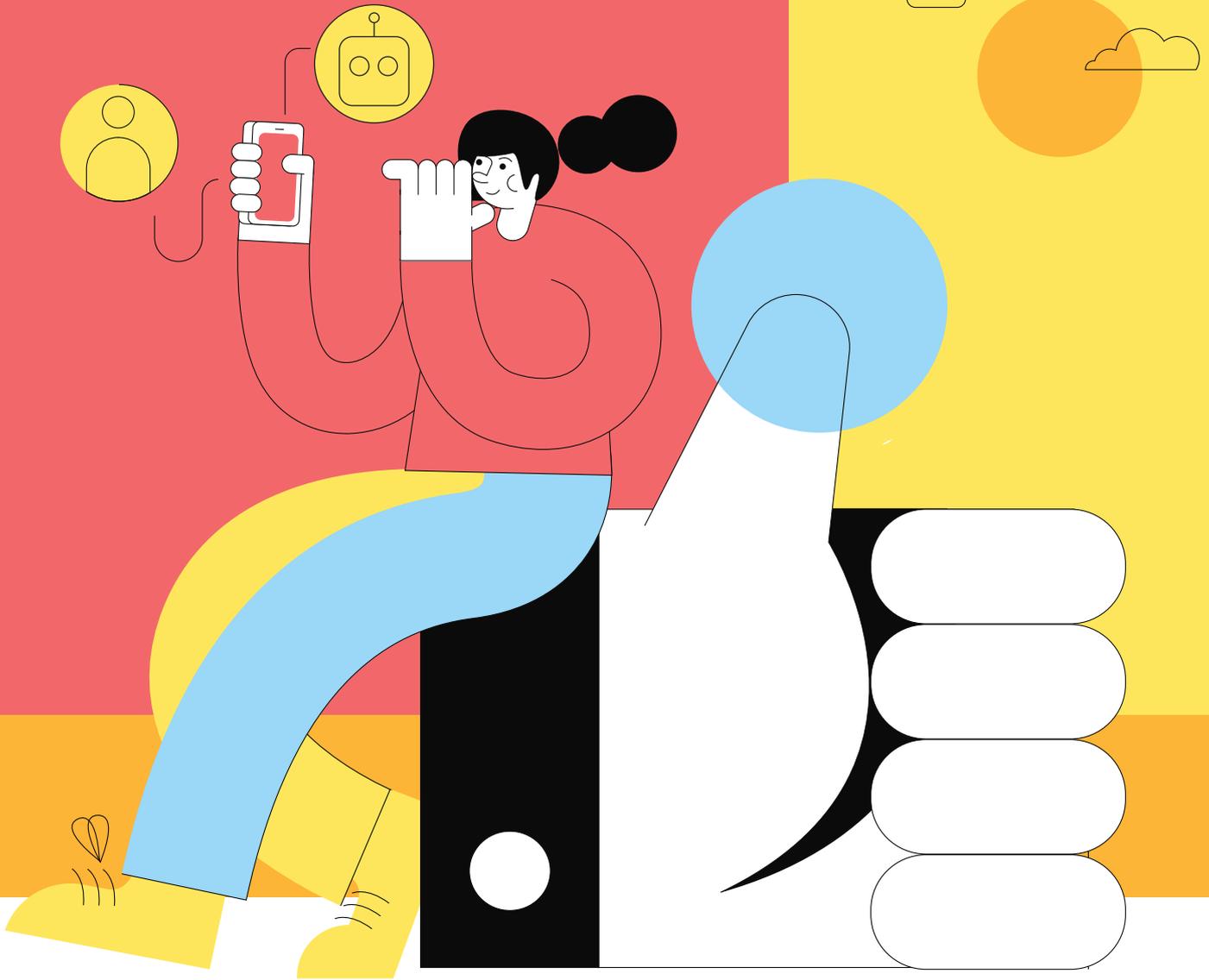
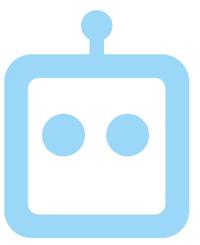


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Empowering Learners,
Developing Staff Capabilities,
and Implementing Sustainable
Digital Ecosystems

Gen 
→ AI^{N3}

N-TUTORR GenAI:N3

N-TUTORR GenAI:N3 Empowering Learners and Developing Capabilities with AI in the Irish Technological University Sector

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“The future of education isn’t about resisting AI—it’s about harnessing it. By embracing innovation, we empower educators to focus on what truly matters: critical thinking, creativity, and human connection.”

PREFACE: OVERVIEW OF GENAI:N3

Adapting to disruptive technologies is not just a challenge, but an opportunity to redefine education.

The N-TUTORR project, which was originally conceived in April 2022, did not contain Generative Artificial Intelligence (Gen AI) as a key thematic area as this pre-dated the emergence of Chat GPT later that year in November 2022. While the key theme of academic integrity was impacted by Gen AI, it was considered necessary to support an additional project focused solely on this new disruptive technology, given the significant impact it was having on the higher education sector. GenAI:N3 was initiated in December 2023 by Dr Hazel Farrell (South East Technological University) who was appointed project lead. Building on her work within SETU, she laid the groundwork for the project focusing on developing key resources and training programmes in response to the needs of educators and learners grappling with Gen AI. The creation of a national network drawing on a broad range of skills and expertise from across the sector was prioritised to ensure high quality outputs and informed decision-making. This network was established in September 2024 with representatives from all N-TUTORR partner institutions.

National Network:

- Hazel Farrell (Project Lead),
- Ken McCarthy (N-TUTORR Institute Lead),
- Peter Windle, Emmett Cullinane (SETU)
- Angela Wright, Tom Farrelly, Larkin Cunningham (MTU)
- Annette Cosgrove (ATU)
- Mohammed Cherbatji (IADT)
- Denise Macgiollari (TUS)
- JJ Quinlan, Jacqueline Toal (DKIT)
- Bryan Duggan (TU Dublin)

While the project directly involves the N-TUTORR partner institutions, the aim of creating broader impact on the HE sector was integral as national and international partners featured as guest speakers, consultants, and facilitators. This was a core consideration in ensuring all resources created for the project were Open and accessible through the project website, while also addressing the challenge of high-quality resources being tied into institutional VLEs.

While the project directly involves the N-TUTORR partner institutions, the aim of creating broader impact on the HE sector was integral as national and international partners featured as guest speakers, consultants, and facilitators. This was a core consideration in ensuring all resources created for the project were Open and accessible through the project website, while also addressing the challenge of high-quality resources being tied into institutional VLEs.

This project has undertaken the following initiatives:

- Establishing a national network across the TU and wider HE sector
- Creation of a GenAI:N3 national hub (website) with open and accessible Gen AI resources
- Development of an Assessment Re-design Framework and short online course for educators
- Development of Student Guidelines and accompanying short online course for students
- Facilitation of a series of 'AI Play' Workshops and Hackathons across the HE sector, both nationally and internationally
- Creation of an AI Tool and an AI Chatbot
- Production of a crowdsourced e-book to showcase outputs and learning from the project, expert articles, case studies, and resources
- AI Clinics for staff to drop in and discuss their issues and experiences with the technology

It is noteworthy that the GenAI:N3 project was undertaken in a very limited period as a late addition to the overall N-TUTORR initiative, however the outputs speak for themselves in terms of quality and value. This exemplifies the strength of collaboration and pooling together of collective knowledge and diverse skillsets from across the sector. While a significant amount has been achieved through this project, this is merely a starting point and far more needs to be done to support educators and learners in the face of evolving Gen AI technologies.

A claim of expertise in an area as vast as Artificial Intelligence would be misguided, as it intersects so many different functions in the education sector and beyond and continues to evolve rapidly. This highlights the importance of continuing to build our network, expanding outwards in each of our institutions, and into the wider university communities nationally and internationally. It also emphasises the need for funding and

resourcing both at institutional and national level to support the ongoing work of the network, as we strive to scaffold our communities in the HE sector.

In the space of two years AI has become embedded in our society and continues to gain a stronger foothold as the technology advances and becomes more accessible. The profound impact on the education sector is undeniable, stimulating the necessity for change and for dedicated teams such as the GenAI:N3 network to support this evolution.

Dr Hazel Farrell – GenAI:N3 Project Lead



“AI is not the future of education—it is the present. The challenge now is not just to adapt, but to innovate, collaborate, and lead the way in shaping its role in learning.”



CHAPTER 1:

ASSESSMENT REDESIGN FRAMEWORK

GENAI:N3

Dr Hazel Farrell

Redefining Assessment in the Age of AI: Fostering Integrity and Innovation in Education

1.0 Introduction

Since the launch of ChatGPT in November 2022 and subsequent surge in Generative Artificial Intelligence (Gen AI) technology, the education sector has been impacted significantly, with efforts to develop policies, strategies, and guidelines to support staff and students in navigating the changing landscape. While these technologies offer great potential for enhancing learning experiences, they also pose significant challenges to academic integrity. Traditional assessment methods, such as essays, unsupervised open-book or remote exams, and online quizzes, are increasingly vulnerable, as students can access AI tools to produce content that appears to be original but is not their own work. While a variety of AI detection tools have been developed, their accuracy remains questionable and reliance on them is not recommended. The implication of this is that a shift of focus is needed from detection to prevention, or as Cath Ellis espouses, from detecting cheating to detecting learning. This presents an urgent need for higher education institutions to reconsider their assessment strategies to uphold academic standards and ensure that assessments accurately reflect students' knowledge and skills.

1.1 Objectives

The goal of assessment redesign is to develop robust, fair, valid, and effective methods that can withstand the potential misuse of AI tools, while also providing students with the opportunity to demonstrate their learning meaningfully. By incorporating a variety of assessment types, considering the balance between formative and summative, and high- and low-stake assessment types, and emphasising process and understanding over final product, educators can create a more reliable and integrity-focused assessment environment. In practice, this can be challenging for a wide variety of reasons including time constraints and large class numbers. However, consideration of which assessments are appropriate for Gen AI usage is also necessary, and - ultimately - the alignment of assessments with programme and module learning outcomes remains the key guiding principle in ensuring that learners have achieved the requisite knowledge, skill and competence.

1.2 Scope

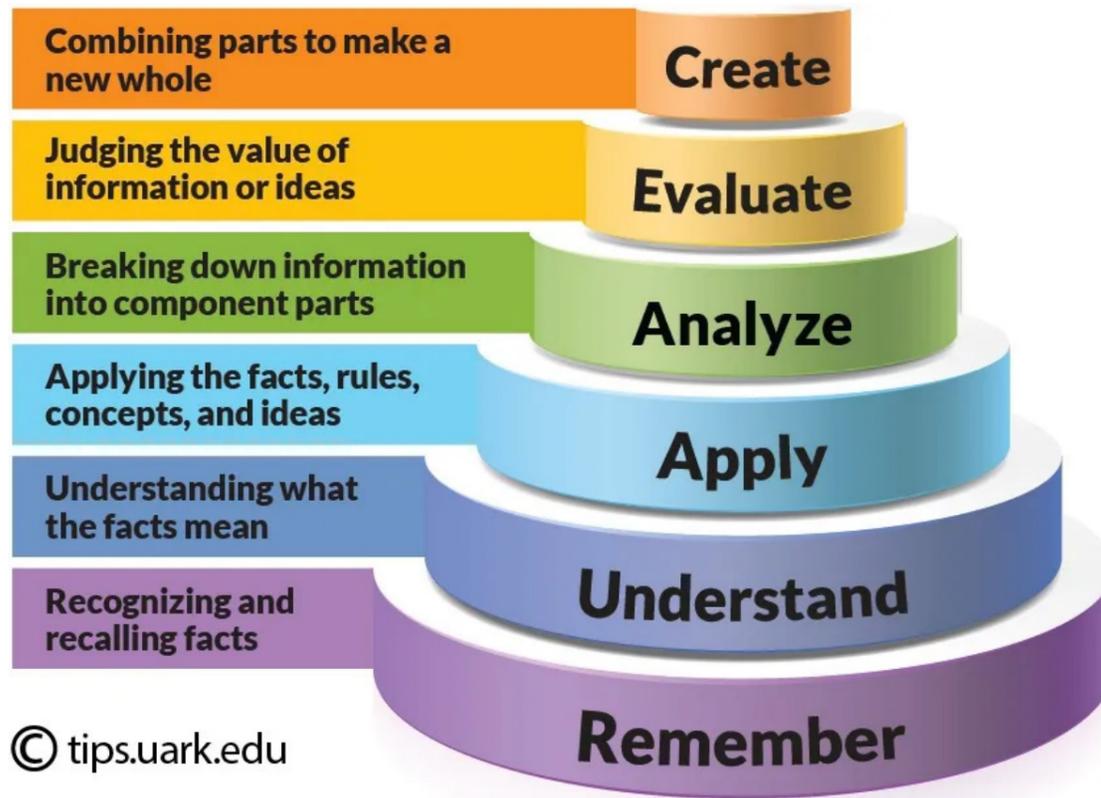
- Consider the purpose of the assessment and determine whether Gen AI usage is appropriate or not, and how best to communicate this to the learners.
- Determine which assessments are most susceptible to AI misuse and prioritise them in the redesign process.
- Explore options in collaboration with discipline-area colleagues to lower the risk of academic integrity breaches for specific assessment types.
- Consider the feasibility of integrating Gen AI into assessments.

1.3 Reconsidering the purpose of Assessment

In an AI-enhanced environment, reconsidering the purpose of assessment becomes imperative to foster a more meaningful and authentic learning experience. Traditional assessments often emphasise rote memorisation and the reproduction of knowledge, which are increasingly susceptible to manipulation through AI tools. Instead, the focus should shift towards assessing higher-order thinking skills, such as critical analysis, creativity, problem-solving, and the ability to synthesise and apply knowledge in novel contexts, illustrated below in the Revised Bloom's Taxonomy by Lorin Anderson and David Krathwohl (2001).

purpose of assessment should aim to cultivate lifelong learners equipped with the skills to navigate and innovate in an AI-driven world.

The types of tasks associated with the different levels of Bloom's Taxonomy are detailed below and while they were not specifically intended for assessment redesign in an AI context, the application for this purpose is entirely relevant.



By prioritising these competencies, assessments can better reflect real-world applications and prepare students for the complexities of the modern workforce. This shift also encourages deeper engagement with the material, promoting a learning environment where students are evaluated not just on what they know, but on how they think and adapt. Consequently, the redefined

BLOOM'S TAXONOMY DIGITAL PLANNING VERBS					
REMEMBERING	UNDERSTANDING	APPLYING	ANALYZING	EVALUATING	CREATING
Copying Defining Finding Locating Quoting Listening Googling Repeating Retrieving Outlining Highlighting Memorizing Networking Searching Identifying Selecting Tabulating Duplicating Matching Bookmarking Bullet-pointing	Annotating Tweeting Associating Tagging Summarizing Relating Categorizing Paraphrasing Predicting Comparing Contrasting Commenting Journaling Interpreting Grouping Inferring Estimating Extending Gathering Exemplifying Expressing	Acting out Articulate Reenact Loading Choosing Determining Displaying Judging Executing Examining Implementing Sketching Experimenting Hacking Interviewing Painting Preparing Playing Integrating Presenting Charting	Calculating Categorizing Breaking Down Correlating Deconstructing Linking Mashing Mind-Mapping Organizing Appraising Advertising Dividing Deducing Distinguishing Illustrating Questioning Structuring Integrating Attributing Estimating Explaining	Arguing Validating Testing Scoring Assessing Criticizing Commenting Debating Defending Detecting Experimenting Grading Hypothesizing Measuring Moderating Posting Predicting Rating Reflecting Reviewing Editorializing	Blogging Building Animating Adapting Collaborating Composing Directing Devising Podcasting Wiki Building Writing Filming Programming Simulating Role Playing Solving Mixing Facilitating Managing Negotiating Leading

<https://www.teachthought.com/learning/what-is-blooms-taxonomy/>

It is also worth acknowledging the potential for Gen AI to be used to cheat on authentic assessments and that different types of authentic assessment will carry less/greater risk of cheating - e.g. written reflections, diaries, reports may be higher-risk than an interactive oral assessment.

In an AI-enhanced environment, reconsidering the purpose of assessment becomes imperative to foster a more meaningful and authentic learning experience.

1.4 Risk Assessment

Assessments that involve the creation of an artefact as the main or only task typically pose a higher level of risk. Similarly, assessments that have little oversight such as unsupervised online assessments also pose a high level of risk. At the opposite end of the scale are fully supervised or proctored exams which have a lower risk level; however, this approach can impact on authentic assessment design and contribute to an environment of mistrust rather than a culture of integrity depending on the context and use.

The following table lists a range of typical assessment types used in higher education institutions. It ranks them in order of risk level, identifies the risk, and suggests steps to mitigate against this.

In addition to the mitigation steps suggested above, a variety of assessment media such as journals, e-portfolios, vlogs or blogs can be selected to accompany larger pieces of work or as stand-alone assessments. This requirement can be useful to ensure individualised elements based on personal experiences or observations of specific classroom activities, while also encouraging visibility of the learning process. Activities involving critical thinking, decision-making, and reflection are more difficult, but still possible, for Gen AI to simulate. Reflective writing is particularly impactful as it is highly personal and requires the student to document their thoughts, challenges, and growth throughout their learning journey.



Assessment Type	Level of Risk	Risks Posed by Generative AI	Mitigation Steps
Essays and Written Assignments	High	AI can generate high-quality written content that may not be easily detected as non-original.	<ul style="list-style-type: none"> Require multiple drafts and incorporate peer reviews. Employ oral defences or follow-up questions to verify understanding.
Unsupervised Open-Book or Remote Exams	High	Students might use AI to complete their exams, leading to misrepresentation of their own knowledge.	<ul style="list-style-type: none"> Implement time constraints that limit the ability to use AI. Use a combination of unsupervised open-book and in-person assessments. Randomise questions and personalise them to individual students.
Online Quizzes	Medium	AI can assist in answering questions, especially multiple-choice ones, if they are available online.	<ul style="list-style-type: none"> Use question banks to randomise questions for each student. Employ proctoring software that monitors students during the quiz. Incorporate questions that require critical thinking and personalised responses.
Research Papers	Medium	AI can generate or heavily assist in creating research papers, making it hard to detect authentic student work.	<ul style="list-style-type: none"> Require detailed methodology sections and data analysis that are difficult for AI to fabricate. Conduct oral presentations of research findings. Require pre-final drafts and incorporate peer reviews.
Lab Reports	Medium	AI can help generate content for lab reports, including data interpretation and discussion sections.	<ul style="list-style-type: none"> Require students to submit raw data and detailed lab notes. Incorporate in-lab assessments and practical exams. Conduct regular checks and comparisons with past student work for consistency.
Creative Work	Medium	AI can help produce content for many creative disciplines including music, graphic design, visual art, and poetry.	<ul style="list-style-type: none"> Require submission of notes and drafts or sketches to ensure preparation. Use oral presentations and Q&A sessions to verify individualised approach. Conduct comparisons with past student work for consistency.
Problem Sets	Low	While AI can solve problems, students still need to understand the process and concepts.	<ul style="list-style-type: none"> Include a mix of automated and hand-written problem-solving components. Regularly update problem sets to avoid repetition. Use oral exams to verify understanding of the solved problems.
Group Projects	Low	AI can assist in parts of the project, but collaboration and presentation skills are difficult to fake.	<ul style="list-style-type: none"> Assess individual contributions through peer evaluations and reflections. Incorporate regular check-ins and progress reports. Require live presentations and Q&A sessions.
Oral Presentations	Low	AI cannot assist directly during live presentations, but can aid in preparation.	<ul style="list-style-type: none"> Focus assessment on delivery, understanding, and ability to answer questions. Use varied formats like impromptu topics or interactive Q&A sessions. Require submission of notes and drafts to ensure preparation.

1.5 Postgraduate Programmes

While postgraduate work is often more closely supervised, the above may be adapted and applied where appropriate. Oral examinations, and presentations followed by Q&A sessions are commonplace for many taught postgraduate programmes; however, the frequency of these could be increased throughout pinch points in the research journey such as: idea generation; literature review; methods; chapter discussions; and so on. Similarly for PhD work, an increased number of oral presentations to peers and staff could be considered.

The requirement of a reflective journal documenting the thought process throughout the research journey is valuable both from a learning perspective and to support the integrity of the work.

For taught postgraduate programmes, active learning such as collaboration with peers through group project work can lower the risk of AI misuse. Where possible, working with industry for problem solving and co-creating is a robust approach as the industry partner can also engage and check for understanding.

Facilitating a workshop on Gen AI and research at an early stage in the postgraduate programme could contribute towards creating a culture of transparency and integrity. Stimulating discussions around academic integrity and accepted usage can ensure clarity and mitigate against misuse.

The implications of assessment redesign as suggested above require more time investment particularly for large cohorts. This needs to be considered in terms of the resourcing of assessments at postgraduate level and may involve the prioritisation of core modules.

1.6 Integration of Gen AI into Assessment Processes

The incorporation of Gen AI into the assessment process can enhance the learning experience and contribute towards establishing more engaging and authentic practices. However, it is also important to determine whether the integration of Gen AI into your assessment is appropriate. The Artificial Intelligence in Education (AIED) Framework developed by the International College of Management in Sydney, recommends consideration of the following factors when deciding whether to allow or restrict AI usage for assessment:

Educational reasoning: If students are asked to demonstrate their understanding, critical thinking skills, or ability to apply knowledge independently, relying heavily on AI could undermine the intended learning outcomes.

The nature of the task: If the task aims to assess a student's writing proficiency, using Gen AI to produce the written content would make this impossible. In contrast, if the task is focused on exploring AI capabilities or understanding its applications, the use of Gen AI may be appropriate and aligned with the learning objectives.

The function of the task: If a student's mastery of specific concepts or their ability to solve complex problems are being assessed, relying on AI could potentially hinder the accurate evaluation of their skills and knowledge.

The following scale developed by Leon Furze outlines the varying levels of Gen AI integration possible in the assessment process. The different levels may be adopted depending on a range of factors including: the discipline; the nature of the assessment; the purpose of the assessment; and the intended learning outcomes.

Leon Furze AI Assessment Scale

1	NO AI	The assessment is completed entirely without AI assistance in a controlled environment, ensuring that students rely solely on their existing knowledge, understanding, and skills. You must not use AI at any point during the assessment. You must demonstrate your core skills and knowledge.
2	AI PLANNING	AI may be used for pre-task activities such as brainstorming, outlining and initial research. This level focuses on the effective use of AI for planning, synthesis, and ideation, but assessments should emphasise the ability to develop and refine these ideas independently. You may use AI for planning, idea development, and research. Your final submission should show how you have developed and refined these ideas.
3	AI COLLABORATION	AI may be used to help complete the task, including idea generation, drafting, feedback, and refinement. Students should critically evaluate and modify the AI suggested outputs, demonstrating their understanding. You may use AI to assist with specific tasks such as drafting text, refining and evaluating your work. You must critically evaluate and modify any AI-generated content you use.
4	FULL AI	AI may be used to complete any elements of the task, with students directing AI to achieve the assessment goals. Assessments at this level may also require engagement with AI to achieve goals and solve problems. You may use AI extensively throughout your work either as you wish, or as specifically directed in your assessment. Focus on directing AI to achieve your goals while demonstrating your critical thinking.
5	AI EXPLORATION	AI is used creatively to enhance problem-solving, generate novel insights, or develop innovative solutions to solve problems. Students and educators co-design assessments to explore unique AI applications within the field of study. You should use AI creatively to solve the task, potentially co-designing new approaches with your instructor.



Perkins, Furze, Roe & MacVaugh (2024). The AI Assessment Scale

leonfurze.com

This is further simplified by Liu and Bridgeman (2023) in the University of Sydney as two clear assessment tracks are identified:

Track 1 (secured): AI use is typically not permitted unless the ethical use of an AI tool is purposefully being assessed. The focus is on 'assessment of learning'. These assessments are supervised, and unauthorised use of AI is considered a breach of academic integrity.

Track 2 (open): Responsible use of AI is encouraged. These assessments are less supervised, promoting engagement with AI and preparing students for an AI-integrated society. Acceptable AI-usage is clearly detailed in the Assessment Briefs and any unauthorised use of AI outside of this is considered a breach of academic integrity.

The incorporation of both tracks is viewed as a positive step in creating a balanced assessment environment where foundational knowledge, and critical thinking skills remain relevant, while also focusing on authentic assessments requiring cre-

ativity, application of knowledge, and higher order skills. It is suggested that most assessments should fall into Track 2 as we prepare our learners for future careers in an increasingly AI-enhanced landscape.

Further information and FAQs on this approach may be found here. <https://educational-innovation.sydney.edu.au/teaching@sydney/frequently-asked-questions-about-the-two-lane-approach-to-assessment-in-the-age-of-ai/>

Consideration should also be given to whether your limitations on AI usage are enforceable. If they are not, the validity of the assessment is in question.

Absolute clarity on what is or is not permitted is vital for learners and therefore consideration should be given to how best to communicate this information. Furze developed a version 2 of his assessment scale with a simplified graphic for this purpose.

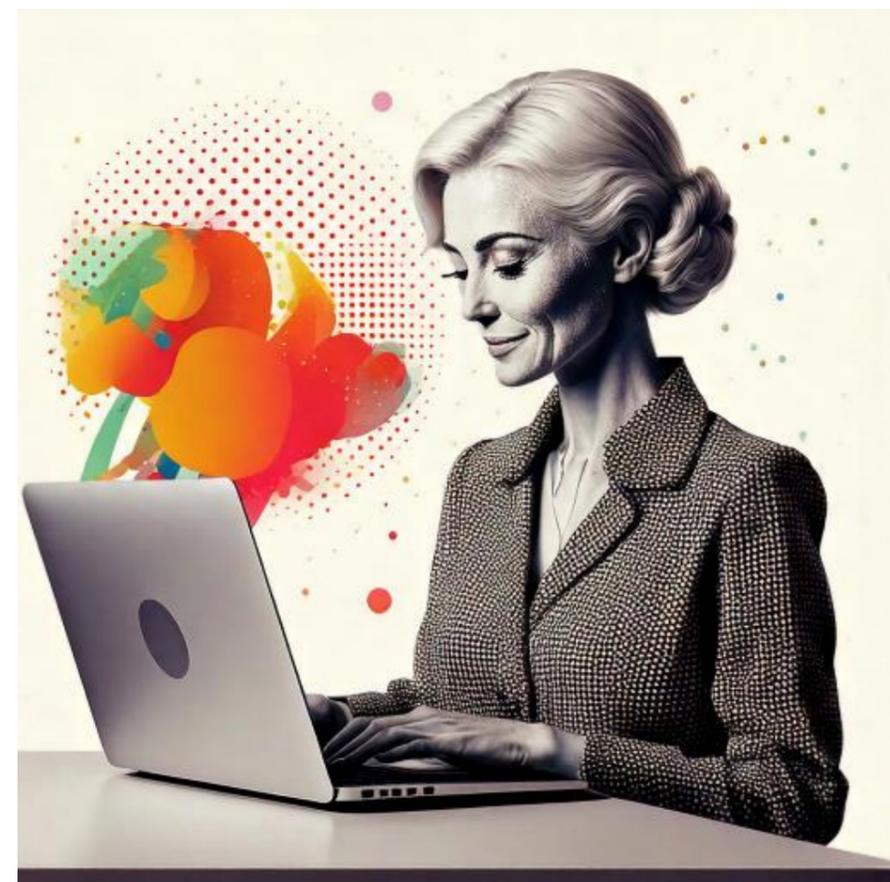
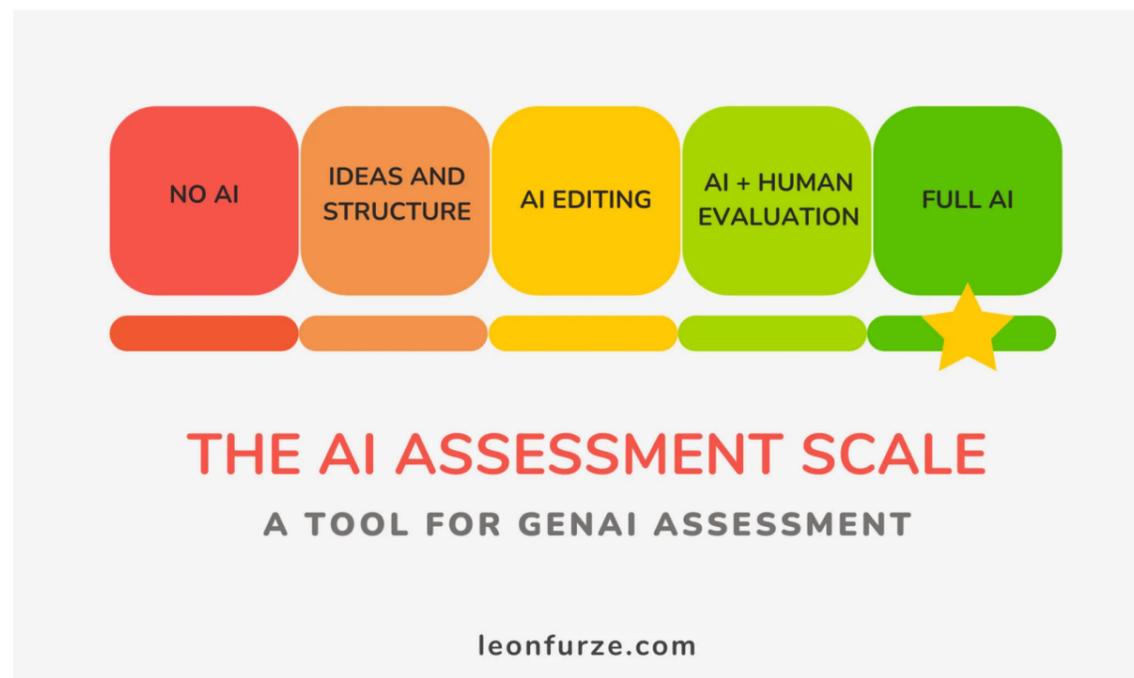
1.7 Focusing on the Process

There has been frequent reference to focusing on the process in emerging research on assessment redesign, but less on what this actually looks like. Essentially, process-based assessments not only focus on an end product, but also on how the learners arrive at their conclusions. This type of assessment is particularly valuable in preparing students for complex, real-world challenges where the journey is just as important as the destination.

Requiring evidence of the learning process can provide deeper insight into the level of understanding, reasoning processes, and ability to apply knowledge. This is good assessment practice beyond the context of Gen AI, but it is also entirely relevant within this challenging space.

The learning process can be revealed through a variety of means including reflective journals, drafts or sketches, staged assessments, and iterative feedback cycles. Students are more likely to produce original work that reflects their own understanding and effort, as the process is unique to each individual. Other benefits include:

- increased opportunities for peer learning, collaboration, and teacher-student interaction
- development of self-awareness of their own strengths and weaknesses
- enhanced student engagement and deep learning
- development of critical thinking and problem-solving skills
- reduced pressure on a final outcome
- promotion of a culture of transparency and integrity



1.8 Further considerations

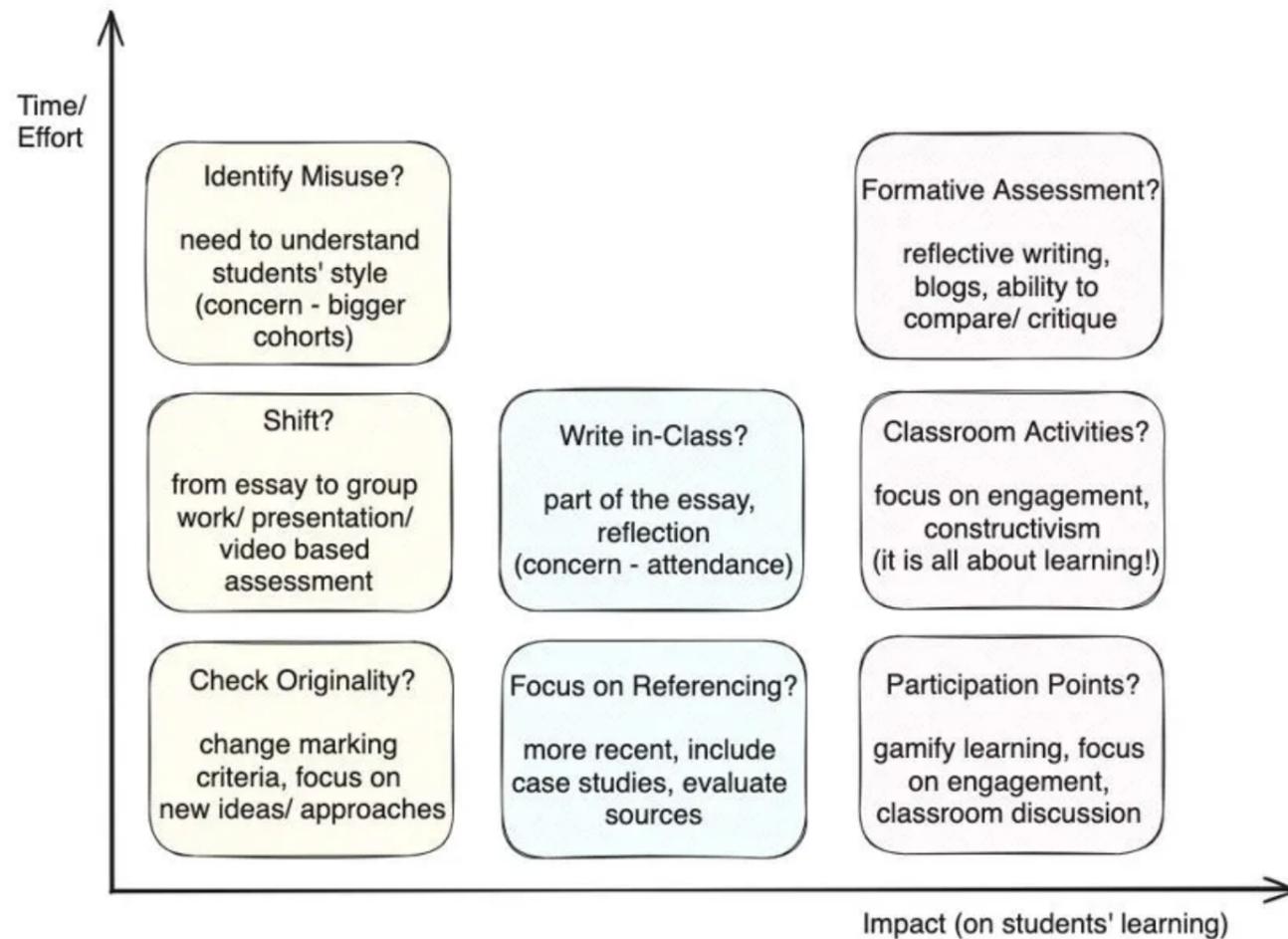
Time Investment

A valid consideration in assessment redesign is balancing the amount of time and effort educators will need to invest in this process versus the level of impact on the learning experience. Virmani and Lau address this in their SEDA blog (June 2024) and offer the following as a starting point for discussion:

Horizontal Axis (Impact): measures the degree to which an assessment format influences positive changes in student learning outcomes. Assessments that lead to greater understanding, skill development, and knowledge retention would be placed further to the right.

Vertical Axis (Time): indicates roughly how much time and effort educators would invest in modifying or redesigning a particular assessment format. Assessments that demand significant changes would be placed higher vertically.

Ideal Zone: would be high in impact yet lower in the time required for modification and include techniques that balance efficiency with effectiveness.



Exploring assessment approaches that deter cheating in the first place rather than focusing on detection after the fact, can be useful in terms of saving time. However, there is no single 'perfect' solution, and the most effective approach will depend on your specific context, learning objectives, and available resources.

Institutional and Wider Supports

In addition to time to adapt to our changing landscape, educators also need to be supported at institutional level by faculties, registry, and senior leadership in terms of professional development, facilitation of open conversations, development of unified approaches, creation of new resources, and expediting processes to redesign or update modules.

Support is needed in the development of clear and useful AI policies and guidelines, while also considering institutional Gen AI tools to ensure equity and data privacy. Resourcing is needed to support changing assessment and feedback processes, particularly for programmes with large student cohorts. Without this support, the challenges around Gen AI are intensified.

Awareness of the national conversation about approaches to redesigning assessment also needs to be reinforced, for instance the QQI programme of activity around Rethinking Assessment and the academic integrity approach adopted by institutions with NAIN. The National Forum for the Enhancement of Teaching and Learning in HE has also seconded an AI expert to support policy development nationally, so there are many positive steps within the sector.

“Historical definitions of plagiarism will not be rewritten because of artificial intelligence; they will be transcended” - Sarah Eaton

‘Postplagiarism’

As AI technology continues to develop at a rapid pace, it is important to consider what the future may look like for educators. While plagiarism traditionally refers to the copying or paraphrasing someone else's work without proper attribution, 'postplagiarism' in the context of Gen AI is a term that encapsulates the new challenges to academic integrity in higher education, as AI tools become more integrated into the creation of academic work. It also signifies the need to re-evaluate and update traditional concepts of plagiarism to address the complexities introduced by the increasing prevalence of AI tools and AI generated content.

Key Aspects of Postplagiarism:

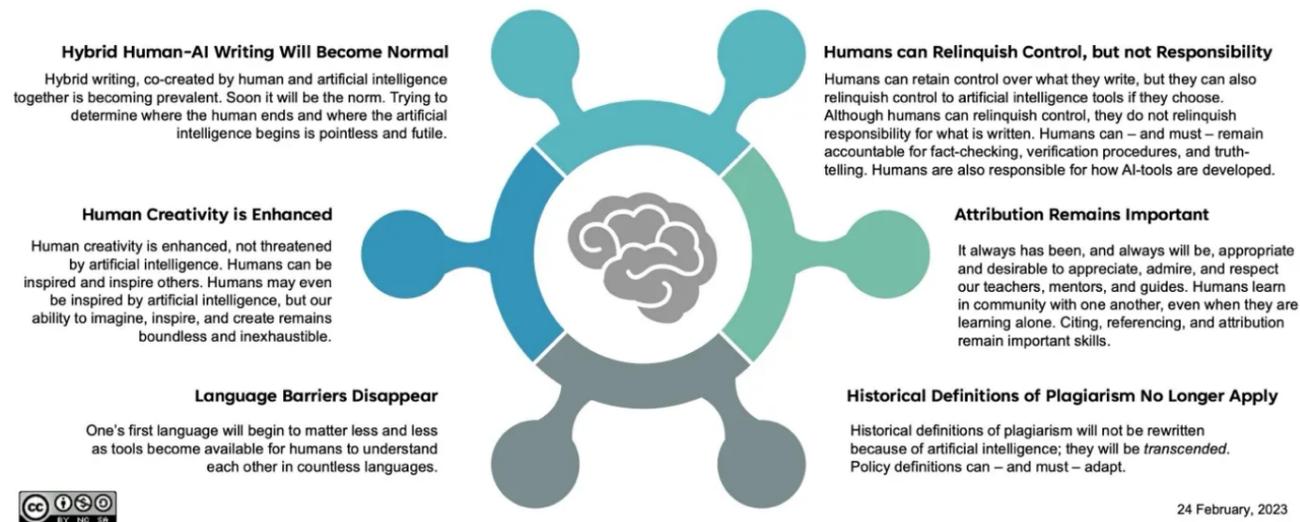
1. **AI-Generated Content:** Students and researchers might use AI to generate essays, reports, or other academic materials. The question arises as to whether this content should be considered original or if it constitutes a form of plagiarism, especially if the use of AI is not disclosed.
2. **Authorship and Ownership:** Traditional academic work is credited to individuals based on their intellectual contribution. However, when AI plays a significant role in content creation, the lines of authorship and ownership become blurred. Who is the true author—the individual, the AI, or both?
3. **Attribution:** There is ongoing debate about how to attribute AI-generated content. Should students cite the AI tool as a source, similar to a book or article? Or is the use of AI tools similar to using a calculator or spellchecker, which do not require attribution?
4. **Academic Integrity Policies:** Updating these policies has become necessary to reflect the challenges presented by AI, to achieve a balance in encouraging the responsible use of technology while maintaining the integrity of academic work.
5. **Ethical Considerations:** The ease of generating content with AI is tempting for students and researchers to submit work they didn't meaningfully engage with or understand.

While there are significant challenges, there are also opportunities to develop innovative approaches and embrace new mindsets. Sarah Eaton optimistically explores the concept of postplagiarism and academic writing in the following infographic:

6 Tenets of Postplagiarism: Writing in the Age of Artificial Intelligence

Sarah Elaine Eaton

In *Plagiarism in Higher Education: Tackling Tough Topics in Academic Integrity* (2021) I introduced the idea of life in a postplagiarism world. Here, I expand on those ideas.



Assessment is a key aspect of the learning experience and as such it deserves careful consideration

1.9 Tips for redesigning your assessment

1. Clearly define what you are assessing and determine whether AI-usage is appropriate - application of knowledge, critical thinking or problem-solving skills, analytical or evaluation skills etc.
2. Ensure there is clarity around whether learners are permitted to use Gen AI or not, and, if they are, to what degree use is permissible. If this is not enforceable (undetectable, unprovable), it is not valid.
3. Focus your assessments on higher order thinking skills - analysis, evaluation, creation etc. but also consider where students will need to have solid foundational knowledge to support them in applying these higher order thinking skills.
4. Design multi-faceted assessments that involve individualised components and include lower risk approaches such as oral presentations, peer evaluation, drafts or sketches, reflective journals etc.
5. Consider the importance of assessing the learning process rather than focusing solely on a final artefact. Build in touch points or design staged assessments where each component builds on the previous one, for example **DCU's interactive oral assessment process**.
6. Incorporate collaborative elements into your assessments - problem solving activities and peer feedback.
7. Facilitate open conversations on Gen AI usage and involve learners in the assessment redesign process whenever possible, including the creation of marking rubrics - UDL approach.

1.10 Conclusion

While grappling with the intricacies of this disruptive technology may seem daunting, the time investment in evolving professionally and becoming more confident in developing an informed approach is highly rewarding. Although, the potential personal impact on educators and their wellbeing while trying to grapple with this rapidly changing environment and the many ethical issues (including equity of access) associated with Gen AI cannot be disregarded.

Assessment is a key aspect of the learning experience and as such it deserves careful consideration. The prevalence of Gen AI has amplified this and stimulated the necessity to reflect on assessment approaches. However, this needs to be undertaken from an informed perspective which requires some level of AI literacy which may be achieved through engagement with professional development.

This assessment redesign framework has been developed as part of the N-TUTORR national project 'GenAI: N3' which aims at scaffolding staff and students in the evolving Gen AI-enhanced HE environment. It offers a starting point for educators in considering assessment in the age of Gen AI. While it cannot cover every eventuality, the approaches can be adapted, combined, or developed further. Most importantly, it aims to stimulate discussion and thought around current research in this area.

1.11 Online Assessment Redesign Course

<https://rise.articulate.com/share/JBD2a01MMKY59uMQVYjVUQ0PpdExqdq3#/>

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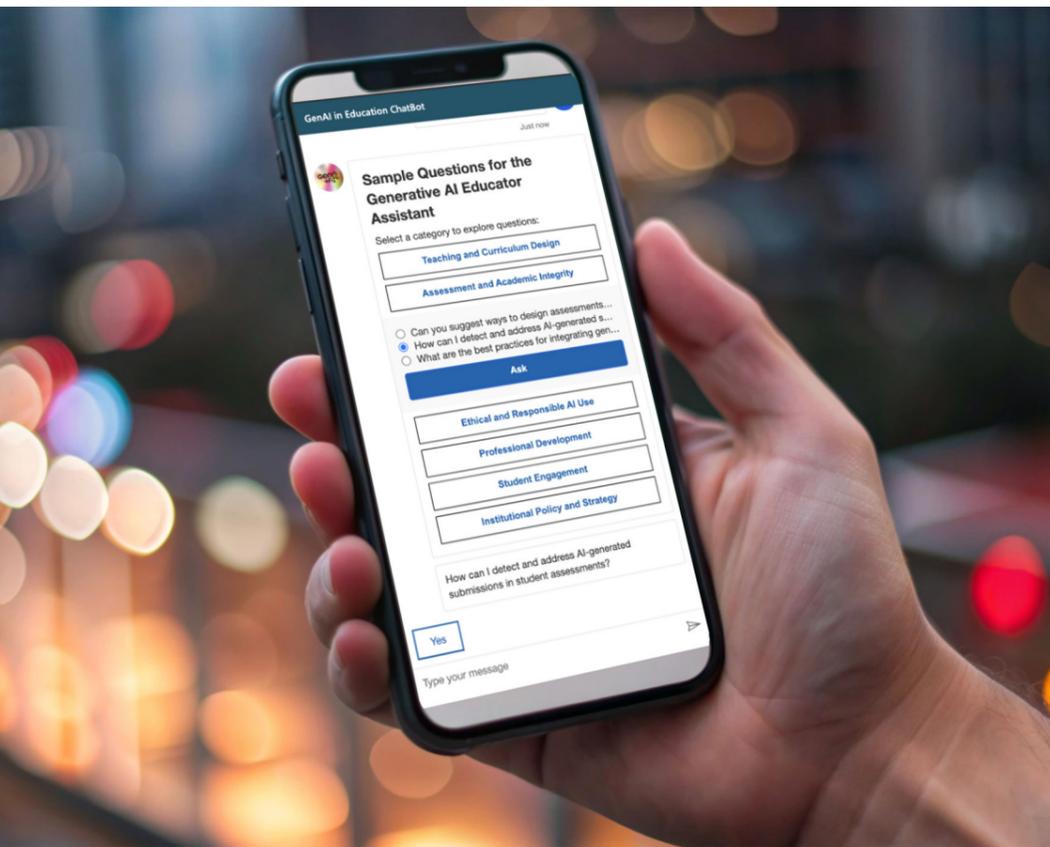
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CHAPTER 2

GENAI:N3 ONLINE

2.0 Gen AI in Education Chatbot <http://chatbot.genain3.ie/>

A Gen AI in Education Chatbot was developed as an educational tool designed to support educators in addressing the impact of Gen AI on teaching, learning, and assessment. It assists in designing assessments that account for AI capabilities, maintaining academic standards, and promoting AI literacy among students. Built on research-based frameworks and institutional guidelines, the chatbot provides tailored guidance for integrating AI ethically and effectively into educational practices. Whether developing assessments, exploring innovative teaching methods, or fostering student engagement, the chatbot offers practical solutions to help educators adapt to the evolving role of AI in education.



The initial screen includes a menu of sample questions. The GenAI in Education Chatbot provides answers from and references to research-based frameworks and institutional guidelines.



2.1 GenAI:N3 Website www.genain3.ie

The GenAI:N3 website was developed by the project team with the intention of establishing an accessible national hub for educators and learners from across the sector. It originated to address the challenges of accessing high quality resources that were being developed at institutional level but were tied into the VLEs of the respective universities and therefore unavailable to those outside of these organisations. This resulted in the unnecessary duplication of work in an already under resourced area. It also motivated the commitment of the project team to develop all Open resources to maximise accessibility, inclusivity, and facilitate broader impact. This is further reinforced by the inclusion of staff and student sections on the website to ensure our learners are also supported in this space.

The national hub will continue to be updated as more resources are developed, and further research emerges capturing the narrative around Gen AI in education.



CHAPTER 3: GEN AI HACKATHONS

3.0 Overview

A Hackathon was hosted by each of the N-TUTORR partners to deconstruct the narrative around Gen AI in Higher Education. These events were held across multiple locations in November 2024 and included guest speakers, workshops, interactive activities, and a series of challenges.

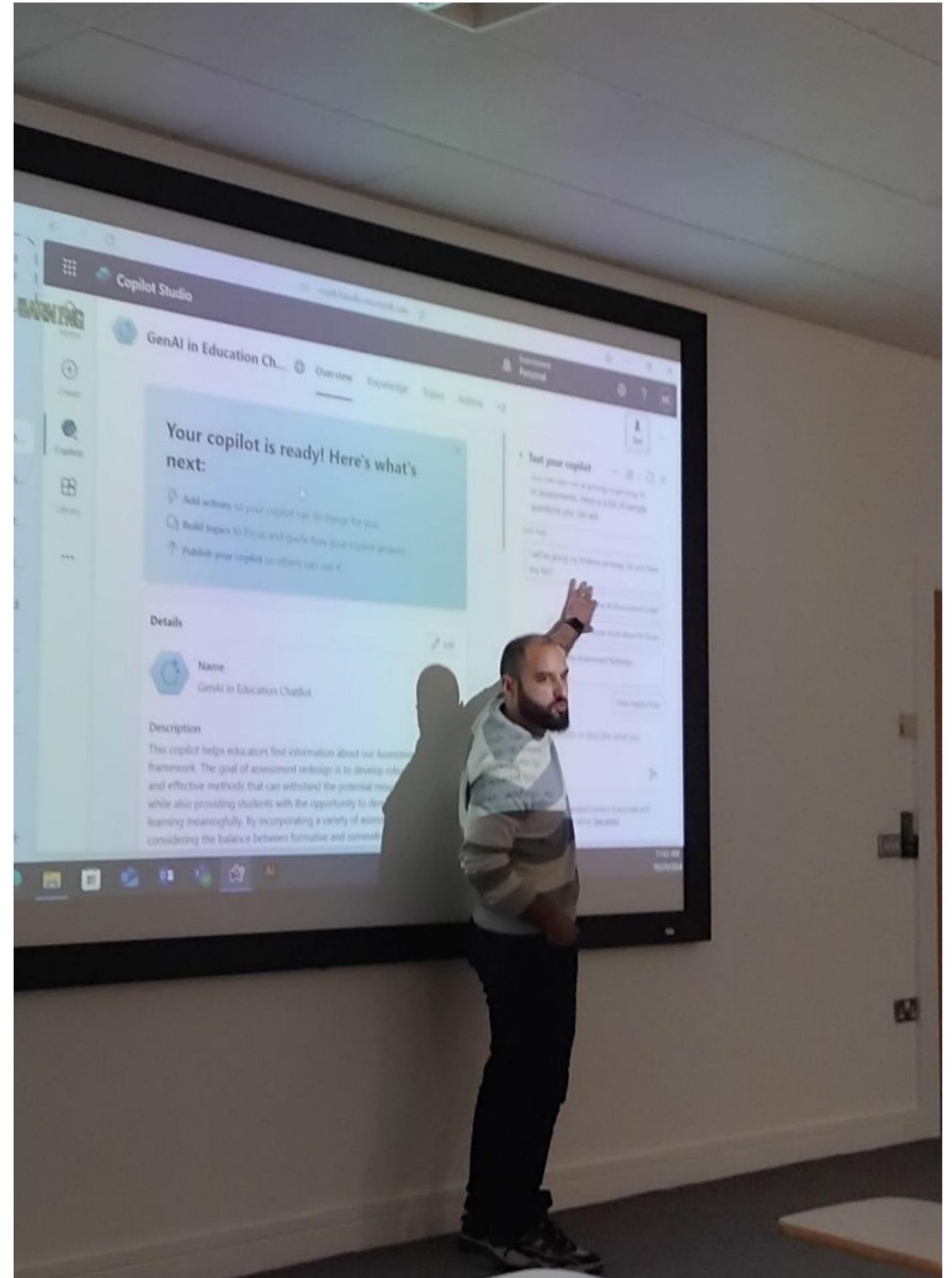
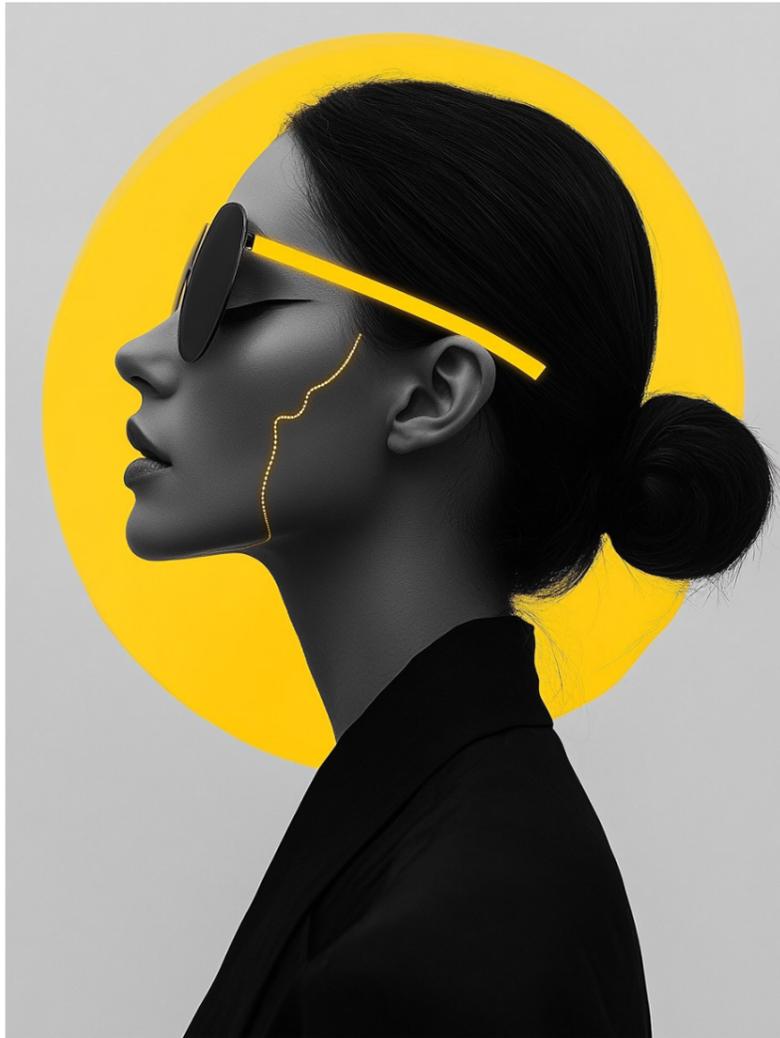
The hackathons provided an interactive platform for staff and students to critically engage in discussions surrounding the integration of Gen AI tools into educational contexts. Specifically, the events focused on examining how these emerging technologies might inform and transform assessment, teaching and learning, and module design strategies in higher education. Participants explored the potential of Gen AI to reshape traditional assessment models while maintaining core educational values, including principles of sound pedagogical practice, the pursuit of authentic assessment, and the preservation of academic rigor. By creating a format and space to allow collaborative exploration, the hackathons provided fun and interesting environments to explore Gen AI with colleagues and student partners.

“Thank you so much for the wonderful seminar yesterday. It was a masterclass in excellent pedagogy and critical analysis! I thoroughly enjoyed it and learned loads. I’ve shared my notes with several other people already.”

3.1 Outputs

Institute of Art, Design and Technology (IADT)

Different approaches were adopted by each institution resulting in a wide variety of outputs, for instance in IADT, Mohammed Cherbatji led colleagues in the creation of Chat Bots trained on their module materials. These Chat Bots were intended as teaching and learning tools. Colleagues explored how to design and develop a Chat Bots with specialised knowledge in a chosen topic. One attendee, Sean Henriques, created a student assistant chatbot during the session. He further developed it to address queries related to programme handbooks, resource access, and technical information about lab equipment. For more information, see Case Study 8 in Chapter 5: Gen AI Case Studies.



South East Technological University (SETU)

In SETU, staff and students explored and evaluated the outputs of a range of AI tools including those for the generation of images, infographics, podcasts, videos, and music. The tool that stimulated most interest is called Napkin, and it focused on the transformation of text into infographics that could be edited and modified before downloading to incorporate into reports, presentations, or learning materials. Here are some of the infographics produced by participants during the hackathons in Waterford and Carlow campuses:

Figure 1 – Research Foundations



Figure 2 – AI Hackathon Experience



Figure 3 – Holistic Virtual Exchange Experience



Dundalk Institute of Technology (DkIT)

At Dundalk Institute of Technology (DKIT) the aim of the Hackathon was to inspire and equip educators by providing new knowledge, tips, techniques, and pedagogical approaches for incorporating Generative AI into teaching and learning. Staff and students had been encouraged to explore the potential of these tools and how they can influence curriculum development and education.

The objective was to collaborate in co-creation with small teams of both staff and students, to develop a new course and produce marketing materials aligning with an N-TUTORR theme. The sessions involved sprint-based activities using Chat GPT to develop a programme design, module descriptors, assignments and lesson plans. To promote this the use of image and video-based tools offered the opportunity to develop multimedia content. The use of Runway ML, Hugging Face, Gen Craft, Suno allowed for experimentation, and Miro facilitated the real time collaboration to share outputs.



Prototype Text generation

Iteration tools, creates:
 - Module Design
 - Lesson plans
 - Assessments
 - Programme design

Module Title:
Sustainable Game Development and Interactive Media

Module Aim:
The module aims to equip students with the skills and knowledge necessary to design and develop sustainable 3D games and immersive experiences. Students will learn how to apply sustainability principles to both content creation (animation, 3D models, textures) and game mechanics, with a particular focus on creating energy-efficient, resource-conscious games and experiences that promote social responsibility and environmental awareness.

Module Learning Outcomes:
Upon successful completion of this module, students will be able to:

stage 4

Prototype Image generation

Using image generation tools
Create some promotional images for content using AI. Post here



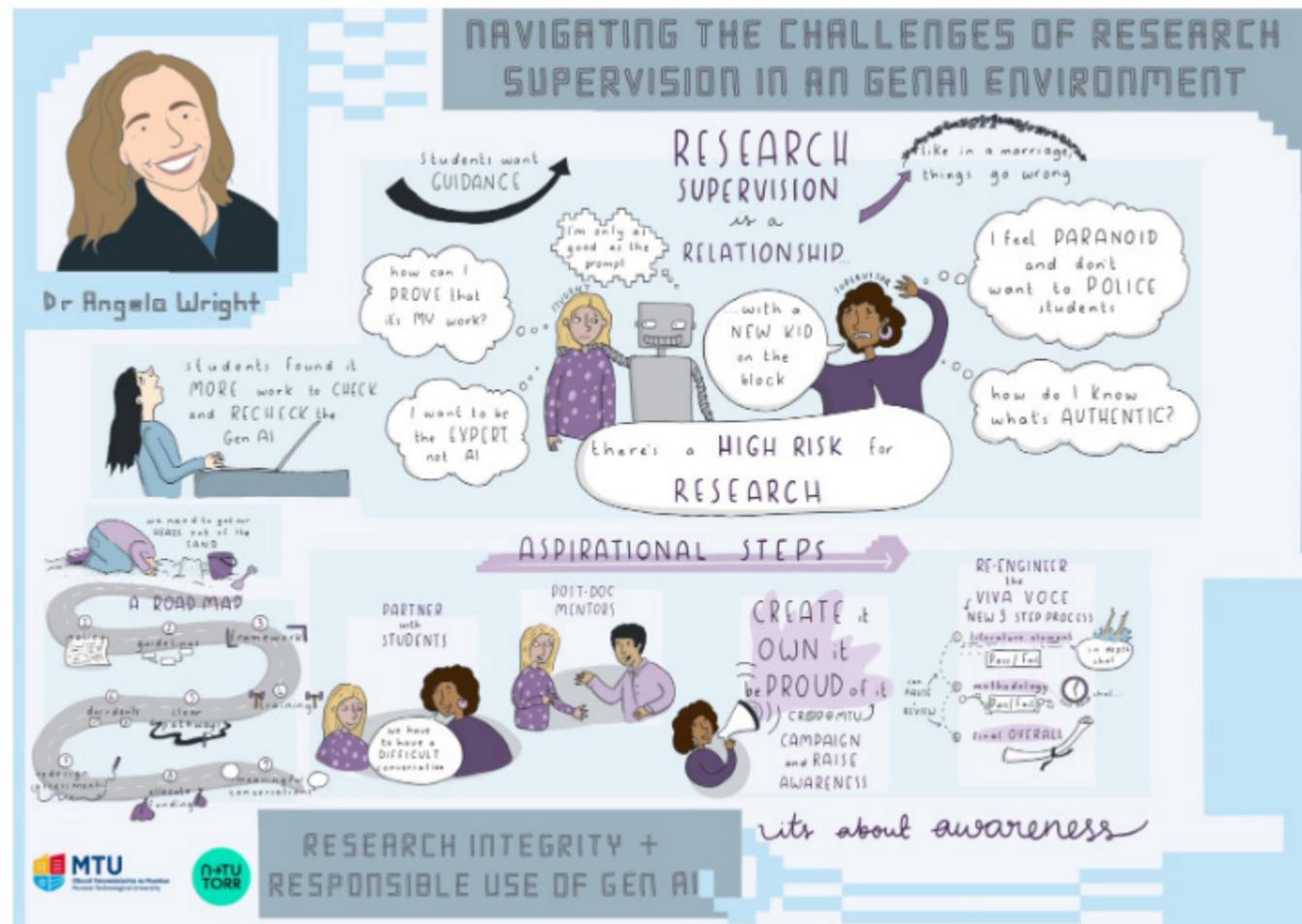


Figure 2.0

We ended the session with discussion reflecting on the potential opportunities for education and practice, as well as challenges of its use to consider and be mindful of, shown in Figure 2 and 3.

“Transforming Brainstorms”
“Project Administration”.
“Teacher Aid” **“New ideas”**
“Creativity” **“Efficiency”**
“info accessibility”
“Idea Generation” on social media”
“User generated videos”



Figure 2 How Staff see Gen AI supporting practice,

3.2 Impact

The impact of the Hackathons was measured in different ways ranging from Vevox word clouds and polls, to feedback forms and verbal communications.

Engagement with the Hackathons is also an indicator of the interest and appetite of colleagues and students to learn more about Gen AI. A total of 80 staff and students from partner institutions attended the Gen AI Hackathons in the month of November, with an additional 25 international participants both online and in person from universities in Spain, Italy, France, Lebanon, and Palestine. Further events will be held next semester as the impact of the sessions has stimulated wider interest within our own institutions and in the broader HE sector.

“Excellent session – great to have a forum to discuss with colleagues”

“Honest conversations about assessment concerns”

“Great to have time to explore software with colleagues in this setting”

“Very informative”

“Food for thought”

“The AI Hackathon was incredible; we got to design a whole new course”

ATTENDANCE: 110 STAFF AND STUDENTS PARTNERS



List of **GenAI:N3** **National Project** **Activities** at ATU:



1. **Generative AI National Website & AI Assessment Design Tool**

This is a local resource which will be a reference point for staff members for Generative AI. It will contain a wide range of resources including guidelines, curated and categorised reading lists, infographic cards, tools, videos and podcasts, discussion forum, glossary of terms. This will also include an interactive AI Assessment redesign Tool.

2. **Generative AI Student Hub & Student AI Badge**

This will be a local resource that will provide students with the support and information they need as they grapple with the impact of Generative AI on their learning and assessment. Promotions will be used to encourage usage. AI Badge will enhance students awareness of use of AI in their learning journey.

3. **Generative AI : N-TUTORR National Network**

A national network where the champions from all NTUTORR partners can collaborate, share knowledge and resources, and organise events to support peers and highlight good practice.

4. **Generative AI Play Workshop**

The development of a series of AI Play workshops for staff to provide an opportunity to explore the limitations and capabilities of Generative AI in a collaborative context.

5. **Generative AI Hackathon**

Generative AI Hackathon hosted by each of the NTUTORR partners to deconstruct the narrative around Generative AI in Higher Education. This will be held across multiple locations at the same date and time and would include guest speakers, workshops, interactive activities, and a series of challenges.

6. **Generative AI Digital Book**

The culmination of the project will be a crowd-sourced book of best practice, case studies, tools and resources around the use of Generative AI in Higher Education. This would also align and reference other N-TUTORR activities including the Staff Student Fellowships, Academic Integrity projects and other collaborative projects undertaken by N-TUTORR.

DATE OF EVENTS

Event: GenAI:N3 National NTUTORR EVENT ** HACKATHON

Date: Monday, 11th November 2024

Guest Lecturer: Dr Rachel Forsyth, Senior educational developer at Lund University, Sweden.

Location: ATU Galway

Time: 10 - 1pm (Includes Coffee & Lunch)

Venue: The Connacht Hotel, Galway

Bio: Rachel Forsyth - New book: Generative AI in Higher Education: Transforming Teaching, Learning, and Student Experience, co-authored with Professor Sam Illingworth, will be published by Bloomsbury in 2025.

Event: GenAI:N3 AI PLAY Workshop

Date: Tuesday, 19th November 2024

Location: ATU, Sligo

Time: 2pm - 4pm

Workshop Facilitators: A Cosgrove, N Henry, N Plunkett, NTUTORR Student Partner

Event: GenAI:N3 AI PLAY Workshop

Date: Wednesday, 20th November 2024

Location: ATU, Donegal

Time: 10am - 12pm

Workshop Facilitators: A Cosgrove, N Henry, D McClay, NTUTORR Student Partner

Event: GenAI:N3 AI PLAY Workshop

Date: Tuesday 3rd December 2024

Location: ATU, Galway

Time: 10am - 12.30pm

Venue: The Connacht Hotel, Galway

Workshop Facilitators: Dr Hazell Farell

& A Cosgrove/ N Henry / NTUTORR Student Partner

Book Here



<https://forms.office.com/e/igHaDmGhJ>

n→TU TORR



Empowering Learners,
Developing Staff Capabilities,
and Implementing Sustainable
Digital Ecosystems

GenAI → AI^{N3}

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The best way to understand AI is to play with it. By exploring together, we turn uncertainty into curiosity and fear into innovation

CHAPTER 4: 'AI PLAY' WORKSHOPS

The 'AI Play' concept was developed in response to the need to engage and support our university communities in the complex narrative around Gen AI. The aim was to provide an opportunity for staff and students to explore the limitations and capabilities of Gen AI in a collaborative and relaxed environment, thereby addressing the fear associated with the rapid progression of this disruptive technology.



Empowering Learners,
Developing Staff Capabilities,
and Implementing Sustainable
Digital Ecosystems



A central template for the workshops was developed and adapted according to the expertise of the facilitator and the needs of the session participants. Each session involved an introduction to Gen AI and an overview of the main developments since the launch of Open AI's Chat GPT in November 2022. This was followed by examples of the practical application of Gen AI in the classroom and beyond, focusing on good practice and the impact on the learning experience for both staff and students. The examples captured a broad range of disciplines in the sessions, varying from one institution or iteration to the next. At this point in each session, the participants engaged in group activities where they explored the technology in a range of creative and functional tasks related to their roles and disciplines. The discussion and group feedback following this exploration proved particularly valuable as new insights and learning were revealed in each session, stimulating interest in pursuing further individual experimentation with Gen AI.

Interactive elements such as Vevox polls, word clouds, and Padlets, were interspersed throughout the 'AI Play' sessions, providing instant feedback and insights into the use of Gen AI throughout the sector.

4.2 'AI Play' at ATU – Galway, Sligo & Donegal Campuses

Facilitator: Annette Cosgrove / Noreen Henry

As part of the N-TUTORR Gen AI:N3 national initiative, Atlantic Technological University (ATU) developed and implemented a series of AI Play Workshops during November and December 2024. These workshops were designed to offer participants an interactive and collaborative platform to explore the capabilities and limitations of Gen AI. The workshops were run across ATU campuses in Galway, Sligo, and Donegal. The workshops attracted significant participation from both staff and students, creating a collaborative environment for the exploration of the Gen AI tools and an opportunity to exchange ideas and knowledge. They were particularly focused on advancing AI literacy among teaching staff and student partners, emphasising its relevance as a critical skill for the evolving educational landscape. The AI Play workshops provided attendees with actionable insights and tools to effectively examine the implication of Gen AI tools on teaching practice and assessment strategy. Also, it gave staff and students the opportunity to address the challenges posed by AI in higher education, with a special focus on reimagining assessment strategies in response to the growing use

of students of these technologies.

Overview of Topics:

- Exploring AI literacy – an important skill for the future of education.
- Actionable knowledge and confidence to apply AI tools in teaching.
- Ensure ethical and inclusive use of AI in education
- Assessment Redesign – to consider AI impact.

These workshops proved to be very successful and Feedback from these sessions was very positive with all sessions achieving an overall satisfaction rating of 9.6/10.

All participants expressed a desire to participate in further workshops on Assessment Redesign and further exploration of Gen AI tools in higher education.

Total Attended: 47 in-person across 3 campuses

“Great to have a space to discuss impact of Gen AI on higher education “

“ Brilliant workshops – great to learn and experiment with Gen AI Tools “

“ Great discussions on Assessment Redesign”



4.3 'AI Play' at DkIT

Facilitator: Jacqueline Toal

The AI Play workshops held at Dundalk Institute of Technology aimed to support educators in the following:

- Creative experimentation activities, timed sprints:
- Hands on text-based generation.
- Image based generation
- Audio/Visual generation.

The tools that were used in the workshop included Chat GPT, Claude, Gencraft, Dallefree, Open Art.ai, Wondercraft ai, Luma Labs.ai, Synthesia as well as Padlet and Miro Boards

The workshop of two hours incorporated some introduction to Gen AI, a brief history of how it evolved, challenges, AI prompt engineering techniques and guided activities with prompts and educational scenarios provided for participants to support creating assessments, module design, lesson plans, images, explainer videos with avatars, podcasts and educational video samples. Vevox Polls and use of Padlet was adopted for real time interaction and sharing the outputs created. To make it more engaging spot prizes had been included and opportunity for networking at the end of the session to discuss the potential use for practice.

Who Attended: Staff at Dundalk Institute of Technology from a diverse array of vocational backgrounds. The

“New AI tools to explore and experiment with in my teaching”

“Avatars Exploration”

“Video and Audio Production”

“The hands-on element was great along with the range of tools included”

session was aimed at those who had no knowledge of Generative AI to spark interest and curiosity in its potential.

Duration: 2-hour session. Format: In person interactive session.

What made it a success: The practical element of the workshop made it more engaging for the participants and the time for experimentation to explore these tools.



4.4 AI Play at IADT

Facilitator: Mohammed Cherbatji

An introductory interactive session aimed at teaching staff who have not yet used generative AI and wish to broaden their understanding of AI in teaching and learning. Participants explored AI use cases for education, experimented with AI tools, and discussed workshop findings. This hands-on workshop was designed for teaching staff with little to no prior AI experience, offering practical guidance to help navigate the growing world of Artificial Intelligence.

Key Topics Covered:

- Prompt Engineering: Crafting effective AI interactions
- Understanding the limitations, risks, and challenges of AI
- Exploring AI generated Text, Image, Audio/Video, and AR/VR

Who Attended:

This workshop was for teaching staff keen to explore how Gen AI can enhance their roles and no prior experience was needed to attend.

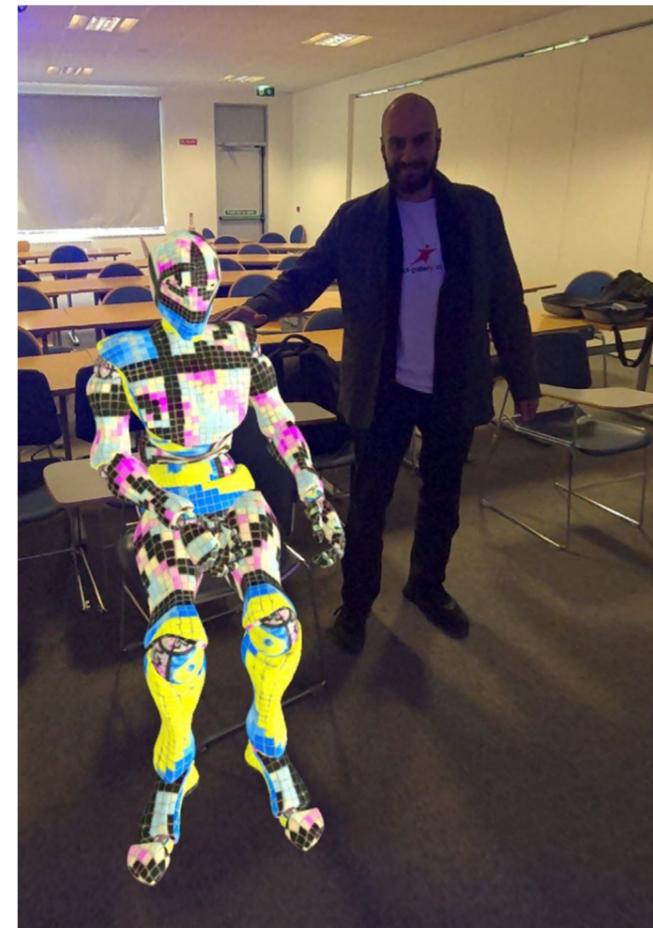
Duration: 2 hours | Format: In-person, interactive sessions



“The creative AI appear to be amazing!”

“I played about with gpt after the workshop; initially I got a shock when entering my assessments...however, much of the output for a music coding exercises”

“GPT offered a solution for a CA but it was not without issues and identical when I asked again...very impressive though”



4.5 'AI Play' at MTU

Facilitator: Angela Wright

Workshops for Staff & Students: Gen AI and Research Supervision

In all there were 9 workshops throughout April & May 2024 that explored the impact of Gen AI on the supervisory and research process; 8 workshops were conducted with research and supervisory staff and 2 with the student community to establish the views and concerns of staff as they navigate the Gen AI agenda. These took place in person and across all 6 campuses at MTU. The facilitator was Dr Angela Wright, and the sessions and research were supported by the Dean of Post-Graduate Studies – Dr Stephen Cassidy.

Learning Outcomes:

- Explore the current situation and understanding of Gen AI among participants
- Explore AI literacy and the relevance for research supervision
- Explore ways to ensure ethical approaches to Gen AI and AI in research education

Key Topics Covered:

- The impact of Artificial Intelligence on the supervisory and student relationship
- How to develop guidelines for Gen AI and Artificial Intelligence
- How to instil Academic Integrity and a good research culture
- Recommendations for best practice in specific fields?
- What is the view on Gen AI as it interlocks with Academic Integrity?
- Concerns, fears and pressure points for supervisors and research students

Who Attended:

The workshops were for academic staff supervising post-graduate students, research staff, and staff who intend to supervise up to L10 in the future.

Duration: 3 hours | Format: In-person, interactive workshops across 6 campuses.

This workshop facilitated by Angela was very informative and thought provoking.

We need more information sessions and guidance like this.

This is a worrying time for research supervisors, and it was great to chat and discuss issues in a safe and open space.

We need more support like this and more opportunities to discuss these critical issues.

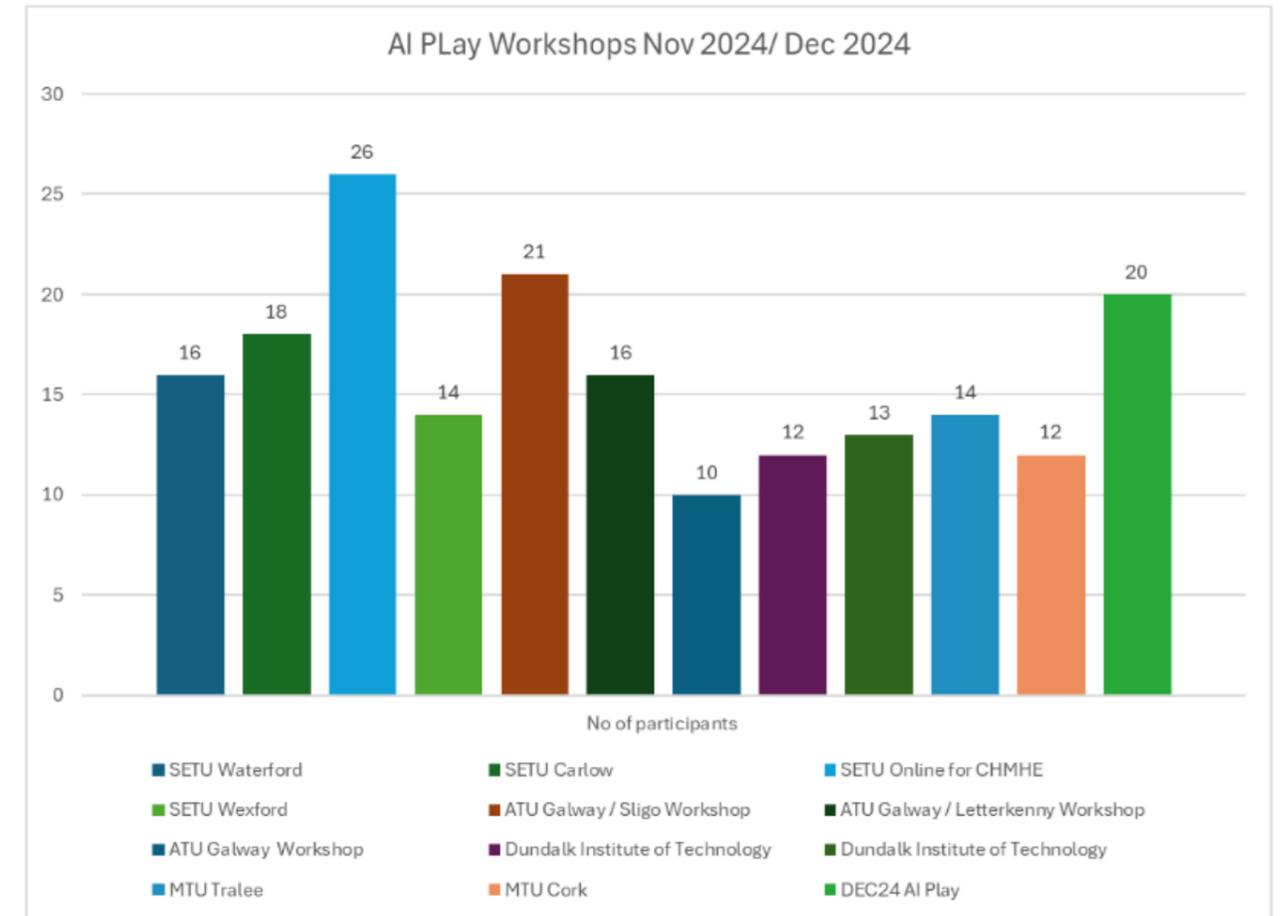


Fig 4.1 List of Onsite 'AI Play' Workshop Participants



4.7 AI Play Clinics and workshops for Staff in TUS

Facilitator: Dr Denise Mac Giolla Ri

In response to the rapidly evolving landscape of artificial intelligence (AI) and its impact on higher education, TUS launched a series of one-on-one AI play Clinics and online workshops for academic and support staff in October 2024. These initiatives created a dedicated platform for exploring how AI could enhance teaching, learning, research, and student engagement. The initiative was driven by the growing need for personalised, interactive discussions that addressed individual concerns and experiences with AI.

The weekly 30-minute AI Play Clinics were designed with the recognition that while AI offers transformative potential, many educators feel uncertain or lack knowledge on how to integrate AI into their academic practice. Creating an accessible, one-to-one format ensures that staff, whether novices or experienced AI users, could freely engage in conversations that directly addressed their individual needs. The clinics aimed to foster an open dialogue about the role of AI in higher education, touching on topics such as assessment planning, lecture resources, academic integrity, pedagogical enhancements, and ethical concerns. The Microsoft Booking system was used for convenience with a meeting link. A follow-up email with an anonymous evaluation on Microsoft forms was issued 2 days after the meeting.

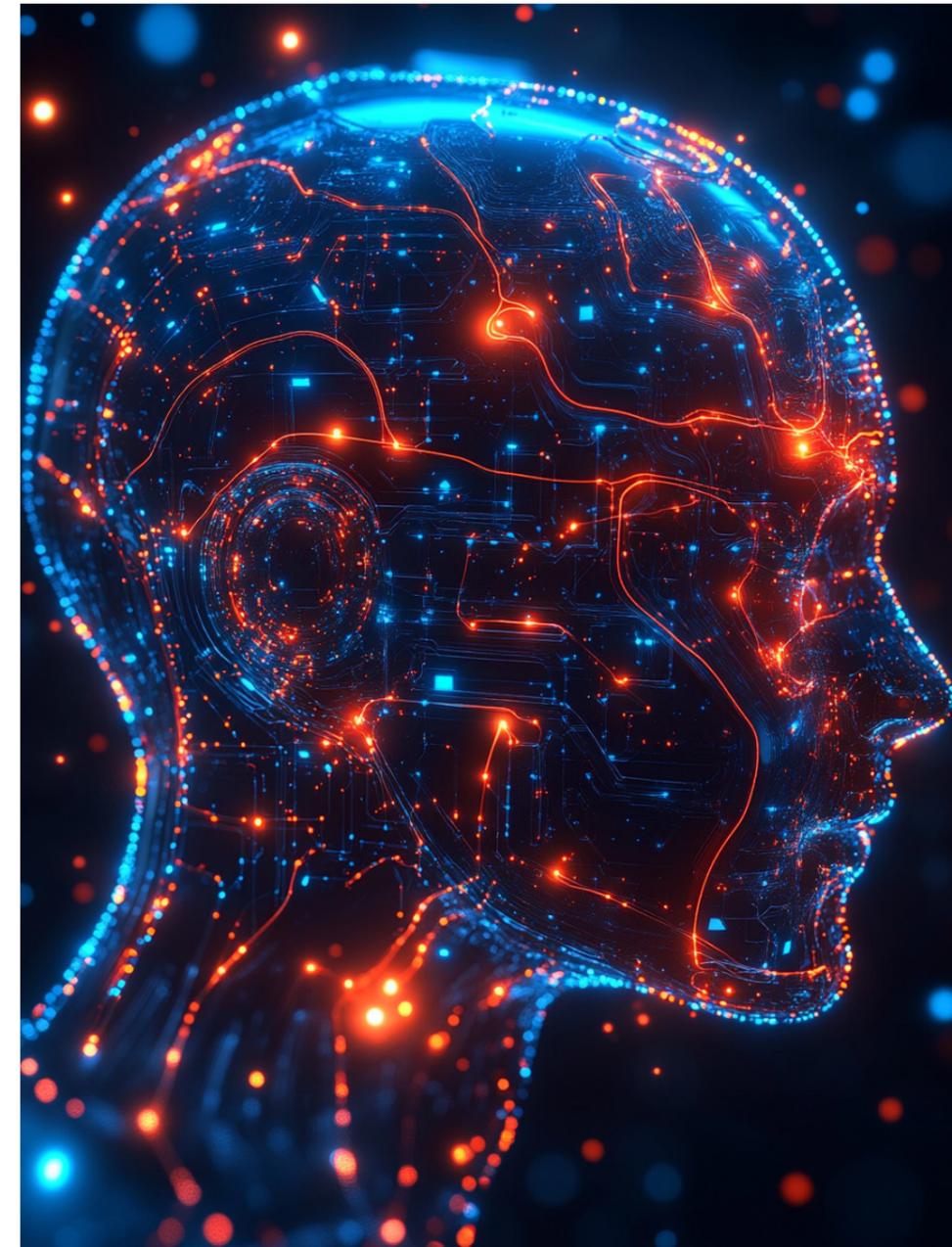
Several key outcomes were identified from engagement with the AI Play clinics and workshops. Participants expressed their interest in AI and shared how they were

currently utilising AI tools. Discussions covered various AI applications, such as redesigning academic modules, assessment design, and improving engagement strategies. Many participants highlighted the desire to integrate AI more frequently into their work but faced challenges, including adapting assessments and fostering writing skills.

A novel idea emerged where ChatGPT was used as a research participant in a sample project, showcasing AI's potential in research. However, barriers to assessment implementation persisted, particularly regarding IT support for in-class exams. Participants noted that procedures, such as granting access to AI tools, were often lengthy and could benefit from streamlining.

The need for more frequent clinics was emphasised, as the one-on-one sessions provided valuable support in addressing challenges and deepening participants' engagement with AI. An eBook was developed and shared, offering a curated list of AI tools and an assessment integrity guide for participants. Approximately 100 individuals participated in the AI Play clinics and workshops.

“This was a great session and a great idea. 30 minutes was the perfect amount of time and Denise was quick to tailor the conversation to my level of knowledge and experience in AI and its uses in my teaching. She opened me up to many sources of information online about AI apps and tools. I found the session very informative and would highly recommend it no matter what your level of knowledge is in AI. Thanks Denise!”



“Overall though, I don't think there are concrete solutions on how to handle AI in the classroom. A strategy needs to be communicated to lecturing staff on how to handle AI especially for any work the student does outside the classroom.”

4.8 Further Workshops

Alongside the National GenAI:N3 project, a number of additional workshops were run across the universities to increase knowledge and awareness of the use of Gen AI in the higher education sector. These included:

- AI Literacy Workshop for Teaching staff (MTU)
- Research Integrity & Responsible Use of Gen AI (MTU)
- Credibility, Chaos, and Creativity: Industry perspectives on how Generative AI is Transforming Knowledge Work (MTU)
- Guest AI Redefining Assessment Workshop: Dr Rachel Forsyth, Senior educational developer at Lund University, Sweden (ATU)
- Generative AI Lecture and workshop for staff by Professor Mike Sharples on "What is Generative AI?" hosted by (DkIT) and supported by N-TUTORR, organised by Institute Lead Dr. Ronan Bree
- Gen AI N-TUTORR Masterclass with Prof Mike Sharples, Dr Hazel Farrell, & Dr Tom Farrelly (Online)
- Is our Learning, teaching, & Assessment 'ready' for the next waves of Gen AI?, Sue Beckingham and Peter Hartley (Online)





CHAPTER 5: GEN AI CASE STUDIES

This chapter provides insight into how staff across the higher education sector are currently exploring and embedding Gen AI in their practices. The purpose of including examples of the practical application of Gen AI across a broad range of disciplines is intended to stimulate creative thinking and further discussion into the opportunities and challenges presented by this technology.

Generative AI is transforming higher education offering new opportunities for pedagogical approaches. It offers capabilities for personalised learning experience, enhancing educator capacity, increases in student engagement through innovative teaching and learning processes, but involves a change and reassessment of approaches in academic (Batista et al., 2024). It has the potential to support with administrative tasks for educators to allow more meaningful development for higher order skills. One such area that is vital is to engage students for meaningful conversations around responsible use of AI, but it is equally important that educators keep up to date of the practical implications of AI to ensure students are empowered with skills for industry (Lee et al., 2024).

The following collection of case studies are some interesting and unique examples of Generative AI use for higher education in Ireland with representative examples from each of the partner institutions within the N-TUTORR framework. These showcase a diversity in vocational areas from Computing, Animation, Engineering, Management and Leadership, Social Care Education and Creative Practices, Research methods and Applied Psychology.

Core Themes emerging from this collection of case studies reflect; opportunities include exploration of Generative AI for fostering critical thinking, creative ideation to support learning, possibilities for supporting educators for content creation in lessons, responsible AI discussions with students to ensure they are ethically aware, and assessment uses with AI. Challenges as educators to be mindful of are Gen AI accuracy and reliability concerns, potential for bias and hallucinations, academic integrity and inequality increasing the digital divide.

The case studies are a repository of practical based experiences exploring the potential of Generative AI tools for teaching and learning, that are to support and inspire others in higher education.

Case study 1: Annette Cosgrove, Atlantic Technological University, Galway - "Sharing Examples of a redesigned assessment for Year 4 Computing. - (Consideration of Gen AI required a redesign of existing assessment)"

Case Study 2: Kieran Hanrahan, Technological University of the Shannon, Athlone. "Using AI enabled platforms in a PhD literature review spanning multiple disciplines"

Case Study 3: Jim Gilchrist, Technological University of the Shannon. "Redesigning a Management and Leadership Programme at QQI level 6 including a relevant assessment tool using AI".

Case Study 4: Jacqueline Toal, Dundalk Institute of Technology. "Gen AI for augmenting human creativity in the creative design process in animation".

Case Study 5: Dr Denise Mac Giolla Rí, Technological University of the Shannon, Athlone, "Harnessing AI to Bridge Creativity and Professional Standards: Developing an eBook Linking Creative Approaches to CORU Proficiencies in Social Care Education".

Case Study 6: Thomas Lupton, Dundalk Institute of Technology. "The Integration of ChatGPT into Higher Education to Promote Critical Thinking".

Case Study 7: Nuala Finucane, Technological University of the Shannon, Midland Midwest. "Designing ChatGPT into the assessment guidelines for MA Students on an Applied Research Methods Module".

Case Study 8: Sean Henriques, Institute of Art, Design + Technology, "Using Microsoft Copilot Studio to create a student assistant chatbot for Applied Psychology".

Case Study 9: Dr Angela Wright, Munster Technological University, "CROP@MTU - Create it, Own it, be Proud of it".

Case Study 10: Emmett Cullinane, South East Technological University, "Reimagining Gen AI Student Guidelines into Interactive, On-Demand Learning".

5.1 Atlantic Technological University (ATU), Galway

Project Team/Name

Annette Cosgrove, ATU, Galway

Title of Case Study

Sharing Examples of a redesigned assessment for Year 4 Computing Students (Consideration of Gen AI required a redesign of existing assessment)

Keywords

Assessment Redesign, Digital Media, Generative Artificial Intelligence (AI)

Year 4 Level 8 Students Leveraging Generative AI in a Final Year Digital Media Video Project

Background: Fourth-year Level 8 students enrolled in the Bachelor of Science (BSc) program in Computing and Digital Media at ATU, Galway were tasked with producing a ten-minute promotional video as part of their final-year project assessment. The project brief required the students to create their video through conventional methods, including the recording of original footage, the development of custom logos, and the use of traditional tools and techniques. Additionally, the students were instructed to generate a video from their website utilizing a Generative Artificial Intelligence (Gen AI) tool. The assessment also required that student groups compare and evaluate the quality and effectiveness of the video produced using traditional methods with that generated by the Gen AI tool.

Objective

The dual-assessment approach aimed to:

- Educate the students about the differences in creative approaches and outcomes when using Generative Artificial Intelligence (AI) versus traditional methods.
- Determine how effectively students can adapt to AI tools while retaining core creative and technical skills.
- Encourage students to analyse the strengths and limitations of AI in digital media production, and to be aware of these tools before entering the workplace in a few months after this module was completed

Approach

AI-Enhanced Project: Teams used Gen AI to assist with ideation, asset creation, animation, and editing.

Traditional Project: Teams relied on their expertise in digital media technologies and skills gained during the past 4 years, using creativity, technical expertise, and pre-existing tools.

Evaluation Criteria

Both projects were evaluated on:

- Creativity and originality
- Technical quality (editing, sound design, visual effects)
- Narrative coherence
- Time efficiency and production process

Final Year Student Feedback

On AI-Enhanced Projects: "AI tools saved us hours of effort, especially in storyboarding and colour grading, allowing us to focus on storytelling." "Sometimes the AI-generated assets felt generic, and we had to work hard to customize them to fit our vision."

On Traditional Projects: "It was rewarding to see a project come together entirely from our own efforts." "We lacked the time to refine certain elements that AI tools could have done quicker."

My own observations, as lecturer:

On AI-Enhanced Projects: Students were able to achieve a level of polish and complexity that might not have been possible with manual methods alone. However, over-reliance on AI occasionally resulted in a lack of originality or emotional depth.

Traditional Projects: While these projects were less polished, they demonstrated more creativity and authenticity. The hands-on approach allowed students to display their skills in editing, graphics design and creativity

The dual-assessment model provided invaluable insights:

- The best outcomes were achieved when students combined AI's efficiency with their creativity.

- Traditional methods fostered originality and skill development, while AI enabled higher efficiency and technical quality.

- Students developed a new valuable skill before entering the workplace - understanding of how to critically evaluate AI's contributions and limitations.

This case study demonstrates the transformative potential of Gen AI in education while highlighting the enduring value of foundational skills and human creativity.

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5.2 Case Study 2: Technological University of the Shannon, Athlone

Project Team/Name

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Applied Social Sciences

Title of Case Study

Using AI enabled platforms in a PhD literature review spanning multiple disciplines

Keywords

Algorithms, Bias, Skills, Skepticism, AI

Case Study Summary

Being long familiar with MLMs like Gemini (Bard) and ChatGPT, I started to look at all the other AI tools available to PhD candidates. This was prompted by the growing obsolescence in previously seminal materials on qualitative research methods by authors like Guba & Lincoln (1985) and Sandelowski (1996). This search located useful resources like the YouTube channel of Dr Andy Stapleton, so I started testing those AI tools with good to excellent reviews to critically assess their utility.

Outputs and impact achieved

Some of the tools made a significant contribution to productivity, bearing in mind that the study bibliography now exceeds 10,000 items. The focus on productivity is key. The tools saved me a great deal of time, expanded my search, improved it, but it is vital to recognise their limitations.

Beta tools like www.paper-digest.com develop relevance lists using key words but my experience with it surfaces a serious issue. Inappropriate use or reliance could see researchers led by these tools' internal and unpublished algorithms and limited datasets rather than the researcher's personal exploration of a given domain. These tools are a potential source of bias for any study.

www.elicit.org purports to answer research questions. It finds relevant material provided this is found in its sources. My experience with these AI-informed tools is that they are heavily focused on quantitative datasets. Qualitative sources appear to be significantly under-represented. This may improve as new resources are added beyond their current limits. Very few of them list grey material like recent conference papers, blogs, podcasts: most concentrate on journals and on books. This preference for "hard data" has been indicated by other commentators in this space.

Other AI powered tools such as www.litmaps.com offer a visual mapping of the connections between papers and studies, including chronological structuring to allow one to review evolution in thinking. 'Litmaps' certainly assisted in the integrative part of the literature review; but it seems to operate well only in specific domains. It became apparent that these AI informed tools are only as good as their search datasets, and details of these datasets are not published. 'Litmaps' mines backwards well but it proved less effective going forward. This might be down to the availability of datasets, how quickly any datasets are updated, algorithmic limitations, keyword analysis, missing data ... some papers disappeared off these tools entirely, which suggests that the underlying dataset was removed, or access was rescinded. Ultimately the researcher has to make their own personal judgement on how to use these tools, and this is not a simple matter.

Similar tools like www.connectedpapers.com suffer similar challenges, e.g. no unpublished papers appeared in its searches (although they may be available now or in the future). My experience is that most evolved of these AI informed tools was www.researchrabbit.ai. This offers greater functionality and whilst its sources appeared broader, it did not list any unpublished materials.

What I learned:

AI is sharp and double edged. Content created by MLMs is identifiable. Anyone can use AIs, but use with caution. We must understand their functionality, limitations and be wary on sources of bias. Researchers must never allow AI to dictate or influence a study's shape or direction.

None of the tools "hallucinated" i.e. never provided faked material - unlike MLMs which have done so with facility in the past.

My use of AI was deliberately constrained to finding relevant studies and the connections between them. These tools did not map 'cross pollination' of ideas between disciplines. Ideas that evolved in America, in construction, that took over a decade to reach Europe, and were used in social science, were not identifiable using any of these tools. The tools illustrate links between materials and authors, but their work is mechanical, mathematical and not (yet!) intuitive.

Within a literature review, they locate material in lists and catalogues. The researcher must join the dots. In a multi-disciplinary review, even fenced into one culture and language, there are subtle differences in meaning. How business views trust is similar but different to how psychology views trust. AI tools can be applied ethically, and have immense potential, but we must lead.

The PhD thesis focuses on an exploration of Corporate

Social Responsibility practice in Ireland, in the relationships that develop between for-profit and not-for-profit entities and looked at this using the lens of trust theory. The goal was to identify whether an online portal would benefit both social actors and if so, what data each should offer prospective partners online. This design was developed only after a very extensive literature review which included multiple perspectives: - anthropology, sociology, business/marketing, psychology and applied social science.

The literature review, which became integrative in nature by necessity, but which used some of the mechanisms found in narrative, systematic and structured literature reviews, grew in scope due to the limited research in this space, for NPOs, not just in Ireland but internationally.

Methods of implementation

The method of implementation was to take a seminal article like Mc Evily & Tortoriello (2011) which offers a meta-analysis of psychological studies into trust and see how these tools provided context and connections for it. Some of them could not find it notwithstanding its heavy citation – those that did had their outputs compared. The tools were tested for their functionality, focusing on what they could deliver in the context of the very substantial scale of the literature review.

Study of these AI tools is in its infancy. See Adams & Chuah (2022) for a general review. There has been an explosion of interest in EFL and tools like Grammarly driven by international higher education. Pierre & Deville (2023) looked at functionality in visual mapping tools like Litmaps. Whitfield & Hofman (2023) reviewed the Elicit platform, hinting at the issue of IPR, trade secrets and marketisation as to why platform creators will not publish their underlying datasets sources. There are many studies into ChatGPT, many of which lack rigour and thus academic value. Google has been a lot tighter with Bard, now rebranded Gemini. SurveyMonkey and similar platforms are now beginning to roll out AI to provide insights into mainly quantitative data. It is noteworthy that on the qualitative side, key platforms like Max QDA have been slower to do this.

In February 2024 Max QDA released an AI Assist with four options. This simplifies coding, offers summaries, and reduces the danger of data overload but it raises the same concerns listed above. An interview is a conversation, not just text. A transcript, no matter how well notated, is not as rich or accurate a source as the original interview, assuming it was video recorded. We need to be sceptical about some of the features on offer – such as the tool that analyses a piece of text and suggests new codes. It seems that Max QDA is using Natural Language Processing (NLP) to evaluate the text's emotional tone and provide limited sentiment analysis operating on a choice between positive - neutral - negative. How well does the form of NLP being used pick up irony?

How many times has someone said, "yes absolutely" and you knew they meant the opposite!

It is fair to argue that the analysis and transformations performed on the text data are legitimate, that the main loss of richness is in the transcribing of the interview into text, however does the researcher want to do their own coding or be led by a black boxed frequency analysis and NLP engine? MaxQDA boast that the language of their summary doesn't have to be the same as the language of the original text. What gets lost in that translation? How do we even know?

These AI tools offer productivity gains and are very sharp – great.

These AI tools are also double edged – use and test them, but make sure you are in control.

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5.3 Case Study 3: Technological University of the Shannon

Project Team/Name

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Title of Case Study

Redesigning a Management and Leadership Programme at QQI level 6 including a relevant assessment tool using AI.

Keywords

Redesign Assessment AI

Case Study Summary

The aim was to redesign a current Management and Leadership Programme at level 6 on the QQI framework of qualifications using AI. The plan was also to design a relevant assessment for the programme. The programme is delivered wholly online to lifelong learners in a higher education institute. The design framework used was the ADDIE model.

Analysis, Design, Develop, Implement, Evaluate.

Before any changes were made, a risk analysis with a response plan was formulated. An action plan with expected outcomes was also put in place at the beginning of the exercise.

AI was used to develop class resources, materials, assessments, exercises and multiple means of engagement with the VLE (Virtual Learning Environment). The current approach to programme development was a very traditional one with lecturers using module manager to create courses. AI was used to great effect to determine past learning experiences of staff and students. These were then categorised thematically, and the positives and negatives were examined. New learning outcomes were generated, and these were contrasted with the old ones to allow for improvements. Numerous AI tools were used to create engaging class slides and pre and post short clips. AI tools were then used to transform class notes and text into content for the class slides. Generative AI was also used to generate a case study for the Continuous Assessment and its rubric and the final exam with solutions. These had to be modified to mitigate against the “misuse” or “unsanctioned” use of AI and make the responses more “Applied” to the workplace. The students were introduced to specific AI to help identify sources of information for their assignment.

What I learned:

The module asynchronous resources were much more engaging and in line with UDL design principles. Assessments were stronger overall.

Metrics from the VLE Moodle show more interaction with, and time spent on various video clips, summaries and module resources than previously. Classes were more engaging (and modern). More students attending the live classes and keeping their cameras on. The same content was delivered but in a more diverse way. Module resources were more engaging (as proven by Moodle Metrics). AI has been normalised to students somewhat.

Classes and content have now been created which engage the student. Assessment is authentic and structured, and most resources can be used again and again with a few small modifications. Overall, a much better experience for the student and lecturer.

Background

As outlined in the summary the aim was to redesign a current Management and Leadership Programme delivered wholly online to lifelong learners at QQI level 6, using AI, including a relevant assessment tool. The design framework used was the ADDIE model. The current approach to writing programmes within the faculty could be described as traditional. An AI survey was used to great effect to determine past learning experiences of staff and students. These were then categorised thematically, and the positives and negatives were examined. Staff responses showed a desire to lighten the workload when it came to preparing and supplying class resources and weekly exercises. Once these thematic areas were identified, they were addressed with the use of AI, which is described in the following section.

Risk

A risk analysis on AI use, and a suitable corrective action was formulated. Categories of risk included lack of AI literacy, inaccurate information or data/ out of date data from generative AI and academic integrity being compromised in assessments were identified as risks. Controls against these included: Better AI education, embracing new technologies, continuous professional development, updating of university policies and actions. It was also determined that all elements of the programme and academic submissions should be checked for accuracy and currency, and finally assessments should be designed to mitigate against the misuse of AI. Students must be informed as to what is appropriate usage of AI in their assessments by lecturers in line with institute policy.

Justification and Rationale

AI tools were used to create engaging classes and pre and post lecture resources. Formative assessment and a summative exam were designed using AI. The rationale and justification for this is that assessments were stronger overall (after modifications) and ensured all learning outcomes were assessed. Much more time is now available for 1-2-1 engagement and support of the student than before. Class resources are much more user friendly and engaging. AI is now being used by students to assist in their time management. Our UDL methodology has improved immensely with multiple means of engagement possible. Metrics from the VLE Moodle show more interaction with, and time spent engaging with programme resources than previously.

Historically student retention/ completion numbers at the end of a programme were used to evaluate the programme. AI is now used to thematically examine data from weekly student feedback, allowing improvements in a much shorter timeframe.

Impact

Lectures and related student resources have now been created which engage the student. Assessment is authentic and most resources can be used again and again with modifications. Continuous evaluation and improvements are easily organised and analysed via an online questionnaire. Overall, a much better experience for the student and lecturer.

5.4 Case Study 4: Dundalk Institute of Technology (DkIT)

Project Team/Name

Jacqueline Toal

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Title of Case Study

Gen AI for augmenting human creativity in the creative design process in animation.

Keywords

Generative Artificial Intelligence (AI), Creativity, 2d Animation, Augmented, Adult learners.

Case Study Summary

The aim of the case study was to explore the use of Generative AI tools for augmenting creativity for enhancing the creative design processes in the assessment of a 2D animation module of student experiences. The goal was to use Gen AI with educator and learner in a safe and responsible way (Miao & Holmes, 2023). The study included comparing the use of AI tools for creativity with the more traditional digital tools in the assessment process and assessing which is more conducive to creativity. There were three assessments; these involved designing a character concept, an environment or setting and creating a short 2D animated sequence bringing these together. This module is delivered fully online to part-time adult students in higher education who enrol to upskill in animation processes. AI was used for digital transformation by incorporating innovative pedagogical approaches to fostering creativity. The goal was to support the diversity of adult learners in their learning journey by using and comparing these tools for the learning process.

The Componential Theory of Creativity by Teresa Amabile (Amabile, 2012) and the Experiential Learning Model by Kolb (Kolb, 1984) provided the guiding theoretical and conceptual models for this study. The Componential Theory of Creativity has the following main tenets which are; Motivation, Domain Level Skills, Creativity Relevant Processes and the addition of the Social Environment. Kolb's model includes Concrete Experience, Reflective Observation, Conceptualisation and Active Experimentation. These two models complement each other and provide an interesting lens to explore the use of Gen AI for augmenting the creative design process.

The use of AI was used as a supporting tool for some techniques in creating characters, backgrounds, mood boards, assets for animation. The choice of the generative AI tools used included but not limited to Gen Craft, Craiyon.ai, Dream Wombo, Playground.ai, Runway ML,

Pika Labs. Students tried these but they also compared with using more traditional processes, for example Gen AI was used to create a background concept sketch or visualisation, they then also compared this by using more traditional digital approaches for animation with tools such as Blender, Krita, Open Toonz and Adobe software.

Findings indicate that generative AI can augment creativity for ideation, visualisation, speeding up the workflow and there are benefits of AI for motion capture. Gen AI also was beneficial for sounds and audio production for animation. However, while there are benefits in the early stages, there is a strong preference for traditional/digital creative processes among the participants, these are more valued. The students were intrigued to use Gen AI but for experimentation and exploration. The potential of AI offers opportunities but is not without risks. Ethical issues arose of bias, hallucinations, equity and digital divide with Generative AI. Artificial Intelligence (AI) creativity copyright guidelines are key as this was a concern and there is a need for education in use of AI prompting, which is crucial going forward for building trust.

What I learnt

From an educator perspective in reflection, the use of Gen AI allowed for quicker generation of ideas which assisted in the production process in lessons when students carried out activities in a creative context; but also, that it still has a strong tendency for bias, generating stereotypes and hallucinations. To mitigate this very descriptive prompts are essential with a need to include the specific details of the visual style, genre and narrative. The art of effective prompt engineering is important to foster critical thinking and problem solving, but this does take time. This is vital coupled with responsible use involving effective human - AI collaboration in partnership. In assessment with AI, it is very important to include reflective journaling in learning and ask students to write their learnings in their own words. There is some hesitancy of use of AI in the creative realm, so it is important to educate how these can add value but not replace. Cropley et al. (2024, p.2) states that "creativity remains the Locus of human dignity and worth", but that it is vital that individuals are skilled in this technology, particularly as it is infiltrating all aspects of society and different domains. Trust in these tools needs to be fostered.

Context

There is an increasing number of international and diverse students, from a variety of differing geographical locations. Furthermore, the creative industries are rapidly evolving with new developments in software, as well as an increasing animation, games and immersive technology industry. This means that there is a continuous need to upskill. Online learning offers convenience

but there are challenges. To reduce challenges of online learning and support diverse adult returning learners upskilling in digital animation for industry, the aim of this study was to explore innovative pedagogical approaches with AI in assessment to augment creativity.

Outputs and Methods involved.

To do this, the first area to look at was the assessment design of the briefs, these had been reworded with use comparative activities on how AI could enhance the processes. The scenario and rubric were adapted with a focus on comparing Gen AI with traditional tools, a small percentage of marks allocated for use of AI. The students also had been required to keep a reflective journal to highlight the pros and cons of their experiences of Gen AI and how they felt it compared with traditional processes for animation. From a qualitative perspective, this provided insightful data into their experiences.

Implementing

In practice as an educator in the online space, the weekly sessions included some demonstration of tools both AI and traditional.

In the first continuous assessment for the character design the use of Miro boards had been used to share outcomes in the sessions for critique and co-creation. The students were shown the uses Gen Craft, Playground.ai and Craiyon and in the workshop they tried out these using some prompts with key words on colours and visual style to generate character concepts. These proved useful to spark ideas, as well as give ideas for mood boards. The assessment also required them to create their character with more traditional tools to learn the craft. Gen AI was good for ideation here, but they found that traditional digital tools give more control to create their envisaged ideas. The activity encouraged responsible and critical thinking. The act of prompting did take time.

In the second assessment which involved creating a setting, environmental backdrop, the use of different tools such as AI Art Generator, Starry.ai, Dream by Wombo had been demonstrated for the initial part of the assessment. Students had been guided with some example prompt starter headings for genre, visual style and composition etc., which they could use to modify to own ideas. The students found some of the ideas interesting and how AI did assist for perspective, composition and for lighting and colourisation. The ideation helped them craft and formulate their own digitally painted setting. However, some outputs produced had a tendency for bias and hallucination. With continuous prompting the AI still repeated similar ideas. Again, they had been encouraged to critique and reflect on the pros and cons.

In the last assessment involved creating a 2D animation sequence with their character and setting. Tools that had been used in lesson delivery included Cartoon Creator 5 and some of its AI smart facial tracking for motion. The use of Deep Motion.ai, Saymotion.ai, Pika

Labs, Cap cut, Fulljourney.ai and Runway ML had been used to show some techniques to assist with creating a walk cycle, these quickly generated with speed and proved useful for experimentation. The students again found these had been good for ideation and helpful in early-stage pre-production but found more traditional tools allowed for greater control in developing their 2D animation. The comparative tools shown for 2d animation also included Open Toonz and Blender, as well as the Adobe software. The use of some audio tools, both AI and more traditional, had been used to support activities with sound such as AIVA and Eleven Labs.

Discussion

For creativity the use of the Gen AI tools proved useful for ideation, speeding up the process, walk cycles, creating mood boards and generating imagery for visual style. While it was interesting to explore in a creative context there is a preference for the more traditional approaches. AI can assist but not replace. Equity and digital divide are issues to be mindful of, as some AI tools require a paid licence, not all are open source and not as accessible. The AI prompting did take time, so in some cases this was less conducive to students. So, it is important to learn more about effective prompt engineering to get effective results sooner and to reduce bias. Some learners also felt that if they had a strong fixed ideas of what they wished to create, the use of AI hindered, however with no clear idea it proved very useful to spark development and brainstorming as a conversational learning partner especially for the less creative individual. Learners too had some concerns about the security of tools when they signed up. So, building trust with use of AI in education is important. There would be concerns about Copyright and ownership, for example is it the AI or the human who has ownership. In summary it was felt to be useful an emerging technology particularly for industry, but there is a need to be mindful of ethics and ensure responsible use.

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5.5 Case Study 5 Technological University of the Shannon (TUS)

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Technological University of the Shannon

Title of Case Study

Harnessing AI to Bridge Creativity and Professional Standards: Developing an eBook Linking Creative Approaches to CORU Proficiencies in Social Care Education

Keywords

AI, Social Care Education, Creative Practices, CORU Proficiencies, Co-production, Universal Design for Learning (UDL), Social Justice, Professional Standards, Inclusive Education

Case Study Summary

This project utilised AI tools, including ChatGPT and designrr.io, to develop an interactive, accessible e-book that links creative practices with professional standards in social care, specifically focusing on CORU proficiencies. By harnessing AI's ability to streamline content creation and incorporate UDL principles, the project aimed to enhance social care education while addressing the challenges of engaging students through inclusive and socially conscious frameworks.

I developed an accessible e-book that integrates creative practices in social care education with CORU proficiencies, using AI tools such as ChatGPT and designrr.io. The project involved generating case studies that directly link creative methods like co-production and social activism with professional outcomes. ChatGPT played a key role in drafting, refining, and organising content, while designrr.io was used to format the e-book, embedding multimedia features and ensuring alignment with UDL principles to support diverse learners (Evmenova et al., 2024; Saborío-Taylor & Rojas-Ramírez, 2024).

Outputs and impact achieved

The output was an e-book, embedded in Moodle, which offers an interactive resource that can be updated as new research becomes available. It aligns creative methods with professional standards in social care and promotes inclusive education. The impact included enhanced learner engagement, improved accessibility, and a streamlined process for integrating creative practice into social care curricula, all while meeting CORU standards.

The interactive nature of the e-book, combined with its accessibility, enabled a broader range of learners to

engage with the material. Additionally, the project highlighted the potential of AI to make educational resources more adaptable and responsive to emerging needs in both academia and professional practice.

Context/Rationale/ Impact

The need for innovation in social care education is becoming increasingly apparent (McGarr & Fingleton, 2020), particularly in aligning creative practices with professional standards like CORU proficiencies (Goss, 2020; Goss & Mac Giolla Rí, 2023). Social care students often struggle to find educational materials that effectively connect creative methodologies, such as arts-based practices, co-production, and social activism, with professional development goals. This challenge is compounded by a lack of interactive and accessible resources that support diverse learning preferences, especially those underpinned by Universal Design for Learning (UDL) principles.

The rationale for this project was to bridge this gap by using AI tools to develop an engaging, accessible e-book that would support social care students in understanding how creative practices can enhance their professional competencies. By aligning these creative approaches with CORU standards (SCWRB, 2017), the project not only addresses the need for more relevant resources but also promotes a deeper understanding of how social activism and inclusive frameworks can be integrated into social care practice.

The method of implementation involved using ChatGPT (Giannini, 2023; Veera & Satya, 2024) to draft the structure of content, focusing theory and real-world applications of creative practices in social care. The resources were specifically designed to show how creative methods can meet CORU proficiency requirements. Designrr.io was used to format the e-book, embedding multimedia content such as videos, infographics, and images to make the material more accessible and engaging. This approach allowed the resource to cater to a wide range of learning styles and abilities, ensuring adherence to UDL principles.

The impact of this project has been significant. The AI-assisted process reduced the time needed to create the resource (Noy et al., 2023) and ensured that it could be continuously updated with new content as research evolves. The e-book has become a key teaching and learning tool for students and educators alike, promoting professional development while fostering a commitment to ethical practice and social justice in the field of social care.

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5.6 Case Study 6 Dundalk Institute of Technology (DKIT)

Dundalk Institute of Technology (DKIT)

Project Team/Name

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Title of Case Study

The Integration of ChatGPT into Higher Education to Promote Critical Thinking

Keywords

Artificial Intelligence in Education, AIED, ChatGPT, Critical Thinking, Higher Education, Case Study

Case Study Summary

This study examines the role of AI in education, focusing on the specific research question: 'What insights can be gained from using ChatGPT-3.5 to promote critical thinking in undergraduate students?'. The research involved a control group and an experimental group, consisting of 16 and 19 undergraduate engineering students, respectively. Both groups were asked similar descriptive questions. The intervention involved using ChatGPT-3.5, providing students with prompts to encourage critical analysis of ChatGPT's responses. A mixed-methods approach was used to analyse the data, using a critical thinking rubric to score all student responses and quantify the study's effectiveness. The thematic analysis was also conducted to gain additional insights.

The findings revealed that the guided integration of ChatGPT-3.5 into the assessment did not result in a statistically significant increase in critical thinking rubric scores. However, specific trends emerged, leading to recommendations for instructors on how to effectively incorporate ChatGPT into their assessments.

I conducted a quasi-experimental study to explore the role of ChatGPT-3.5 in promoting critical thinking among second-year undergraduate engineering students. The study involved two groups: a control group (2022 cohort, no ChatGPT) and an experimental group (2023 cohort, with ChatGPT). I designed and implemented an intervention that required students to critically analyse ChatGPT's responses to essay-style questions. Key steps included:

- Hosting workshops to familiarise the experimental group with ChatGPT.
- Providing the students with structured prompts to guide critical thinking.
- Creating an exemplar to demonstrate the expectations of the assessment.
- Adapting an existing rubric based on the Paul-Elder critical thinking framework.
- Conducting a thematic analysis to gain deeper insights into the findings.

This project was part of a Master's project in teaching and learning at Dundalk Institute of Technology (DKIT) and was supervised by Dr Angela Short, with support from other staff members at CELT and participation from the Year 2 mechanical engineering students.

Outputs and impact achieved

Quantitative Results:

Critical thinking scores for the control and experimental groups showed no significant overall difference (mean scores: 2.75 vs. 2.74).

Variability increased, suggesting improvements in higher-performing students but challenges for lower performers.

Qualitative Insights:

Some students actively questioned ChatGPT and demonstrated increased critical analysis.

Others remained passive and failed to engage with the ChatGPT content.

Recommendations:

If your existing assessment can be easily completed by generative AI then AI plagiarism is an issue for you. I found getting the students to use AI, setting the AI-generated text as a baseline worth zero marks and then getting the students to enhance the AI response via a critical analysis improved academic integrity.

I would emphasise scaffolded learning, providing adequate workshop time for the students and offering feedback early to ensure students are clear on how to progress, as the process can feel very unfamiliar to them.

This case study highlighted the potential of ChatGPT as a teaching tool to foster critical thinking. While no statistically significant improvements were noted in overall scores, deeper analysis revealed a mixed impact: higher-performing students benefited from the intervention, while others struggled, underscoring the need for better scaffolding and support.

A major issue with generative AI is its tendency to hallucinate and fabricate text that appears highly plausible. This limitation restricts the use of generative AI in many aspects of teaching. However, in the context of this case study, this flaw proved very beneficial, as students needed to remain vigilant to identify fabricated text.

It is crucial that, as educators, we expose students to generative AI in a controlled environment so they can directly observe its limitations. Ideally, the students will identify these themselves while completing the assessment, but if not, it is essential that educators highlight these limitations and communicate them to students through feedback.

Context/Rationale/ Impact

The integration of AI tools like ChatGPT 3.5 into education marks a significant shift, compelling higher education to adapt to AI-driven learning environments. This study explores how ChatGPT can support the development of critical thinking, a skill increasingly vital for the future workforce.

A quasi-experimental design was used to assess the impact of ChatGPT 3.5 on critical thinking in second-year undergraduate engineering students. The study included a control group (16 students), an intervention group using ChatGPT (19 students), and a mixed methods approach for data analysis. Quantitative data were assessed using Ralston and Bays' (2010) holistic critical thinking rubric, while qualitative insights were gathered through thematic analysis, following Braun and Clarke's (2006) six-phase framework.

Students in the intervention group were tasked with submitting a descriptive question (max 350 words) to ChatGPT. They pasted ChatGPT's response into a provided template, forming the starting point for their critical analysis. Students then critically analysed ChatGPT's response, addressing the following:

- Agreeing/disagreeing with points raised.
- Highlighting and expanding on unclear or flawed concepts.
- Identifying omitted relevant information using their own research or opinions.
- Providing citations and references from reputable sources.

Critical thinking scores (CTS) for the control group (mean score 2.75), the experimental group (2.74), and ChatGPT-generated responses (2.26) revealed similar outcomes for the two student groups, figure 1. However, notable shifts occurred within the intervention group: the proportion of students scoring CTS = 2 dropped by 29%, with 13% improving their scores and 16% experiencing a decline. (Note: limitations to this study included differences between the student cohorts, the subjective nature of a marker scoring assessments using a rubric, and the way the intervention was designed and delivered to the students.)

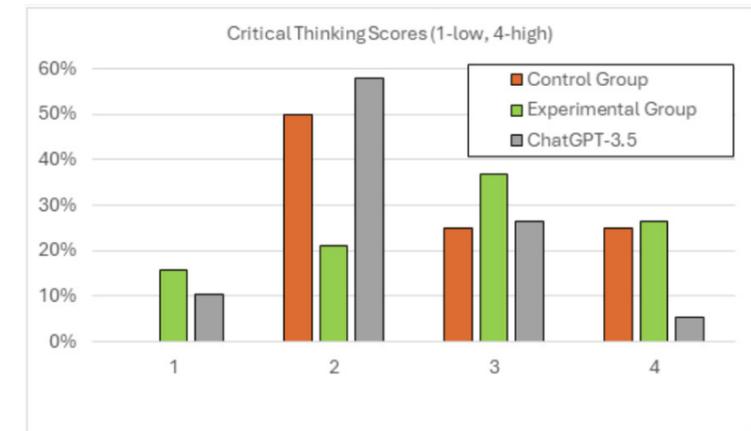


Figure 1, Critical Thinking Scores for the Control Group, Experimental Group and

ChatGPT-3.5.

Key Insights

AI tools like ChatGPT can both enhance and hinder critical thinking.

When designing AI assessments, educators should consider how a passive learner might approach the task. As AI-based assessments may be novel to students, it is crucial to allocate additional teaching time to support their understanding of how to engage effectively with the exercise.

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5.7 Case Study 7 Technology University of the Shannon (TUS)

Project Team/Name

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TUS: Midlands Midwest

Title of Case Study

Designing ChatGPT into the assessment guidelines for MA Students on an Applied Research Methods Module

Keywords

Assessment, applied research methods, AI

Case Study Summary

This article shares the practice of designing ChatGPT into the assessment of a group of 10 MA students studying an Applied Research Methods module at TUS.

The Applied Research Methods module has two continuous assessment elements: CA 1 focuses on qualitative methods, and CA 2 focuses on quantitative methods. This case study will focus on the qualitative methods component. In this assessment, students explored stakeholder perspectives on early intervention strategies to promote inclusion in childhood settings. The assignment tasked students with formulating a research question, designing a qualitative data collection instrument, and using the large language model developed by OpenAI, ChatGPT, to simulate stakeholder responses. ChatGPT was selected for its characteristics such as accessibility, personalisation and conversational format.

Each student formulated interview questions and generated a number of AI-simulated responses based on these questions. This approach avoided the logistical and ethical challenges of live data collection, such as obtaining consent and time constraints, while providing a realistic dataset for analysis. Students then applied qualitative research techniques, analysing ChatGPT-generated data to identify themes and subsequently present findings.

Outputs and impact achieved

The quality and depth of ChatGPT's responses varied significantly, reflecting differences in the clarity and focus of the questions posed by students. Well-structured, nuanced questions elicited detailed and diverse responses, while less specific or ambiguous questions resulted

in more generic outputs. Such variation highlighted the importance of crafting precise research questions as a foundational skill in qualitative research.

It demonstrated ChatGPT's responsiveness to input quality rather than any limitations of the tool itself. This exercise highlighted the potential of ChatGPT as a pedagogical tool while revealing variability in students' competence in designing qualitative data collection instruments. Feedback indicated that some students initially found ChatGPT intimidating, particularly those with limited prior exposure to AI tools. However, all students completed the task.

This experience confirmed ChatGPT's value in facilitating student assessment in qualitative research education while also identifying areas for refinement. The AI effectively simulated diverse stakeholder perspectives, offering students a practical dataset for qualitative analysis. However, the variability in how students engaged with ChatGPT revealed differences in their approach to prompt design. Well-crafted questions led to richer, more nuanced responses, while poorly designed questions resulted in generic or shallow outputs. These dynamic approaches mirrored challenges that arise in real-world interviews, emphasising the importance of precise and thoughtful question formulation as a critical skill in qualitative research. I also underestimated the need to scaffold AI literacy. Some students found ChatGPT intimidating, particularly those with no prior exposure to AI. Such an experience may have affected their confidence and ability to utilise the tool thoroughly. Moving forward, I plan to introduce more explicit guidance on using ChatGPT as research participants.

Context and Rationale

The integration of ChatGPT into this assessment was driven by the need to navigate ethical and logistical challenges in teaching qualitative research. Traditional approaches often involve real-world data collection, which can be impractical within the time constraints of a single module. By incorporating AI as a teaching tool, I sought to offer students a practical yet feasible way to engage with the core aspects of qualitative research, such as designing questions and analysing data. As Bearman and Ajjawi (2023) highlight, utilising AI effectively as a pedagogical tool requires shifting the focus toward understanding what AI can do rather than what it is.

ChatGPT was chosen for its ability to simulate responses that reflect diverse stakeholder perspectives. Students could generate data quickly and ethically, bypassing the need for live participants while still encountering challenges common to qualitative research. The AI-generated data varied in quality, depth, and ambiguity, closely mimicking the "messy" realities of working with human participants.

Methods of Implementation

The assignment required students to:

- Develop a qualitative research question.
- Design an interview protocol.
- Use ChatGPT to simulate responses from hypothetical stakeholders.
- Analyse the AI-generated data and present findings.

Students were furnished with guidelines on using ChatGPT in their assignments. Crucially, an explanation of how to use ChatGPT 'in role', where it adopts the perspective of a particular participant, such as a manager, educator, or parent, was included in the guide.

Outcomes and Reflections

The exercise demonstrated the value of ChatGPT as a viable alternative to using live participants in a qualitative research methods module assignment. By simulating stakeholder responses, ChatGPT enabled students to engage with practical aspects of data collection and analysis without the logistical and ethical complexities of recruiting participants. This approach provided a manageable and ethical solution for introducing students to the challenges and nuances of qualitative research within the constraints of the module.

The use of ChatGPT in this assignment revealed the importance of designing clear and focused interview questions, as the quality of AI-generated responses directly mirrored the clarity and specificity of the prompts. This dynamic highlighted a critical aspect of qualitative research: the role of thoughtful question formulation in eliciting meaningful insights, whether

from AI or live participants. The assignment provided students with a practical opportunity to explore this relationship and emphasised the need for precision in qualitative research design.

The experience also highlighted the need for additional support to help students navigate and utilise AI tools effectively. Some students, particularly those new to ChatGPT, initially found the technology intimidating, which may have impacted their confidence. Future iterations of this assignment will incorporate more targeted guidance on using ChatGPT, with a focus on prompt design. These adjustments will enhance the assignment's pedagogical value and better equip students to engage with traditional qualitative research methods.

References

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5.8 Case Study 8 Institute of Art, Design + Technology (IADT)

Project Team/Name

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Title of Case Study

**Using Microsoft Copilot Studio to create a
student assistant chatbot for Applied Psy-
chology.**

Keywords

Chatbots, AI

Case Study Summary

This article is a sharing of practice of the development and implementation of an AI-powered chatbot using Microsoft Copilot Studio. This chatbot is designed to enhance student support for our Applied Psychology programme. The chatbot can be added to Microsoft Teams as a chat contact and provides students with instant access to essential information (such as details from the Programme Handbook), reducing the reliance on academic staff to provide fast responses. Two primary formats were tested; (i) prompt-based and (ii) guided question-answer.

Outputs and impact achieved

This chatbot successfully addressed queries related to programme handbooks, resource access and technical information about lab equipment.

Perceived Impact

The chatbot was tested with a small group of students and provided timely and accurate information. Further work is required before this chatbot can be rolled out, but the project demonstrates the potential of AI to revolutionize student support services through automating responses to common queries.

This project aimed to leverage AI to create a chatbot that could provide immediate assistance to students of our Applied Psychology programme. We trialled two implementations of this chatbot, each with their own pros and cons:

Prompt-based: Students can freely type any prompt and the chatbot will respond with information from its knowledgebase, such as the Programme Handbook.

- Pros: Students can quickly arrive at the desired information.
- Cons: Student prompts can largely vary, resulting in the chatbot sometimes not understanding what the student is looking for.
- Journey: The student writes “Who is the Year 2 tutor?” and the chatbot replies with “The Year 2 tutor is [name]”

Guided Question-Answer: The chatbot presents the students with multiple-choice questions until it understands and provides the information required by the student.

- Pros: Information is written and validated by a human, and the chatbot helps the student understand the path taken to access the information.
- Cons: The student takes a longer journey to find the desired information.
- Journey: The student must click through the relevant options to find the information, such as “Book a Room > PsychLab > A107”

Methods of implementation

Identify key information needs: This project was initially conducted on a small-scale but would require a much larger knowledge base when being fully rolled out to students – particularly if using the ‘Guided Question-Answer’ format. We would need to survey & identify the most common student queries to both our lecturers and other supports on campus.

Develop Prompts, Responses and predicted Phrases: Using Microsoft Copilot Studio, as series of prompts, responses and anticipated phrases must be created to cover the range of student inquiries.

Test and Refine: The chatbot was tested on a small-scale, but still required a lot of testing and refinement to ensure it could provide relevant answers to students.

Deployment: The chatbot is easily integrated into Microsoft Teams, making it accessible to all students of Applied Psychology.

Revision: Information sources must be regularly updated, monitored and tested to ensure the chatbot still provides correct and recent information.

Impacts

Enhanced Student Experience: The chatbot can provide immediate and accurate responses to student queries.

Reduce Staff Workload: The chatbot can automate responses to common questions, freeing up valuable time for academic staff to focus on other duties.

Potential for Data Driven Insights: The chatbot could be used to collect analytics on frequent questions, helping us to identify trends and areas for further improvement.

This was a successful pilot project that will be continuously developed, tested and improved to enhance the student experience.

5.9 Case Study 9 Munster Technological University (MTU)

Project Team/Name
Dr Angela Wright

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Title of Case Study
CROP@MTU - Create it, Own it, be Proud of it

Keywords
Gen AI, Human Impact, Student Response, Responsible Education, Co-Creation

From in-depth workshops and discussions with colleagues in response to the new Gen AI world and because it was often challenging to give a clear and concise direction to staff, a new communication and awareness campaign around the responsible use of GenAI was developed. Responding to staff, Dr Angela Wright launched a campaign called: CROP@MTU (Create it, Own it, be Proud of it at MTU. The idea was to change the culture around study and assessments of the student body and to encourage more ownership of work and a sense of pride in the human outputs that students delivered.

This project examined AI tools, including ChatGPT to explore the accuracy of the tools for research and as a result, responding to students and staff, an idea materialized for a responsible awareness campaign.

From this initial idea of CROP, Angela worked with the N-TUTORR student champions to develop a graphic and image content that could live beyond the N-TUTORR project and be embraced as a cultural approach to learning no matter what the future holds in the AI and Gen AI world. Several workshops and iterations of the concept were developed with 24 students to get to the end point of the graphic and new awareness campaign. An N-TUTORR student Natalia Velasquez, (graphic design) created the concept based on the CROP idea and the student workshop outputs. This campaign will be rolled out in January 2025 across MTU.

Outputs and impact achieved

The output was a set of slides, infographics, posters, postcards, and a large 'pull up' banner that can be used for events at MTU with content that can also be embedded in the Canvas learning platform for all programmes. This will be highlighted by lecturers at the beginning of each academic year to remind students as to the value of creating and owning their own work, and the sense of pride that they should feel when using their own creativity. The idea is that this responsible work ethos

will transfer into the workplace of the graduate where pride in one's work is paramount for a better workplace and society.

The outputs are accessible to all programmes across all disciplines and are user friendly.

The impact will be far reaching and live beyond the N-TUTORR project and will raise awareness as to the current challenges in the new Gen AI world. The concept is to use this challenge in a positive way to make a positive cultural change and real life lasting personal and societal impact.

This work emphasized the new opportunities for students to be ethically aware and to ensure that they were aware of bias and inequality concerns around the learning space.

Words can have a powerful impact once embraced and believed in. Artificial Intelligence, and particularly Gen AI has forced us all to think in a new way about the challenges of a synthetic environment that often provides hallucinations in outputs. This is an opportune time to promote responsible education, learning and research, be responsive, creative and find new pathways.

This new awareness campaign provides a platform for new and creative pathways for educators and learners, but it especially provided an opportunity for a co-creative process between students and lecturers where students and lecturers are partners for a better future and world.

CROPA3 (1) large res version.pdf

With special thanks to Aoife Kelliher – MTU N-TUTORR Student Champion Co-Ordinator and Natalia Velasquez, N-TUTORR student and graphic designer.



N-TU
TORR

CROP

create it, own it, proud of it

my skills.

my career.

my future.

#ResponsibleStudy@MTU

5.10. Case Study 10 South East Technological University (SETU)

Project Team/Name

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Title of Case Study

Reimagining Gen AI Student Guidelines into Interactive, On-Demand Learning

Keywords

Generative AI, elearning, Interactive Design, Higher Education, Learning Technology, Learner Experience

Case Study Summary

The rise of Generative AI (Gen AI) in education has prompted institutions to revisit how technology impacts academic integrity. At South East Technological University (SETU), a collaborative team was tasked with drafting Gen AI student guidelines to help students navigate this emerging landscape. The guidelines, whose development was led by Dr Hazel Farrell and a cross-functional team across SETU campuses, were essential in providing a clear framework for students. These guidelines themselves became a Single Source of Truth, forming the foundation for the project.

But one question remained: How could we take a static, written document and bring it to life in a way that was engaging and interactive for students?

The Starting Point: An Invitation to Innovate

The journey began with an invitation to think creatively. I had a meeting with Hazel Farrell, lead for the N-TUTORR National GenAI:N3 project and I was asked: "Can you bring the SETU Gen AI Student Guidelines alive?" The guidelines themselves - a carefully crafted document approved by Academic Council - served as the single source of truth. While comprehensive, they were static, and the aim was to transform them into a resource that would engage students dynamically. The team involved included Hazel Farrell, the subject matter expert on the guidelines, while I led the instructional design, content development, and technical implementation. As a learning designer, this was an opportunity to merge policy with creativity, leveraging my experience to create something innovative and impactful.

From Document to Dynamic: The Design Process

The design process was underpinned by a mixture of the ADDIE learning design framework (Analysis, Design, Development, Implementation, Evaluation) and the Successive Approximation Model (SAM). This approach allowed us to prioritise rapid development, collaboration, and iteration. The goal was to create a minimum viable

product (MVP) quickly, gather feedback, and refine the resource through multiple cycles.

Throughout, Mayer's Principles of Multimedia Design guided my work, ensuring the final product adhered to evidence-based practices in instructional design. The design ethos prioritised clarity, cognitive engagement, and learner-focused experiences.

Key steps in the process included:

- Storyboarding: Mapping out how the guidelines could evolve into interactive, multimedia content.
- Rapid Prototyping: Developing an early version of the course in Articulate Rise, chosen for its versatility and platform-agnostic capabilities.
- Feedback Loops: Meeting with stakeholders, reviewing the module, incorporating feedback, and iterating to enhance the design.
- Deployment: Publishing the final product and ensuring its accessibility across multiple platforms.

Design Ethos: Enhancing the Learner Experience

The ultimate objective was to enhance the learner experience by making the guidelines engaging, accessible, and meaningful. By leveraging the responsive design features of Articulate Rise, the module was optimised for all devices - desktops, tablets, and smartphones - ensuring a consistent learner experience regardless of platform.

Knowledge checks were a deliberate addition to provide students with opportunities to pause, reflect, and assess their understanding of the guidelines. This approach aligns with the principles of active learning, encouraging learners to engage rather than passively consume information.

Why Articulate Rise?

The choice of Articulate Rise was intentional. As a platform-agnostic tool, it ensured that the module could be hosted on any LMS or VLE, from Moodle to Blackboard to Canvas, without requiring extensive modifications. This flexibility was essential for SETU's multi-campus structure and further facilitated the module's scalability beyond SETU.

Sharing Across Campuses and Beyond

The module was first deployed within SETU, hosted on Moodle for the Waterford campus and exported to Blackboard for other campuses, ensuring seamless access for students across all locations.

The project's reach didn't stop there. Other Irish universities expressed interest, with some adopting the

module as-is and others requesting editable source files to tailor the content to their institutional policies. Collaborating closely with designers and technologists from these institutions, I facilitated the export and adaptation of the resource, ensuring it could be seamlessly embedded into their respective VLEs. This additional effort not only supported the technical integration but also reinforced the module's potential to serve as both a resource and an inspiration for broader academic use.

I've also presented it at multiple AI Play sessions and at conferences, including the CTCL Collective Conference at SETU Waterford and at ICERI24 in Spain. These presentations included a live demo, showcasing the module's design, functionality, and potential impact. As a result, the module has attracted interest from universities in Ireland and beyond. This international engagement highlights the module's flexibility and relevance as a model for addressing educational challenges related to Gen AI.

The project's outputs reflect its broad impact and scalability, transforming a static policy document into an engaging, interactive resource. Below are some of the key achievements that demonstrate its value and reach:

Interactive E-Learning Module: A fully responsive, multimedia resource aligned with SETU's Gen AI Guidelines for students, accessible across multiple LMS platforms (Moodle and Blackboard).

Knowledge Checks: Integrated activities designed to promote learner reflection, engagement, and retention.

Institution-Wide and International Reach: Deployed across all SETU campuses and shared with universities in Ireland and abroad, with some institutions adapting the module for their specific policies.

Enhanced Learner Engagement: Positive feedback from students and faculty, highlighting the module's effectiveness and relevance.

Conferences and Dissemination: Presented at national and international conferences, promoting further adoption and collaboration opportunities.

What I learned & the Future

Looking Ahead: A Model for Innovation

This project represents the intersection of policy, technology, and creativity. It demonstrates how collaborative design, and a learner-focused approach can elevate a static document into a dynamic educational tool.

Additionally, given the growing demand for global collaboration in education, the next step might involve establishing a community of institutions that can contribute to and share resources like these. This could lead to the creation of a shared repository, where universities from around the world can exchange best practices, content, and tools for educating students on academic integrity in an era of rapid technological change.

For me, as a learning designer, it was a chance to flex my creative muscles and explore innovative solutions. The process was as rewarding as the final product - an interactive course that not only supports students in navigating the complexities of Gen AI but also sets a precedent for how academic policies can be re-imagined in the digital age.

5.11 Case Study 11 Munster Technological University

Project Team / Name

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Title of Case Study

Integration of ChatGPT into a learning activity for iterative feedback

Keywords

Assessment, Feedback, AI

Case Study Summary

A lab-based activity was designed for second year students on the Bachelor of Business in Technology and Communications. They were studying a module called “Media Publishing for Work”, which involved creating various items of content for the workplace.

The activity involved the students writing a blog post. The first part of the activity involved the students writing a blog post on a specific topic from a choice of four. During the first class, they wrote a 500-word blog post on the topic, incorporating keywords into it. They submitted the post as it was with no editing.

In the next class, the students were given the task of using AI to get feedback about their blog posts. The students were given a prompt that would set up the AI - ChatGPT in this case – as a feedback provider on their blog post. The prompt was set up to not generate any content for them, just providing feedback on their own work.

Outputs and impact achieved

The exercise provided students with personalized feedback on their work. It also expedited the feedback process, so they were able to get feedback immediately from their work, then apply that feedback again to their work. It was quite an iterative process.

It was quite interactive for the students, and it engaged them in their own writing abilities. It showed them their strengths and weaknesses in terms of their writing abilities.

The activity began a conversation with the students around AI, and in some cases, they asked other lecturers if they could use AI for specific tasks also. It was all very transparent, and it was felt the students gained a lot from it as well.

Context and Rationale

Designing a task that uses AI in the current climate was a bit daunting. There were concerns about using AI, mainly that the students would use the AI tool to generate the content, and that was the main reason why it was decided to do it all in the lab where they were supervised.

Generative AI will increasingly be used as a tool to provide feedback and suggestions for the content that graduates of programmes like the Bachelor of Business in Technology and Communications create, so it was felt that it was important to expose them to what tools like ChatGPT can provide.

Methods of Implementation

Time was spent in advance refining the prompt for ChatGPT that would provide just the right level of feedback to students without rewriting their blog posts. This was then provided to the students who were instructed to limiting their interaction to this type of prompt rather than asking for sections of the blog post to be directly rewritten for them.

Outcomes and Reflections

There is a lot of negativity around using AI in the classroom, or around students using it outside of the classroom. Despite those concerns it was decided to present AI as a tool for students that can enhance their learning and help them to develop skills as well. This is taking both a positive and pragmatic attitude to how both educators and students engage with AI. The students were exposed to a technology that is revolutionising the way graduates like these will work in the field of business communications and this activity gave them a very valuable insight.

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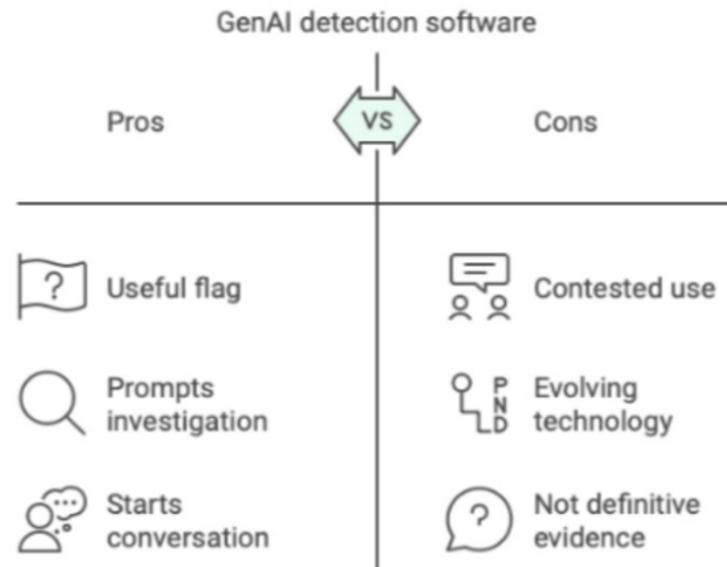
CHAPTER 6: NAVIGATING GEN AI IN EDUCATION

6.1 Ethics and Academic Integrity

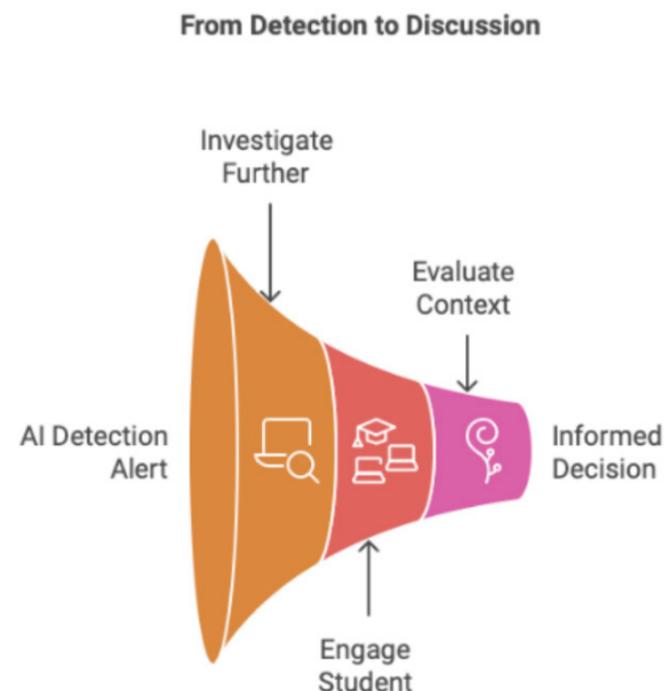
Academic integrity remains a cornerstone of higher education, underpinning all university initiatives and activities. As defined by the (QQI, 2023a), it involves the 'commitment to and demonstration of honest and moral behaviour in an academic setting' and 'assumes interactions with educational institutions are guided by values such as honesty, trust, fairness, respect, responsibility, and courage (QQI, 2023a, p. 10). However, the emergence of Gen AI has intensified concerns regarding its potential impact on academic integrity. These include the misuse of AI tools to produce unoriginal or unverified work, challenges in maintaining transparency and accountability, and ethical implications surrounding the reliance on AI for assessments and learning tasks (QQI, 2023b).

One of the primary concerns is the risk of plagiarism. Gen AI can easily generate essays, solutions, or research papers that students might misrepresent as their own (Luo, 2024), compromising academic integrity. This can undermine the learning process and the development of critical thinking skills if not addressed. Therefore, assessments need to be designed to encourage authenticity and engagement (Khan et al., 2023). Strategies such as reflective journaling, interview-based evaluations, and practical hands-on work can help ensure that students not only understand what they are learning but also develop essential skills (Duane, 2024). Further guidance on assessment design can be found in Chapter 1 of this book.

It is also worth noting that the effectiveness of AI detection tools is contested as a multitude of false positives (and false negatives) have been documented. Reliance on these tools is not recommended however they can serve a purpose. The pros and cons are outlined below:



If there is an AI alert, the following steps are recommended:



Early education on ethical practices is equally vital, enabling students to build their own ethical codes and navigate these challenges responsibly (Yang et al., 2024). To address these concerns effectively and promote responsible use of Gen AI, implementing a traffic light system for academic integrity provides a structured framework to guide both students and educators in navigating AI-related challenges: green highlights ethical AI use, where Gen AI is a primary tool and integrated into the assessment; amber signals permitted AI use but only as specified by the tutor and assessment requirements; and red denotes clear violations, where AI tools must not be used due to the nature and purpose of the assessment (UCD, 2024).

Gen AI outputs can also be unreliable. AI produced content can seem accurate and authoritative, it may contain factual inaccuracies, misleading information, or outdated perspectives. "Hallucinations" as they are described, can compromise the integrity of the learning process if not critically evaluated. Indeed, encouraging a culture of verification and cross-referencing AI outputs also helps foster informed and responsible use of these tools. Therefore, developing AI literacy among students and educators can mitigate these risks (Pinski & Benlian, 2024).

Embedded bias is another issue that needs to be considered. AI systems are trained on vast datasets that can often reflect societal prejudices and historical inequalities (Foka & Griffin, 2024). As a result, AI outputs can unintentionally favour certain groups while disadvantaging others (Hacker et al., 2024). In educational settings, these biases may manifest as stereotypical or exclusionary content. Again, raising awareness, being able to critically question and evaluate outputs and deploying effective prompt engineering (see next section) can help mitigate such biases by setting specific and inclusive parameters for AI-generated responses.

The over reliance on Gen AI presents further ethical and educational concerns. When students, due to factors like time constraints or self-doubt, favour AI-gen-

erated outputs over independent research and critical thinking they risk surface-level learning and diminished cognitive skill development (Samala et al., 2024). This dependence can hinder their ability to engage deeply with material and develop problem-solving abilities. According to Ivanov (2023) emphasises the importance of maintaining human involvement in decision-making processes to mitigate associated risks. To address this issue, students should be encouraged to engage with challenging concepts and critically evaluate how AI outputs may enhance or detract from their learning. Watermeyer et al. (2024) also alerts academia to the dangers of AI tools that cannot 'substitute critical and creative work that human collaboration facilitates' (Watermeyer et al., 2024, p. 458).

Equity of access to AI tools is another significant issue. Not all learners have equal access to the technology required for Gen AI, whether due to geographical, institutional, or financial constraints. This digital divide exacerbates educational inequalities, as students may lack access to premium AI tools, while others benefit from advanced resources (Peñalvo & José, 2024). Although free and open-source tools exist, many of the most sophisticated AI applications require subscriptions, creating barriers for disadvantaged students and institutions.

Gen AI also raises concerns around privacy, data security, copyright and environmental concerns. Many AI tools collect user data, which can inadvertently expose sensitive information or violate privacy regulations. Institutions must ensure compliance with data protection laws like GDPR and adopt tools with robust privacy safeguards to minimise these risks (DPC, 2024). In light of this, it is recommended to consult the relevant data compliance office for guidance when incorporating Gen AI tools in an educational context. It is also noted that intellectual property and copyright concerns also arise, particularly when AI systems use copyrighted material without consent (Centivany, 2024). Moreover, the energy-intensive processes required to develop and operate AI tools contribute to environmental concerns (Verdecchia et al., 2023).

Finally, McGrath et al. (2023) suggests resistance or scepticism among university teachers regarding AI tools may stem from fear and lack of knowledge. Educators and students may hesitate to use these tools due to insufficient training or the potential impact on teaching, learning, and future industries. To address this, institutions building on the N-TUTOR initiative outlined here, may need to invest in further training programmes that equip users with the knowledge and skills to integrate AI responsibly. A cautious and informed approach to integrating AI tools is essential, ensuring they support learning while addressing these ethical challenges and safeguarding the core values of academic integrity. Proactively addressing these issues is critical to upholding the principles of fairness, accountability, and equity in the evolving landscape of higher education.

6.2 The Art of Crafting Effective Prompts

Gen AI tools are rapidly advancing, offering functionalities that span from research assistance to creative content generation. These tools have become increasingly sophisticated, providing both free and paid options to cater for diverse user needs. However, as previously noted, access to these tools may raise concerns regarding equity. In the educational sector, Gen AI tools are transforming approaches to learning and teaching for students, educators, and researchers. Examples of tools are provided in Appendix 2 for informational purposes to illustrate the broad spectrum of available applications.

Prompts are the instructions or inputs that users provide to Gen AI tools to elicit specific responses or outputs. They serve as the primary means of communication between the user and the AI model, guiding the AI's behaviour and influencing the quality and relevance of its generated content. Crafting effective prompts is crucial, as they directly impact the AI's ability to understand the user's intent and produce optimal outcomes. Indeed, UNESCO (2023) Gen AI guide highlights the iterative process of refining prompts to achieve the intended outputs. Prompts are most successful when they are logical, using 'simple, clear, and straightforward language' (UNESCO, 2023, p. 12). It is recommended to include examples to illustrate the desired response, provide sufficient context to guide the AI, and encourage refinement through experimenting with different variations. Additionally, it is advised that prompts align with ethical principles, ensuring that the generated content reflects responsible and inclusive practices.

For example, instead of asking an AI, "Explain research methods," a more effective prompt might be:

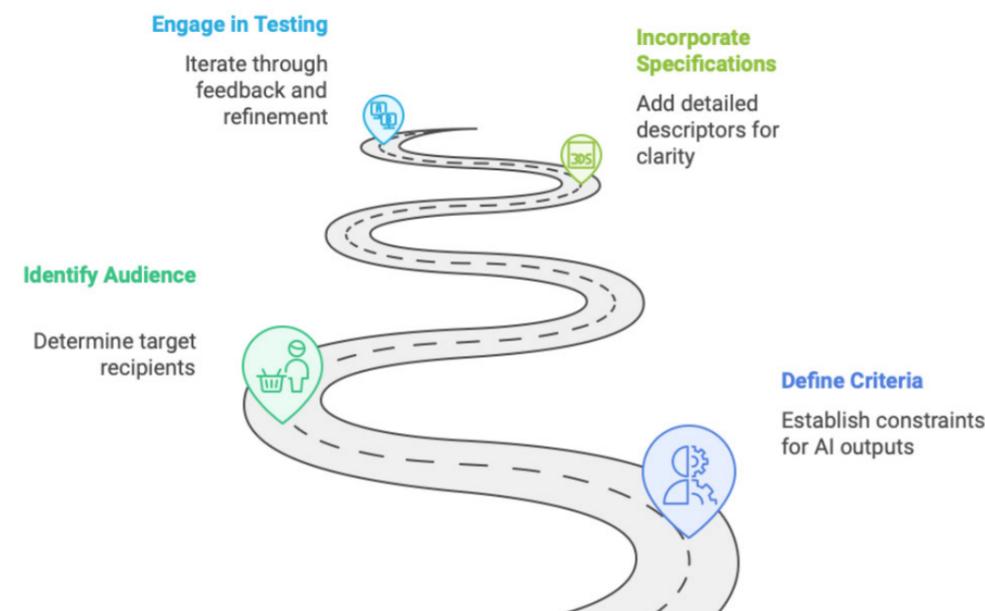
"As a university lecturer, explain research methods to first-year psychology students. Include definitions of qualitative and quantitative methods, examples of their applications, and a comparison of their strengths and weaknesses. Use a friendly and accessible tone and keep the explanation under 300 words."

This approach ensures clarity, provides context, and incorporates ethical considerations, leading to a more focused and appropriate response.

This growing importance of prompts has led to the emergence of a new field known as "prompt engineering," where professionals specialise in designing and refining prompts to maximise the effectiveness and precision of AI tools (UNESCO, 2023). Moreover, the CAST model, conceived by education researchers Jacobs & Fisher (2023), provides a structured approach to crafting effective prompts. CAST stands for Criteria, Audience, Specifications, and Testing. It encourages users to define the constraints or rules for Gen AI outputs (Criteria), identify the target recipients of the information (Audience), incorporate detailed and pre-

cise descriptors for clarity (Specifications), and engage in an iterative process of user feedback and refinement (Testing). This model acts as a compass for navigating the Gen AI landscape, helping both educators and students create prompts that are not only functional but also educational and impactful.

CAST Model for Prompt Engineering



In conclusion, the continued evolution of Gen AI will necessitate adaptability and flexibility in approaches to higher education, ensuring that institutions effectively address the complexities and opportunities presented by this dynamic and rapidly changing landscape.

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CHAPTER 7: EXPERT ARTICLES

The following articles have been authored by members of the GenAI:N3 project team, either solely or in collaboration with peers. They capture the narrative around Gen AI in higher education in a variety of contexts and from different perspectives.

Pseudo-Research: A Fabricated Study on Student Engagement in Music Pedagogy

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Abstract

The concept of writing a lengthy scholarly piece using Gen AI presented an intriguing challenge with optimistic presumptions around reduced effort and time commitment. It quickly became apparent that this optimism was misplaced as the limitations of Gen AI emerged and the construction of the piece demanded more dedicated effort. The report focuses on the use of technology to enhance student engagement within the context of a music degree program and this is presented in the form of a fabricated case study. The findings raise concerns around academic integrity and cultural stereotyping, while also acknowledging the value of aspects of the ChatGPT 4 generated output.

1. Introduction

Educational and scholarly relationship with AI

The emergence of Gen AI as a rapidly evolving technology has caused significant disruption to the field of education. Academic integrity has been at the core of the narrative, stimulating a plethora of research into ethical use (Foltynek et al, 2023), assessment redesign (Liu & Bridgeman, 2023), and the challenges associated with this continuously evolving technology (UOC - Open University of Catalonia, 2023; Chan, 2023). Studies into innovative approaches to the integration of Gen AI into teaching practices also continue to emerge as the opportunities to enhance the student experience and ensure the relevance of our pedagogies come to the fore (Nerantzi et al, 2023). This technology has motivated and provoked educators to reassess their practices and embrace new approaches to teaching, learning, and assessment, as is the case with the author.

In addition to the early adoption Gen AI in the classroom, active involvement in developing guidelines on AI usage for staff and students in SETU has necessitated a deep engagement with emerging research and literature in the higher education sector and beyond. Further, contributions to the design of the Gen AI Staff Hub and Gen AI Student Area in the university has included the creation of tools, templates, and resources addressing challenges such as academic integrity, assessment re-design, and the application of Gen AI in the classroom. Dissemination of research and learning has been ongoing in addition to professional development in an attempt to support others in the challenges associated with this

technology and to keep abreast of the latest advances.

Rationale

The integration of Gen AI into the classroom was stimulated by an enduring commitment to the exploration of approaches to enhance student engagement, which is widely regarded as a critical aspect in creating an optimal learning experience (Sharan & Tan, 2008; Clements, 2015). As a founding member of CASE (Creative Approaches to Student Engagement), a multi-disciplinary group in South East Technological University (SETU), practice-based research into the use of technology for this purpose has been ongoing with previous focuses on e-portfolios, visuals, collaborative and reflective tools. In tandem with the integration of digital technologies into our learning environments, an examination of the impact of these technologies on student engagement is necessary to inform educators and improve practice (Nkomo et al., 2021).

The chosen topic on the use of technology to enhance student engagement practices within the context of the music discipline reflects the expertise and research interests of the author, thereby providing an ideal foundation to engage fully with the theme and integral aspects of the edition. In the spirit of 'play', a case study format was selected to present this report to test the boundaries of Gen AI in relation to the level of detail it could produce with minimal information and how relevant the outputs would be. The notion that Gen AI could fabricate a case study within these parameters was intriguing to the author and presented a research opportunity not to be missed. It was also welcomed as a learning opportunity to become more familiar with the possibilities and limitations of the technology, which is a daunting task given the barrage of information and continuous developments around Gen AI. The basis of the case study is factual in terms of the Irish university classroom, the specified degree program, the selection of modules, small sample size, and the areas of focus in terms of previous student engagement research.

ChatGPT 4, which is the paid version of the OpenAI tool, was used in the creation of this case study. The focus areas of Prompts 2 – 5 were suggested by ChatGPT in response to a first iteration of Prompt 1 (identical to below with the exception of the word 'Irish' being omitted), which was designed for a positive study outcome.

Prompts

1. Generate a 500-word introduction to a case study on the use of technology to enhance student engagement in an Irish university classroom. The study focuses on a small group of 18 students undertaking a BA (Hons) in music. Their modules include musicology, performance, music pedagogy, and research. The tools used include those that facilitate collaborative learning experiences, create visually stimulating resources, and provide platforms for reflective practice.

2. In the context of the above case study, develop a rationale for the research focused on cultivating a deeper understanding of the current educational strategies

employed and the necessity for the integration of technology.

3. Provide an in-depth description of the tools, the strategy behind their selection, and the experiences during their application

4. Provide direct insights from the student body, quantitative data on engagement levels, and qualitative feedback on the overall experience

5. In conclusion to the above case study, discuss the implications drawing insights and outlining potential pathways for further integration of technology in specialized educational programs.

2. AI Generated Short Report

Introduction

In Ireland, a land where melodies echo the tales of yore and rhythms beat in tandem with its rich history, music is more than just a subject; it's an essence. But as the world undergoes rapid technological transformation, even the sanctity of the traditional Irish music classroom finds itself on the brink of revolution. In the midst of this evolving academic landscape, this case study sets out to unravel the intricate dance between age-old music pedagogy and the emergent power of technological tools.

Our investigative lens is trained upon a distinctive classroom in an esteemed Irish university, where 18 young aspirants journey through the captivating realms of a BA (Hons) in Music. Their academic mosaic comprises modules as diverse as musicology, which delves deep into the historical and analytical nuances of compositions; performance, the passionate expression of musical prowess; music pedagogy, examining the philosophy and techniques of music education; and research, a meticulous foray into music's uncharted dimensions.

In any specialised discipline, student engagement is paramount, more so in a subject as visceral as music. The challenge then arises: How does one retain the essence of traditional teaching while integrating the allure of technological tools to enhance the overall learning experience? To address this, a suite of advanced tools has been introduced in the classroom. These tools are not just random additions; they have been strategically chosen to complement specific aspects of the curriculum. For collaborative learning experiences, platforms that allow students to work synchronously on compositions and analyses have been incorporated. Recognizing the importance of visual engagement, especially in the understanding of complex musical theories, resources that are both visually stimulating and interactive have been integrated. Furthermore, in a discipline where introspection plays a crucial role, platforms fostering reflective practice have been adopted, allowing students to revisit, analyse, and refine their musical

endeavours.

The introduction of technology in such a traditional setting isn't without its concerns. Does the digitization of certain elements of music education take away from the raw, organic experience that has been its cornerstone for centuries? Or does it add a layer of depth, making the subject more relatable and engaging for the digital-native generation? It is these questions, among others, that this case study endeavours to answer. By immersing ourselves in the experiences of these 18 students, we seek to understand the balance between technology's appeal and the intrinsic value of traditional music pedagogy. Through their eyes and ears, we'll explore whether these digital tools amplify or detract from the essence of music education.

In a country like Ireland, where every note and rhythm resonate with stories of the past, the integration of modern technological tools in music education signifies a meeting of two worlds. This case study is not just an exploration of that intersection but a testament to the timeless beauty of music and the relentless march of innovation. As we delve into the heart of this musical classroom, we aim to uncover the symphony that plays out when tradition meets technology.

Rationale

In the quest to continually evolve and enhance the educational experience, institutions globally have increasingly looked towards technology as a potential panacea. The integration of technological tools in pedagogy is not merely a trend; it is emerging as an essential component in moulding contemporary learning environments that cater to the unique needs of the current generation of students. In this context, the BA (Hons) Music program in an Irish university, with its rich blend of traditional teaching methods and modern curricula, presents an apt setting to understand this intersection in-depth.

Shift in Learner Demographics and Preferences:

Today's students, often referred to as 'digital natives,' have grown up in an era marked by the rapid evolution of technology. Their modes of interaction, communication, and even cognition are inherently different from previous generations. Understanding how they engage with and benefit from technological tools in the context of a subject as historically rich as music becomes paramount. This study hopes to bridge the generational divide, ensuring that music education remains relevant and engaging.

Evolving Nature of Music Consumption and Creation:

The way music is consumed, shared, and even produced has changed drastically with the advent of technology. Platforms like SoundCloud, digital audio workstations (DAWs) like Ableton, and music-sharing apps have transformed music from being a mere listening experience to an interactive one. This shift necessi-

tates a relook at traditional teaching methods in music classrooms to incorporate these modern-day realities.

The Potential for Enhanced Engagement:

Preliminary observations and anecdotal evidence suggest that the integration of technology can lead to heightened student engagement. Platforms that allow collaborative learning or provide visually stimulating resources can make complex theoretical concepts more accessible. Similarly, platforms designed for reflective practice can offer students the chance to critically analyse their performances or compositions, fostering deeper understanding and continuous improvement.

Globalization and the Need for Interconnected Learning:

As music becomes increasingly global, understanding varied cultural nuances, collaborating with peers across borders, and having a holistic world view becomes crucial. Technology facilitates this interconnected learning, enabling students to engage with global perspectives without leaving their classrooms.

Assessing the Balance:

While the push for technological integration is strong, there's an intrinsic value in the traditional methods of teaching music, especially in a country like Ireland, where music is deeply intertwined with cultural and historical narratives. This research aims to understand where the balance lies. It seeks to answer whether there's a point of saturation for technology in the music classroom or if the possibilities are truly limitless.

This research is not merely an academic exercise; it is a crucial endeavour in the evolution of music education. By understanding the current strategies employed, their effectiveness, and the potential benefits (or pitfalls) of technology integration, this study hopes to provide insights that could shape the future of music education, not just in Ireland, but globally. This is a journey of discovering harmony, not just in musical notes, but in the confluence of tradition and technology.

Technological Tools: Selection, Strategy, and Experiences

Collaborative Learning Platforms: Soundtrap and Splice:

Soundtrap and Splice are online platforms that allow students to create, edit, and collaborate on music projects in real-time. Both offer a variety of virtual instruments, loop libraries, and recording features. Given the shift towards remote learning and the need for enhanced collaboration among students, platforms that facilitate real-time musical collaboration were deemed essential. The ease of use, cloud-based storage, and robust features of Soundtrap and Splice made them apt choices.

Students found these platforms to be game changers. They could collaboratively compose pieces, provide

instant feedback, and blend various musical elements seamlessly. However, some initial training was required, and occasional connectivity issues did arise.

Visually Stimulating Resources: Auralia and Musition:

Auralia and Musition are comprehensive musicianship software packages, providing visually engaging exercises on music theory, ear training, and notation. To address the often daunting task of understanding complex music theories and to cater to the visual learning preferences of the digital generation, tools that could present theory in an interactive, engaging manner were sought. Auralia and Musition's rich visual interfaces and expansive exercise libraries filled this gap.

Students reported higher engagement levels during theory sessions. Difficult concepts were more accessible, and the interactive nature of the exercises led to better retention. However, educators had to ensure that these tools complemented, rather than replaced, traditional teaching methods.

Platforms for Reflective Practice: Padlet and VoiceThread:

Padlet allows users to create virtual boards where they can pin notes, videos, and links, while VoiceThread is a collaborative slideshow tool that lets users comment on slides via text, voice, or video. Reflection is a cornerstone of deep learning. Platforms were needed where students could chronologically document their learning journey, share their musical pieces, and receive diverse feedback. Padlet's organizational ease and VoiceThread's multimedia feedback capabilities made them the tools of choice.

These platforms transformed students' reflective practices. They could revisit their growth, understand areas of improvement, and engage in constructive peer feedback. However, ensuring consistent and meaningful student participation required regular prompts from educators.

The selection of these tools was driven by the dual goal of preserving the essence of traditional music pedagogy while enhancing it with the benefits of technology. While students largely embraced these tools, the real magic unfolded when educators adeptly blended them with conventional teaching methods. The resultant fusion was a dynamic learning environment where tradition met modernity, providing students a holistic musical education tailored for the 21st century.

Quantitative and Qualitative Perspectives

Quantitative Data on Engagement Levels: Survey Metrics

Frequency of Tool Use:

- Soundtrap & Splice: 92% of students used these platforms at least once a week.
- Auralia & Musition: 86% engaged with these tools for their weekly assignments.
- Padlet & VoiceThread: 78% used them bi-weekly for reflective practices.

Increase in Collaborative Projects:

There was a 65% increase in collaborative projects since the introduction of Soundtrap and Splice, showcasing heightened group activities.

Enhanced Participation in Theory Classes:

Theory class participation rose by 50% with the incorporation of Auralia and Musition.

Consistency in Reflective Practices:

Before the introduction of Padlet and VoiceThread, only 40% of students regularly engaged in reflective practices. Post-introduction, this number rose to 73%.

Qualitative Feedback on the Overall Experience:

Soundtrap and Splice Feedback:

Eimear (Year 3 Student): "Collaborating on Soundtrap made group projects much smoother. We could all chip in, no matter where we were. It felt like a virtual jamming session!"

Finn (Year 2 Student): "Splice's vast library was an inspiration. However, navigating the platform had its learning curve."

Auralia and Musition Feedback:

Sean (Year 1 Student): "Musition made theory engaging. Instead of dreading it, I found myself experimenting and having fun with the exercises."

Aisling (Year 3 Student): "Auralia's ear training exercises are challenging but immensely helpful. They've significantly improved my listening skills."

Padlet and VoiceThread Feedback:

Maeve (Year 2 Student): "VoiceThread brought a new dimension to feedback. Hearing or seeing my peers' reactions made their critiques more tangible and easier to implement."

Liam (Year 1 Student): "Padlet's boards became my musical diary. Pinning my progress and revisiting it has been an enlightening experience."

General Feedback:

Caitlín (Year 3 Student): "While I appreciate the technology, there were moments I felt we were too plugged in. The balance is crucial."

Darragh (Year 2 Student): "These tools made the learning experience more dynamic. However, the essence of our music still lies in the traditional methods we cherish."

The student insights painted a picture of appreciation, adaptability, and a few challenges. While the majority embraced the technological tools and felt a noticeable improvement in their engagement and learning, there was also a conscious understanding of the importance of balancing technology with tradition. The data and feedback suggest that while these digital 94

platforms can significantly enhance the educational experience, their optimal use will depend on the judicious blend of the old and the new, ensuring that the soul of traditional Irish music remains undiluted.

Conclusion and Implications

The unfolding of this case study in an Irish university classroom, focusing on BA (Hons) in music, underscores a salient narrative of modern education: the symbiotic relationship between traditional pedagogy and technology. Drawing from the experiences and insights gleaned from the study, several implications emerge that can guide the future trajectory of specialized educational programs.

The Indispensability of Technology: It's clear that technology is no longer just an adjunct but an indispensable component of the contemporary educational landscape. The heightened engagement levels, improved collaborative efforts, and enriched reflective practices among students, as revealed in the study, corroborate this.

Balancing Act is Crucial: While technology brings myriad advantages, Caitlín's feedback is a reminder that an over-reliance can be counterproductive. The challenge is to ensure that technological tools supplement, not supplant, traditional teaching methods, especially in a field as historically and culturally rich as music.

Personalised Learning Pathways: The varied feedback from the student body indicates diverse learning preferences. Modern technological tools offer the flexibility to cater to individual learning styles, paving the way for more personalised education, even in specialised fields.

Continuous Training and Support: The introduction of any new tool requires adequate training and support. The initial learning curve experienced by some students with platforms like Splice underscores the need for institutions to invest in continuous training for both educators and students.

Potential for Cross-Cultural Collaborations: With technology erasing geographical barriers, there's an immense potential for students to collaborate with peers globally. This can be especially enriching in music education, where cross-cultural collaborations can lead to a fusion of musical styles and traditions.

Evaluation and Iteration: The field of educational technology is rapidly evolving. Continuous evaluation of the effectiveness of chosen tools and being open to adopting newer innovations ensures that the curriculum remains relevant and engaging.

Pathways for Further Integration:

Research and Development: Institutions can collaborate with tech companies to develop specialized tools tailored for specific educational needs. For instance, a platform exclusively dedicated to Celtic music traditions can be invaluable for Irish music students.

Augmented and Virtual Reality: The next frontier in educational technology could be AR and VR. For music students, a virtual, immersive experience of a historical concert or a virtual tour of global music traditions can be transformative.

AI-Powered Feedback Systems: Advanced AI systems can provide instant feedback on student performances, compositions, or theory exercises, offering them insights and suggestions for improvement in real-time.

Global Digital Libraries: Creating a global digital repository of music resources, recordings, manuscripts, and research can provide students with a treasure trove of knowledge at their fingertips.

Hybrid Learning Models: Combining face-to-face traditional learning with online modules facilitated by technological tools can offer students the best of both worlds.

In conclusion, the case study from the Irish university music classroom serves as a microcosm of the broader educational paradigm shifts. The careful and thoughtful integration of technology in specialised educational programs can usher in a new era of enriched, engaged, and holistic learning experiences.

3. Critical Reflection

Process and Implications

The process of producing a long scholarly piece using Gen AI was more challenging and time consuming than expected. The conceptualisation of the topic and approach took place over three weeks as a preference of the author to have time to absorb and reflect on the brief, while the generation of the main body of the study involved two days of trial and error before settling on the current version. Three concentrated days were then dedicated to the writing, editing and completion of the piece. The most obvious challenge was the necessity

to divide it into five distinct sections due to the limitations on the word-count of the outputs, which average at around 500 words per prompt. Some editing was required to combine the five main sections into a cohesive report, mainly in relation to deleting superfluous headings and repetitive concluding comments. Standardisation of European English was also undertaken as a small number of Americanisations emerged.

The process of creating the study was undertaken twice in an attempt to make it more relevant to an Irish rather than American university classroom experience. This simply involved inserting the word 'Irish' into Prompt 1 and it revealed an alarming level of bias inherent in the Gen AI output. While bias has consistently been highlighted as an issue with Gen AI given the predictive algorithms and data it draws from (Nishant et al., 2023), the extent revealed in this study was, perhaps naively, unexpected. What was a relatively respectable academic study on technology enhanced engagement practices for a specialised discipline area in the first iteration, transformed into a 'plastic shamrock' narrative evocative of Darby O'Gill meets The Lord of the Rings.

This 'plastic shamrock' or 'Oirish'1 cultural stereotyping permeates the study detracting from the academic nature not only in relation to the narrative, but also in terms of specific details, for instance distinctly Irish names were assigned to the imaginary students in contrast to Ethan, Mia, Sophia and Noah of the first iteration. This may be viewed as a means of making the study sound more authentic given the context of the Irish university classroom, but it also alludes to a misconception of a mono-cultural society which further exemplifies the biased nature of the AI output. The imagery of an antiquated society and education system is also evoked through the frequent twee references to tradition versus modernity.

Aside from the cultural stereotyping, the invention of core elements of the study including the tools, statistics, fictional students, and quotations, was both revealing and concerning in terms of how authentic the AI output sounds. The ability of Gen AI to fabricate specialised and often highly detailed information and present it in a believable manner is of significant concern in the context of academic integrity (Elkhatat, 2023). These fake statistics suggest significantly enhanced learner engagement categorised by increased tool usage, collaboration, participation and reflection, illustrating the predisposition of Gen AI to a positive outcome in this case. This is worrying as the authenticity and integrity of academic research may be increasingly called into question in the future. A sixth prompt seeking a reference list was originally included, but a decision was made to omit this as the resultant list was accompanied by a disclaimer highlighting the fictional nature of the sources and the necessity to replace them with 'actual' references.

Although the value of engaging with the opportunity to experiment and play with Gen AI is recognised, a deeply embedded 'ethical conscience' impacted on the completion of the work. The struggle with presenting work

not conceived entirely by the author proved challenging and this was intensified by the necessity to become conversant with the fabricated AI generated material. However, the AI output is impressive in terms of the clarity and logical progression of information, and while the suggested tools may not necessarily reflect the personal preferences of the author, they are valid choices.

The conclusions presented by ChatGPT reflect common research findings, for instance the fact that most technologies promote interactive and collaborative learning (Schindler et al, 2017) which can improve educational outcomes (Escotet, 2023) is widely recognised. Similarly, the challenge of over-reliance on technology and ideal usage complementing rather than replacing teaching and learning practices emerges frequently in narratives around technology enhanced learning. This may be applied to current concerns around AI-usage as can the flexibility of the technologies to create personalised and specialised learning pathways (Nah et al, 2023). The need for ongoing research and training as new technologies emerge is also recognised (Chan, 2023), and the suggested future pathways are aspirational, but thought-provoking. While these conclusions are not ground-breaking, they are relevant and reflective of the data ChatGPT is drawing upon.

Improvements to the approach could be made by training ChatGPT to replicate the author's writing style and by providing skillfully crafted prompts to produce a more nuanced output. Further professional development and engagement with emerging research would enhance the skills of the author in this regard. Despite the limitations and challenges of this exercise, valuable insights have emerged with implications for our pedagogical practices:

Using ChatGPT to complete a long scholarly piece (albeit fake) is more involved and time consuming than originally perceived.

Solid foundational knowledge of the topic and good prompting skills are required to benefit most from Gen AI.

The extent of cultural stereotyping revealed in this study is a stark reminder that warnings about bias need to be taken seriously.

The ability of Gen AI to produce detailed and convincing fictional outputs including statistics is concerning in terms of academic integrity and students consuming false information.

Finally, it is clear that engaging in training and experimentation with Gen AI is vital as this disruptive technology evolves and increasingly impacts on our practices. The decision to optimistically, but cautiously embrace it appears to be a good approach as AI not only permeates our professional lives but also becomes embedded in our society.

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7.2 Generative Artificial Intelligence: Implications and Considerations for Higher Education Practice

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Abstract:

Generative Artificial Intelligence (GAI) has emerged as a transformative force in higher education, offering both challenges and opportunities. This paper explores the multifaceted impact of GAI on academic work, with a focus on student life and in particular, the implications for international students. While GAI, exemplified by models like ChatGPT, has the potential to revolutionize education, concerns about academic integrity have risen, leading to debates on the use of AI detection tools. This literature review highlights the difficulties in reliably detecting AI-generated content, raising concerns about potential false accusations against students. It also discusses biases within AI models, emphasizing the need for fairness and equity in AI-based assessments. The paper highlights the disproportionate impact of GAI on international students, who face biases and discrimination. It highlights the potential for AI to mitigate these challenges by providing language support and accessibility features. Finally, this review acknowledges the disruptive potential of GAI in higher education and calls for a balanced approach that addresses both the challenges and opportunities it presents. It emphasizes the importance of AI literacy and ethical considerations in adopting AI technologies to ensure equitable access and positive outcomes for all students.

Keywords: Generative Artificial Intelligence; International students; ChatGPT; Academic Integrity; AI literacy, Academic Integrity

1. Introduction

When a development such as generative artificial intelligence (GAI) comes along, with the potential to disrupt almost every aspect of academic work, it is very easy to fall into the trap of using superlatives such as ‘game-changing’ and ‘seismic’. While ChatGPT has come to overwhelmingly dominate the early narrative about GAI, it is important to acknowledge that it

is essentially the most popular brand of a particular approach to GAI, but there are many other equally, if not more capable models (Perplexity.ai, BLOOM, ChatSonic; Claude; Bard, Whisper, Jasper Chat to name just a few). Such is the potential impact that GAI can, and indeed is already having, that one can be swept along at times alternating between hand-wringing portents of doom and the joyous embrace of potentialities. The truth (if indeed that is an appropriate term) is that the lines between artificial and reality are becoming increasingly blurred and we as individuals and as a collective may well need to adopt a new pragmatic approach to how we live, work, teach, and study that recognizes the very real likelihood that GAI will become as ubiquitous as the Internet itself in our everyday lives.

Paule Revere’s midnight ride on the 18th of April, 1775 where he alerted his compatriots that ‘The British are Coming’ forewarned the American militia in preparation for the subsequent battles at Lexington and Concord. ‘The British are Coming’ has subsequently been regarded as a call to arms in preparation for ‘battle’, and in this sense we are characterizing much of the narrative about assessments and GAI in similar terms. We are being presented with a plethora of dire warnings that academic integrity and disciplinary knowledge are under attack. There is vociferous saber-rattling by those who claim that this is yet another existential threat to the institution of higher education, and that the academic enterprise will surely be irreparably damaged by this new threat. We hear the call to arms (or perhaps, a dejected surrender!) that written assessments as we know them are, or will become redundant, and that a return to traditional invigilated pen and paper exams is the only way to ensure a return to order and integrity in higher education assessments. This type of moral panic is common and understandable with a disruption to institutional norms of this magnitude, but we argue that returning to past practices that were more secure but less reliable or valid as an assessment strategy would ultimately serve students poorly in preparation for a world where GAI tools will be woven through all aspects of their life and work.

2. What is Generative Artificial Intelligence?

Generative AI has become so ubiquitous in such a relatively short period of time that it may seem a little unnecessary to explain what is meant by the term. However, it is that level of ubiquity, and indeed pervasiveness, as well as the still emerging nature of the field, that makes it all the more important to clarify exactly what we are discussing in this paper, and how it works, as some of the concerns that arise from the use of GAI emanate from the way the models that underlie these tools are trained and subsequently operate. Generative AI refers to a class of artificial intelligence

systems designed to generate content or data, such as text, images, video, music, computer code, or even complex combinations of these media, that closely resembles human-created content. These systems use machine learning techniques, particularly deep learning, to understand and mimic patterns, styles, and structures found in the input data they are trained on [1-3]. Therein lies one of the issues with AI; it is not a neutral and objective ‘entity’; it depends on the quality of the data used in training, and the nature of the algorithms used, which can be subject to the human biases of their creators [4]. And while these biases can be at least partially accounted for, the process uses human intervention and exposure to the worst elements of the internet, often using poorly paid and vulnerable people to do this work that is ultimately harmful to them [5].

Generative Pre-trained Transformer (GPT) models, which underlie the popular ChatGPT tools, are based on the use of “publicly available digital content data (natural language processing [NLP]) to read and produce human-like text in several languages and can exhibit creativity in writing” [1 p.53]. Since the release of ChatGPT and its open API in November, 2022, this model and several similar rivals have been used to create literally thousands of AI-powered tools that are able to produce graphics and digital artworks; music; identify and describe images; produce and describe video content; and many more emerging applications. But arguably, it is the text generating capacity of GPT models that have attracted the most attention so far for their ability to mimic human writing. In academia, this attention has caused considerable anxiety, concern, and prognostication about the potential, often negatively conceived, impacts of these tools on knowledge creation, academic work, and the integrity of the academic enterprise [6]. These fears make the sector vulnerable to the claims of the technology snake oil industry, which offers techno-solutionism targeted at those fears, but which often does not live up to its promise.

3. GAI and academic integrity

The arrival of ChatGPT, and other GAI models close on its heels that are rapidly increasing in specificity, accuracy and efficacy, is fueling significant concerns about how these tools may be used to ‘cheat’ in academic programming - to circumvent academic norms around originality of thought and written text that is foundational to most understandings of the academic endeavour. While this concern is understandable in consideration of the long-held traditions of higher education, it reinforces the existing culture of privileging one form of knowledge representation - written text and particularly that written in English - over others. Valuing writing above other creative works makes this form of communication a target for techno-solutionism claiming to protect the integrity of the writing process [7]. In relation to this emerging threat to academic integrity, the responses from the higher education sector “have been varied and fragmented, ranging from those that have

rushed to implement full bans on the use of ChatGPT to others who have started to embrace it by publishing student guidance on how to engage with AI effectively and ethically” [8 pp.1-2].

As a result, a growing number of ed tech startups, as well as long-established technology companies, have suddenly turned their attention to developing tools that claim to be able to detect text generated by AI models, using the language of ‘protecting academic integrity’. In response to demands from the sector, OpenAI, the company behind ChatGPT, created a tool in January 2023 that was intended to detect content created by their own model, but the company warned early on that the nature of generative AI was such that it would be almost impossible to reliably detect AI-generated writing. In late July, 2023, they quietly sunsetted the tool, acknowledging that the efficacy was too low to use for most desired applications (e.g. to support accusations of cheating or integrity breaches and subsequent disciplinary proceedings), and there was potential to do harm by leaving the tool running. Even the academic integrity tech giant Turnitin, who released their own AI text detection tool in April 2023 [9] to much fanfare and claims of impossibly high accuracy had to walk back those claims a few months later when the evidence showed that the false negative, and more concerningly, false positive rates were both much higher than originally reported.

Research on the efficacy of a wide range of GAI detection tools is now beginning to become available (although most is still in pre-print or as yet not peer-reviewed at the time of writing) [e.g.10-15]. A universal theme throughout these studies is the conclusion that at present, it is impossible to reliably detect content generated with the assistance of AI, especially if it is adapted from the AI output. False positive and negative rates of these tools are unacceptably high for use as evidence of academic misconduct in situations where the use of such assistance is not approved [e.g. 16]. Even Originality.ai, a tool that currently has the highest success rate at detecting AI generated text content does not recommend the use of their tool and its outputs for academic disciplinary proceedings [17].

What does this mean for students, then? Unfortunately, while we now have evidence that the difficulty of using another technology in detecting AI generated text means that these tools should not be relied upon as sole evidence of academic misconduct, it is inevitable that some students will be accused on the basis of reports from these systems that are either institutionally procured (as in the case of the popular Turnitin platform already used by many institutions to detect writing similarity) or through the ethically questionable practice of submitting student work, without consent, to the multitude of freely available platforms that instructors could find with a simple online search. However, institutional faith in proprietary ‘plagiarism’ detection software may be misplaced if the study by Khali and Er [11] is indicative of their effectiveness. Submitting fifty short essays generated by ChatGPT through Turnitin

(n=25) and iThenticate (n=25) respectively, they reported that 40 out of the 50 returned scores indicating high levels of originality. It is to be expected that Turnitin's similarity checking tools would identify AI generated content as original simply because it is not copying text from other sources, rather, generating original text based on the prompt and therefore would have no basis for a comparison to existing text.

Interestingly, when Khali and Er reverse engineered the process and asked "is this text generated by a chatbot?" (p.9) ChatGPT identified 46/50 or 92% had been written by itself. This result is also not surprising, given that ChatGPT is trained to provide answers based on a prompt, not necessarily accurate answers (sometimes referred to as 'hallucinating'), so the framing of the prompt significantly impacts the directionality of the answer. In fact, this last point is of particular significance for those attempting to use ChatGPT to detect generative AI text. The reality is that "inputting a prompt and a string of text, ChatGPT will confidently state that most original texts are its own work, even excerpts from famous novels" [18]. The danger of an instructor relying on ChaptGPT to 'test' student papers for AI plagiarism is well illustrated by the experiences of the Texas A & M instructor Dr. Jared Mumm who failed his entire class on the basis of ChatGPT (incorrectly) claiming that every essay written by his class had been written by ChatGPT [18]. The uncritical reliance on reports from technology solutions, which are often difficult to interpret meaningfully for many people, has a long history of leading to inequitable and unfair treatment of students who may be accused of breaching integrity rules when they have in fact done nothing wrong.

4. Implications of Generative AI for International Students

The international education market has become critical to the financial sustainability of higher education sectors in several parts of the Western world, with Australia, the US, the UK and Canada the most popular destinations globally for students seeking an international education experience. These countries' higher education systems, particularly Canada and Australia, are heavily reliant on revenue from international students as public investment in higher education has become unsustainably low and forcing institutions to seek alternative revenues to fund the majority of their operations. This situation can sometimes lead to the demonization of international students - resentment for the places they take in higher education, inflated concerns about their contribution to the cost and scarcity of housing in university towns, and the fact that they are needed to prop up these under-funded education systems at all [e.g., 19].

There is also sometimes suspicion and assumptions about the motives of international students, and a belief that certain cultural groups are somehow trying to 'game' the system or 'cheat' their way to a valuable credential [20]. Such beliefs, which are usually held

without sound evidence, dehumanize international students, which, ironically, the academic integrity literature suggests is one of the conditions that increases the likelihood of students breaching academic integrity rules. Leask [21 p.183] notes that "Despite the difficulties associated with defining and detecting plagiarism, it is said to be on the increase, and students from 'other cultures' are frequently highlighted as being perpetrators of this crime against the academic community of enlightened Western scholars." This discourse of othering of students who come from beyond the dominant white Western culture is pervasive in the literature, with international students being portrayed as inferior, unable to think critically or learn in the superior Western culture, or as desperate inferior learners whose only hope of success is to plagiarise [21].

There are undertones of bias and racism in the way that academic integrity charges are brought against international students, with the term 'international students' often being used pejoratively, and as a euphemism for non-white or of non-European background [20]. In her review of the University of Windsor's (Ontario, Canada) academic integrity processes and procedures that showed a disproportionate number of students of colour being charged with academic integrity violations, Christensen Hughes [22] noted that some faculty appeared to be deliberately targeting students from visible minorities. This is likely related to the unfounded belief that students from these minority groups are more likely to cheat than their domestic counterparts.

Of similar concern, Liang et al. [23] found that several of the most widely-used AI detectors consistently misclassified non-native English writers' content as being generated by AI, while native English writing samples were more likely to be accurately identified, suggesting a significant bias against certain linguistic patterns. This is an artefact of the extant biases in the data that most models are trained on, but to an instructor who already believes or suspects that international students are pre-disposed to cheating, it would confirm the pre-existing bias. And be likely to lead to international students being falsely accused of mis-use of GAI tools at a higher rate than their domestic student counterparts, posing obvious concerns for equity and fairness.

Another potential concern for equity, especially in institutions that condone the use of AI detection tools, is that there will always be a lag between the latest AI models and any potential tools designed to detect their outputs, creating a self-reinforcing challenge where those who have access to the latest models have an advantage over those who don't [24]. Access to the latest models will inevitably come at a cost, so only those who can afford that cost will be able to use them. What that means practically is that students with the resources to buy access to the best AI tools will have an advantage over those who can't, not just because the model may produce better outputs, but because they are also less likely to get caught by any detector trained to look for outputs from earlier models. This reinforces existing inequities and potentially unfairly targets learners with the least access to resources, and suggests that

institutionally procured or developed and supported AI systems may be necessary to ensure equitable access for all students. Authors should discuss the results and how they can be interpreted from the perspective of previous studies and of the working hypotheses. The findings and their implications should be discussed in the broadest context possible. Future research directions may also be highlighted.

5. Potential positives for students

While there are many concerns about the potential for GAI to be used inequitably or harmfully against students, and particularly international students or those for whom English is an additional language [25], we acknowledge the more hopeful view that these tools also have the potential to provide a number of benefits for diverse student groups. The first and most obvious is the potential for AI to act as a personal language tutor. Thousands of international students coming into Western education systems enter English language preparation programs every year to prepare them for university-level communication. The conversational nature of AI bots based on Large Language Models (LLMs) makes them a good fit to provide a low-stakes, personal, adaptive language tutor that international students could use to improve their written or spoken English. Models could even be trained on local terminology and idioms so that they could explain these to learners in context. To be clear, we see these developments as augmenting the experience of intensive English language learning, rather than replacing the existing approaches, but they would provide some flexibility and reinforcement that is often not available in traditional in-person models that are currently common in English language preparation programs [e.g. 26,27].

While the advantages of extensive personalized learning and feedback are well known, reconciling how that might be achieved in practice has until very recently been less evident, all the more so in the context of increased workloads for many educators. Educational chatbots have been available since the early 2010s, but the rapidly increasing availability of more and more powerful AI software and datasets means that reliable alternative (non-human) real-time support is now an achievable reality [28]. Kaplan-Rakowski et al. [3 p.316] argue that chatbots "can engage students in interactive, conversational ways and provide immediate answers to questions, which minimises delays in learners' progress due to waiting for teachers' responses". Given the multifaceted and increasingly complex nature of the student experience, we need to grasp any tool or strategy that can have a positive impact on student wellbeing. For example, a study by Wu et al. [29 p.77798] reported that student engagement with a responsive chatbot that acted as both a teaching assistant and companion, "could reduce feelings of isolation and detachment with greater effect than teacher counselling services".

Beyond general chatbot tutors, some of the most significant capabilities lie in the specific rather than the general. By that we mean that we see real potential to impact learning with the development of AI tools

that are trained specifically on the information corpus of a course (such as the ProfBot application (<https://profbot-2.vercel.app/>) from Toronto Metropolitan University's Dr. Sean Wise that is currently in beta [30] or an individual textbook (such as MathGPT, which was trained as a tutor for open access maths texts, but can be expanded to any textbook) [31]. With tools like this, the AI acts as a personal study buddy, capable of explaining concepts in multiple ways, responding to questions, creating bespoke questions/quizzes based on the content of the course or textbook, and providing feedback on student work. These tools will feasibly be able to translate and explain concepts written in English to multiple languages, which may significantly impact learning of students in real time by helping them make the connection between the English version and their preferred language. One can easily imagine the potential reduction in cognitive load this could bring about for newcomers if they can expend less cognitive capacity on trying to grasp concepts only previously available in English.

With increasing globalization of higher education and international students coming to English speaking education from significantly more diverse linguistic backgrounds, AI supports based on polyglot models such as BLOOM [32] have the potential to ease the transition for many of them by offering contextual, real-time translation into multiple languages. These translations could be based on audio, text, or even images and video. It is likely that students will use these tools to improve their writing in English, especially if they are trained and encouraged to use them ethically and appropriately.

A further potential positive impact of AI for international students lies in the possibilities these tools offer to students with disabilities. International students with disabilities face all the same discrimination and challenges that local students with disabilities do, but they have to do so on top of trying to become culturally and linguistically fluent, learning about systems and practices that are often extremely foreign to them [e.g. 33, 34]. International students are often unaware of the supports available to them in their new institution, struggle to navigate the formal accommodation process, and can also experience personal cultural barriers to self-identifying as having disability or requiring additional support if their previous cultural experience does not recognise disability in the same way as in the Western educational context [e.g. 35]. This can be especially challenging for students with invisible or hidden disabilities [33]. Approaching these challenges through a Universal Design for Learning (UDL) approach would require a shift in curriculum development and support to reduce or remove barriers to students, without the need for one-off adaptations for many students [e.g., 36].

One way to achieve at least some of the goals of UDL [37] would be to offer AI as an assistive tool for all

learners, which would help to level the playing field for students with disabilities. For example, learners who need a note taker to create notes for them could use a tool like Otter.ai to capture and summarize the class, providing a searchable digital starting point for the learner to work from. Bespoke solutions may even be able to be trained to provide content or support in the format best suited to the learner's needs. For example, a learner with a particular need for a visual representation such as a concept map could generate that from their class notes and readings as a starting point for study. Many institutions already allow or encourage students to use assistive AI technologies such as Grammarly to check their written work, and GAI tools are very similar in functionality. They are also rapidly becoming incorporated into office productivity suites (such as Office 365 and the Google Suite), so will become a normal part of the accessibility workflow for many people. It is important that a lack of AI literacy does not lead to unfair or unrealistic restrictions on tools that have the potential to improve the lives of many people who currently face barriers to full participation in society. This section is not mandatory but can be added to the manuscript if the discussion is unusually long or complex.

5. The Need for AI Literacy in Higher Education

Despite the inevitable hand-wringing and moral panic from certain elements of the education world, the reality is that GAI is with us now (even in instances where you may not be aware of it) and will only continue to become a normalised part of our lives. This new reality is resulting in a shift in terms of what is considered to be part of the modern individual's essential 'toolkit' of competencies; "just as traditional literacy skills have been associated with individual rights, understanding AI is essential in the AI era [38 p.354]. The increasingly widespread use of AI across all aspects of society has "created a need for us to not only be able to use AI (even when we do not realise it) but to also have a greater understanding of its broad applications, usefulness, limitations, and biases" [39 p.3]. If our aim is to equip our students with skills, knowledge, and competencies that will allow them to thrive in the 21st Century, then we need to rapidly adapt our programming to include AI literacy and competency across the disciplines. That means that academics and staff in universities need to develop literacy in the applications of AI to their own disciplines. AI literacy can be thought of as an extension of digital or ICT literacy, but the different affordances, risks and ethical questions that arise from their use require a specific set of skills and critical faculties that go beyond general technology literacy, incorporating elements of functional and social literacy as well [38 & 40].

Several potential frameworks for AI literacy and competency in education are starting to emerge [41 - 43]. For something as dynamic as AI, we are mindful that any framework/s we suggest can necessarily be somewhat limited and timebound. Nonetheless, we feel that the work of Ng. et al [41] and Hillier [42] provide a useful

way to reflect on where your current knowledge and practice of AI is situated and identify perhaps where you wish to progress it too.

5.1 – Ng et al.'s Framework

Ng et. al's [41] exploratory review of AI literacies provides a granular and graduated way of conceptualising AI literacy. From their review, they identified four aspects of AI literacy. The most 'basic' aspect is a rather functional understanding of literacy in terms of simply knowing and understanding AI where users need training in the acquisition of "fundamental concepts, skills, knowledge and attitudes that require no prior knowledge" [41 p.4]. The second aspect is an ability to use and apply AI in a manner that goes beyond acquisition of 'know how' knowledge. This level seeks to "to educate citizens to understand AI applications and how it can affect our lives, as well as knowing the ethical issues regarding AI technologies" [41 p.4]. The third aspect of AI literacy that they identify moves the dial on from being simply users of AI to a capacity of being able to evaluate and create AI. Finally, as a way of mapping these literacies they "proposed to assign these three aspects (i.e., know and understand, use, and evaluate and create AI) into the cognitive levels of Bloom's Taxonomy" [41 p.4] Thus they assigned "Know and Understand AI" to the bottom two levels of the Taxonomy; "Use and Apply" to the middle 'apply' level with "Evaluate and Create AI" assigned to the three higher cognitive levels of 'analyze', 'evaluate' and 'create'.

5.2 Hillier's Framework

Matthew Hillier's [42] proposed AI literacy framework offers another useful starting point for academics, staff and students who need to become proficient and comfortable with the use of AI tools. From our perspective we believe that it is a particularly useful framework as it "is focused on a user perspective rather than a developer perspective because the majority of students will sit in the former category" [42] The framework includes five basic elements:

Ethical use of AI tools

While he acknowledges that a number of the legal and ethical issues are still to be resolved, he proposes that users should familiarize themselves with issues regarding: algorithm transparency, data ownership; privacy, hidden labor, embedded bias and undisclosed plagiarism.

Knowledge of AI affordances

Given the sheer number of AI tools currently available, it is practically impossible to have a comprehensive knowledge of all tools. Nevertheless, users should familiarise themselves with the capabilities and limitations, including the key risks and benefits of the tools that they are using.

Working effectively with AI tools

This element moves from being a more passive user, to the 'user-as-developer' approach, and encourages educators to "leverage free, open access online resources...then work with students to develop unit specific examples and lead discussion on the effective use of tools relevant to the discipline, unit or assessment task context" [42].

Evaluation of AI output

Developing an ability to interrogate and critically analyze content is a key 21st century graduate attribute. As previously noted, "Generative AI is known to hallucinate to produce plausible, but false information in its output (such as fake references) and so being able to evaluate the output for its quality is a key capability in making use of AI tools" [42].

Use and integration into practice

Given the implications that AI represents in the workplace, it is vital that "educators can collaborate with students to explore how industry are adopting generative AI tools, how it is impacting workflows and productivity as well as how industry can navigate the emergent issues that these tools bring" [42]. Quite simply, students will be entering a workforce where an ability to use AI will be an integral element of many of their roles; consequently, they need to be capable of embracing this new reality.

5.3 Proposing a Framework

Proposing a framework for a landscape as complex and rapidly changing as AI in education may seem like a fraught exercise given that it is almost impossible to predict where the evolution of these tools will lead. Literacy frameworks such as those discussed here should be considered more like a compass than a map in that they indicate a general direction we should strive to head in, rather than an exact path to get there. Universities should be critical places helping to shape the ethical and equitable development and use of AI, and university staff will need to be AI literate to avoid perpetuating or creating inequities for diverse learners. As the two frameworks illustrate, there is a range of available literacies, ranging from the functionalist level of skills and knowledge acquisition up to the level where you are encouraged to adopt a critical examination of the implications of AI use. However we choose to address AI literacy as a sector, it is clear that we cannot ignore these skills as a requirement to fully participate in an AI-infused society, and need to begin building those skills into our programs immediately. You of course free to choose how you access and interact with AI systems, but perhaps you will consider "the need to recognize the importance of establishing an educational environment that places paramount value on fostering critical thinking, encouraging self-reflection and empowering students to actively engage in the learning process" [44 p. 4].

5. Conclusions

Even though AI has been around for a long time in various forms, the capabilities of the current crop of AI technologies using Large Language Models has the potential to be vastly more disruptive to higher education and society at large than previous iterations. We are already seeing that minority and marginalized students, especially international students, are being accused of breaching academic integrity rules by using AI assistance in their assessment at higher rates than their domestic colleagues, perpetuating an existing inequitable pattern.

By the same token, these technologies have the potential for positive impacts, with international students and students with disabilities likely to have access to assistive technologies that could significantly help them learn and succeed. As educators, students, institutions, and policymakers grapple with the implications of GAI, it is imperative that we prioritize ethical AI usage, cultivate AI literacy, and develop frameworks that empower students and educators to harness the full potential of these technologies.

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7.3 Postgraduate Supervision in a ChatGPT World: What's Next?

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Abstract

This study explores the considerable challenges for research supervisors of postgraduate students in Higher Education. For experienced academics, the responsibility of assessing theses and dissertations has never been more critical. With the advent of ample search engine opportunities, Generative Artificial Intelligence (Gen AI) technology, and adhering to proper academic integrity processes, how can supervisors navigate these complexities, unsupported by solid procedures, due to the rapidly changing nature of AI? If a supervisor is concerned as to the integrity of the presented work during the supervisory process, what options are available to the supervisor to address concerns with the student in an informed and protected way? This work draws from theoretical perspectives, discussions with research supervisors, including early career supervisors, collegial deliberations, and considerations.

This paper will explore what research supervision is and the challenges associated therein. Recommendations for best practice will be presented for discussion during the proceedings.

Keywords: Research Supervision; Artificial Intelligence (AI); ChatGPT; Higher Education Supervisory Challenges.

1. Introduction

Acting as a research supervisor in Higher Education (HE) is challenging and complex. Many academics and lecturers avoid it entirely mainly due to the fear of the nature of this type of student engagement. Discussions with colleagues reveal a preference for traditional educational delivery; general lecturer/ student interaction in a lecture hall setting. Many reasons exist for this; first, it is a much more formal process; second; the learning process is mostly at a distance, is pre-prepared; third; personal interaction is limited, fourth, many are comfortable with tried and tested delivery methods. Adding in nouveau complexities of contract cheating, Artificial Intelligence (AI) using ChatGPT; a game changer and disruptor in HE, academic weariness is heightened as many Universities try to better understand AI and ChatGPT. The vastness and implications of these AI tools are not clarified for most staff, with few policies or clear strategies in place to work with it, against it, embrace or ban it. Overall, lecturers believe that they are more protected and less exposed in the traditional approaches of delivery. If, however, academics continued only with traditional modes of education, avoiding all forms of research supervision, valuable academic output, or the encouragement of future expert super-

visors will not be fostered. Academic outcomes and higher research levels are essential where new contributions are the foundation of progress in each discipline to improve practice and knowledge (Wright, 2020). What guidance/best practices are available for supervisors, however? Government publications in Ireland outline "research excellence is fundamental" to the quality of research activity and "involves an evolving range of research practices that research performers need to embed" (Gov.ie). The HEA's Principles of Good Practice in Research in Irish Higher Education Institutions (2019) provide "a clear and consistent framework for HE institutions" (Gov.ie), however, can this keep pace with technology and AI? University recommendations are to create assessments that cannot use AI, however, the very nature of a dissertation is detailed extended text, and the issue with Gen AI is it struggles to generate accurate reliable citations, for now. This machine learning tool will learn and evolve, however. Researching for this paper, reading Cotton et al. (2023) was interesting. Most of their paper was written using Gen AI. It was eye opening, yet hopeful, as there are evident issues with ChatGPT. The paper here presents an overview of the situation faced by research supervisors by examining the practical contributions using the literature review as a method (Snyder, 2019).

2. Approach: Aim, Objectives, Method

The main aim here is to examine the supervisory dynamic for educators in tertiary education. Specific objectives include reviewing and outlining the challenges faced by research supervisors, identifying pertinent issues and best practices, finding opportunities for improvement, development, and training; identifying ways to support lecturers to supervise; reflection on AI but not expecting to find any immediate solutions. To garner a deep appreciation of the concepts and challenges in relation to research supervision, first an extensive review of the relevant literature was undertaken through searches in Science Direct, Scopus, EBSCOHOST, and University Websites, Government and HE websites such as, QQI (Quality & Qualifications Ireland) and the HEA (Higher Education Authority), the Department of Further and Higher Education, and the National Academic Integrity Network (NAIN) to understand the current and situational context for Tertiary education and the impacts on research supervision. Informal discussions with colleagues took place across various disciplines and geographies to understand challenges. From this, current and future research approaches are identified to try to establish the existing fears in this educational context and with a view to identifying the next steps in the process. The aim of the approach is to establish a base line and from here, look for support to produce additional tool kits and training opportunities. Documentation and policies exist, but they do not include direction for AI specifically. Next steps will include interviewing relevant HE supervisors and identifying future lecturers interested in supervision to gather further information to inform tool kit development. This tool kit will be developed with the support of N-TUTORR[1] which

was established for the transformation of learning in the Technological Universities in Ireland. This work is pertinent, relevant, applicable, and transferrable across transnational international HE Institutions.

3. Understanding Research Supervision

Quality high level research supervision is expected in HE where robust quality assurance underpins all supervision especially at doctoral level (HEA.ie). For doctoral education, the core element is the advancement of knowledge, original research, and critical thinking. For supervisors, this is underpinned by academic freedom and innovative thinking (HEA.ie). Considered a nurturer and the most advanced level (Zhao, 2001), research supervision is the highest level of delivery. It requires multitasking with intricate skills, expert field work and knowledge, stakeholder management, navigating funding bodies and sensitive relationship management. Relationship management/dynamics between the parties (student/lecturer) are often complex, however, in many cases little advice is available, particularly, to early career supervisors. Many are fearful of showing weakness in fear of impacting careers (Wright, 2020). In many ways it's a marriage, both parties start out with the best intentions, hopes and aspirations, however, unforeseen circumstances and differing outcomes/outlooks can drastically change the dynamic. Research students start this marriage looking for optimal supervision (Zhao, 2001); supervisors are often looking for outputs, publications, grant writing and reduced time-tabling. So, like all marriages it is a shared process. In Ireland, the National Framework for Doctoral Education proposes excellence in all forms of doctoral education while providing a set of principles. It is consistent with European and international standards including the Salzburg principles, the Salzburg II recommendations, and Principles for Innovative Doctoral training (HEA.ie). In the UK, The Good Supervisory Practice Framework (Taylor, 2019), acknowledges the highly complex and demanding roles in modern research supervision, however, issues of GenAI are too recent and were unforeseen to be included. When it comes to supervisory approaches, many exist. (Gatfield, 2005; Lee, 2007); and (Lee, 2007; Lucey et al., 2021) advocate mentoring. In contrast, Zhao (2001) uses rigorous research plans with no 'ad hoc' methods. In the new landscape, previous concerns of managing dynamics, quality outputs, gender balance, fade as nothing could have prepared supervisors for ChatGPT.

3.1 The Use of Artificial Intelligence (AI) ChatGPT

The use of AI by students is becoming a major concern for Universities, especially with long written assessments. Many tools exist that can be used to generate content, and ChatGPT is most used due to its "user friendly" application (Li et al., 2023). It is an AI chatbot that can understand context, nuance, humour, built on OpenAI's foundational large language models (LLMs) like GPT-4 and its predecessors proving that machines can 'learn' the complexities of human language and interaction (Marr, 2023). OpenAI released an early demo of ChatGPT (November 30, 2022) and this chatbot went

viral on social media as users shared its capabilities. GPT-4, the latest most advanced can write and answer anything (Marr, 2023). This rapidly advancing tool has profound impacts on how academics examine, particularly postgraduate work. ChatGPT changes dynamics, roles and trust (Dai et al., 2023) when writing a dissertation/thesis[2]. Currently, HE institutions are challenged to provide guidelines/best practice for supervisors because of advancement in speed of machine learning. By the time a document is written and released to staff, AI has galloped on leaving academics in its wake. To better understand AI, Li et al. (2023) examined agreed use of ChatGPT with three of their Ph.D. students' interaction with ChatGPT. Findings uncover benefits like quick reference and effective self-teaching. Li et al., (2023) note some Universities agree to its use with faculty knowledge; but where does plagiarism fit in this debacle?

3.1.2 Plagiarism

Concerns such as the grave issue of plagiarism and resulting disciplinary procedures with ChatGPT exist. Plagiarism, defined as "the action of taking someone else's work, idea and passing it off as one's own; theft [oed.com; mtu.ie(c)]; from the Latin plagiarius, 'kidnapping' (Oxfordreference.com). The University of Oxford goes further providing clarity on AI; "all published and unpublished material, whether in manuscript, printed or electronic form, . . .and material generated wholly or in part through AI (except AI pre-authorized)" (ox.ac.uk). When discussing ChatGPT with colleagues, the first concerns are 'where does this sit with current regulations on plagiarism? Consulting new guidelines (Mt.u.ie(b)) finds use of AI "should be viewed as explicit instances of plagiarism". Without any policy of intervention, ChatGPT is here to stay, and employers will want graduates to use these tools. So, how students can take advantage of ChatGPT while embracing integrity is what educators need to consider.

3.2 Discussion

Creative and imaginative ways to use AI to engage students and personalise learning experiences exist (Cotton et al., 2023), still, plagiarism concerns remain within the overall purpose of HE. This gray area could devalue degrees but will depend on each HE Institution's procedures developed and aligned with HE policy. Interestingly, Cotton et al. (2023) tested ChatGPT with colleagues and wrote an academic paper on ChatGPT and students using ChatGPT. They found ChatGPT provided cohesive relevant writing, however, the content was repetitive and did not have critique, or analytical capacity. Reading their artificial paper, the researcher finds cohesive very logical writing, lacking creativity, new insights, or learnings. The main findings are that AI tools at this moment generate very similar writings on any one topic; if generated for multiple students, then patterns will arise leading to detection with the correct University tools. Titchener and Greene, (2023) advise that integrity concerns will arise throughout a candidature and resolve these promptly to avoid inappropriate practices that can become deep rooted and carry forward within the future culture of the student when they

are supervisors. Dai et al., (2023) explore the impact of ChatGPT on five dimensions of research supervision approaches such as functional, enculturation, critical thinking, emancipation and relationship development through perspectives of 20 postgraduate research students with 4 month's experience of approved use of ChatGPT. They find that ChatGPT "accelerated research progress, enhanced research quality, improved scholarly development and professional skills, enhanced critical thinking, increased student confidence and autonomy and a deeper supervisory relationship" (Dai et al., 2023). Certainly, Dai et al., (2023) provide a different perspective and suggest a change in roles and duties of supervisors and postgraduates; supervisors outline high-level guidance, students move from novices to self-directed researchers using ChatGPT. Cotton et al., (2023) conclude that while the use of AI presents opportunities and challenges, Universities can effectively address concerns by taking a proactive and ethical approach to the use of these tools, while Dai et al., (2023) conclude there will be an evolving model of postgraduate supervision where technology serves as 'epistemological tools' enhancing supervision. Kelly (2023) says we must engage in AI literacy and consider how we assess. From the student perspective, Dai et al., (2023) found that where postgraduates used ChatGPT (with permission), they understood more of the capacities of it, and progressed to tailor it to their needs. However, of concern are issues of authenticity and accuracy in AI outputs (Sikstrom, 2023). Obviously for a dissertation, this is unnerving, so, Dai et al. (2023) note students stopped using it and cross-validated sources. This demonstrates students learned from using the tool, and gained an in depth understanding of it, changing their approach when using ChatGPT.

4. Recommendations: Supervisory Responsibilities and Best Practice

Academic supervisors are in pivotal positions to guide practice and must not shy away from challenges (Wright, 2020). Supervisors hold key positions to mentor and ensure students have appropriate robust grounding in conduct (Lucey et al., 2021; Titchener and Greene, 2023). Supervisors must stay current, undertaking professional development, improving practice where possible, (Taylor, 2019) especially now with AI. Many supervisors are not afforded specific supervision training (Wright, 2020) and for most Tertiary Institutions, no compulsory modules, or training exist. However, all HE institutions must be placed to support supervisors and provide training. Now is the time to further collaborate (Wright, 2020) to see what processes are in place through proven evaluated programmes in an international capacity. Postgraduate students struggle in terms of what is required of them, therefore more formal class work with support will be beneficial (Wright, 2020) with clear roadmaps (Gatfield, 2005). Opportunities are there to empower learners and staff capabilities. Supervisors must abandon 'ad hoc' approaches (Wright, 2020) for postgraduate supervision to more formalized structured approaches with scaffolds. Government funded projects exist to transform HE such as N-TUTORR in Ireland, for HE to progress

towards sustainable educational; now is the time to act and embed correct approaches. Universities endeavor to engage in creating AI literacy curricula and protocols for staff and students for responsible use of generative AI tools (Dai et al., 2023). Awdry (2023) believes there is a place for AI once students are supported to work with integrity that deters them from cheating. In an Irish context, QQI established The National Academic Integrity Network (NAIN)[3]. NAIN is framed by the challenges of contract cheating, established under new legislation tackling providers of contract cheating (Kelly, 2023). NAIN draws from national and international guidance to engage with challenges of academic misconduct; embed a culture of academic integrity and develop tools for providers.

4.1 Recommendations & Conclusions

Change will only be affected if emerging good practices are embedded across research disciplines (Gov.ie). The introduction of new HEA legislation[4] for AI clarifies and enhances oversight, governance, and relationships for HE. The Irish Government are committed to ensure Principles of Good Practice are implemented by HE institutions (Gov.ie) and supervisors must be guided here. Future investments, resources and training will be substantial for Governments as they move positively ahead. Future assessment strategies must reflect what is happening with AI (Kelly, 2023) and postgraduate programmes can leverage generative AI tools for AI-enhanced research supervision models (Dai et al., 2023). Start immediately with discussions with colleagues, don't be afraid to outline fears, join communities of practice, look for training, tools, and support. Encourage students to 'own' their work, use robust practices, and be proud of what they produce with no risk of future challenges. What are the differences now in terms of plagiarism? There are none. Concepts are the same, if you copy any content, ideas that are not your own, either human or AI generated, this is plagiarism. It is reminiscent of the initial debate of Wikipedia use, students were told, if you want to 'google' and consult Wikipedia, do, however, it is not an academic source, not legitimate, cannot be authenticated and therefore cannot be used in HE. Supervisors and postgraduate students, Theses and dissertations need the "construction of nuanced arguments" [MTU.ie (b)], the development of empirical, critical, creative thinking; ChatGPT hasn't 'Learned That Yet'!

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[4] New legislation for this for the first time in fifty years

7.4 Designing Authentic Assessment to Improve Academic Integrity

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Abstract

The use of AI chatbots has sparked worldwide debate regarding assessment practices in higher education. Early indications on the use of AI chatbots, signal significant disruption to the higher education system in relation to academic misconduct concern. In terms of the research approach, initially, a systematic literature review was conducted to examine the association between academic integrity and authentic assessment with 32 focused publications from 2019 to 2023 analysed. This led to the development of a robust 'Model for Practice' to guide the implementation of authentic assessment in a way that simultaneously improved academic integrity. This paper presents the main findings of a case study approach with two final year student groups whose teaching and assessment schedule was based on this Model. Results show that the Model addresses the issue of assessing students in a manner that engages students, improves their employability skills, and ensures adherence to academic integrity guidelines.

Keywords: Authentic Assessment & Design; Academic Integrity; Contract Cheating; Academic Misconduct; ChatGPT

1. Introduction

The rapid launch of ChatGPT in November 2022 has resulted in a dearth of educational research into the relationship between assessment design and the use of advanced machine learning algorithms in higher education. This lack of literature, along with the changing educational landscape, has motivated the current study exploring the impact of authentic assessment design on academic integrity. The uncertainty surrounding ChatGPT has led to widespread disparity on the possible implications for higher education, with some studies warning of a potentially catastrophic impact on assessment, and others dismissing these concerns, stating that ChatGPT may bring opportunities in terms of new modes of learning and assisting educators. The necessity for higher education institutions to produce 'employment ready' graduates has positioned authentic assessment as a primary tool for developing students' professional skills needed for today's multifaceted workplace (Ajjawi et al. 2023). The acquisition of these employability skills, however, is reliant on evaluation and assessment procedures that hold students to

the highest academic standards. The legitimacy of a higher education institution will be undermined if the institution cannot guarantee that an assessment accurately measures student learning. Although guidance on how authentic assessment can incorporate ChatGPT will undoubtedly increase, the novelty of such studies means that empirical evidence is urgently required to support this guidance and to ensure confidence in any findings.

2. Research Context: Authentic Assessment and Academic Integrity

Authenticity has long been recognised as an inherently valuable characteristic of assessment design (Ajjawi et al., 2023). Authentic assessment is defined as 'assessment which aims to engage students in real-world scenarios that are complex, ambiguous, and unpredictable, to simulate the real-life situations and problems that students will face in their careers (Bretag et al., 2019). Authentic assessment has emerged as an alternative to standard exams, which emphasise memorisation and recall and, instead, aims to assist students in contextualising their learning, encourage internal motivation, promote inclusion, and improve higher-order critical thinking, problem-solving, application and self-reflection skills (Sotiriadou et al., 2020).

Bretag et al., (2019) define academic integrity as compliance with ethical, moral, and professional principles, values and standards that serve as guidance for making decisions and taking action in education, research, and scholarship institutions. Ellis et al., (2020) state that there is a growing awareness of new academic misconduct practices, such as contract cheating, in higher education institutions and yet there are no definitive answers in relation to the volume of assessments procured through contract cheating providers, and the optimal management and penalisation processes for academic misconduct. Academic misconduct threatens academic standards, quality, and credibility in higher education, leading institutions, and regulators globally to urgently explore potential solutions. Maintaining the trust placed in assessment and its ability to ensure that students have demonstrated learning to a level that is worthy of an award is critical in combatting academic misconduct. Assessment needs to evolve along with a changing academic integrity landscape to ensure that students who engage in academic misconduct are not awarded a qualification that they have not earned (Ellis et al., 2020).

It is proposed that authentic assessment should be at the forefront of an assessment movement that addresses; the requirement for improved student equity, the rise of artificial intelligence, and threats to academic integrity in higher education (Ajjawi et al., 2023). Studies have challenged the view of authentic assess-

ment as an academic integrity panacea; for example, although authentic assessment may reduce academic integrity breaches, there is no one assessment that can prevent it, and, furthermore, the assessment type itself is not enough to address academic misconduct (Bretag et al., 2019). Moreover, the real-world, career-focused, complex problem-solving task aspects of authentic assessment may be overly complicated for academically and linguistically diverse students (Ellis et al., 2020). Additionally, lecturers may lack resources to provide scaffolded support to students, leading students to seek assistance from illicit sources. Nevertheless, there is sustained interest in authentic assessment, and its place in the pedagogical environment cannot be disputed. Evidence supporting the claim that authentic assessment is the solution to academic integrity remains absent. This paper aims to address the research question; "Can Authentic Assessment Design Improve Academic Integrity?"

3. Methodology

3.1. Systematic Literature Review

The initial research method employed in this paper was a systematic literature review, where clearly defined searches, rigorous inclusion criteria, and comprehension evaluations were used. The article searches used Scopus, Taylor and Francis, ERIC and Science Direct databases to provide a comprehensive, multi-disciplinary view of the relationship between authentic assessment and academic integrity. Articles were included if they were peer-reviewed, written in English and focused on higher education. Articles before 2019 were excluded due to the plagiarism focus, as this study aims to incorporate new cheating practices. Articles were included for further analysis if the title, abstract or keywords included the keywords 'authentic assessment/task/learning' and 'academic integrity/misconduct/

Table 1. Theoretical Perspectives on Authentic Assessment Design to Improve Academic Integrity

Theoretical Perspective	Authentic Assessment	Academic Integrity	Main Authors
Well-Timed, Personal, Unique Tasks Engagement	Adequate time, Personalised; Evidence gathering	Meaningful; Verifies participation; Peer pressure	Sotiriadou et al., 2020
Complexity	Active contribution; Students as partners	Motivation; Partnership gives students support	Bretag et al., 2019; Ellis et al., 2020
Teaching & Learning Environment	Scaffolded complex tasks; Group work; External engagement	Difficult to outsource complex tasks; External scrutiny	Bretag et al., 2019; Ellis et al., 2020
Scaffolding	Personalised teaching, feedback; Student-lecturer relationship; Clear assessment requirements	Lecturer detection due to student ability awareness; Early identification of struggling students	Harper, Bretag and Rundle, 2021
Support/Instructional Material	Distinct, interconnected, progressive, reflective assessment components	Subsequent progressive tasks; Reflecting on class and group sessions; Feedback on each task	Bretag et al., 2019; Ellis et al., 2020; Sotiriadou et al., 2020
Inclusion	Assessment support; Clear instructions; Lecturer recordings; Exemplars; Rubrics; Training	Expectations clarified; Student understanding of assessment requirements and marking criteria	Sotiriadou et al., 2020
Feedback	Assessment and Rubric Co-Design	Refine assessment design; Adapt to learning styles	Sotiriadou et al., 2020
Industry Partners Culture	Peer feedback; Feed-forward	Familiarity with work; Learning Ownership; Student-lecturer dialogue	Bretag et al., 2019
Assessment Type	Partner with a company; Real-world setting	Presenting externally; Employment opportunities	Ellis et al., 2020
	Assessment Design to minimise cheating; Supportive environment	Promote academic integrity culture and visuals; Dedicated staff	Ellis et al., 2020
	In-Class Tasks; Personalised work; Orals/Vivas; Reflections	Random nature of lecturer questions; Defending personal work	Harper, Bretag and Rundle, 2021

Based on a summary of the systematic literature review and resulting theoretical perspectives, six characteristics are recommended as essential authentic assessment design features. The proposed framework (Figure 1), developed in this study, displays these characteristics, and it is proposed as part of this research, that the design should minimise academic misconduct, and improve student engagement and employability skills. The framework recognises that a holistic academic integrity culture and lecturer assistance are necessary for implementation.

Figure 1. Authentic Assessment Design Framework

3.2. Implementation

To explore an authentic assessment approach with the students, the authentic assessment characteristics and theoretical perspectives were broken down here into a weekly implementation plan for a 13-week semester, as shown in Figure 2.

Figure 2. Authentic Assessment Weekly Implementation Plan

This plan was implemented with two final year student groups – Marketing (97 students) and Home Economics and Business (32 students) taking a mandatory Corporate Strategy module. The industry partner for the authentic assessment element was the Marina Market, a local market to the University and City consisting of a multipurpose venue with an indoor food hall set up in an old warehouse with 40 vendors permanently occupying the space. Confirmation was sought that all students visited the Marina Market before deciding on this partner, so that no student would be disadvantaged. Representatives from the Marina Market presented information on the businesses and outlined that they were seeking unique event ideas for their venue. Students formed groups and took part in a rubric co-design workshop where they were provided with a past assignment rubric and asked to suggest changes individually using an online discussion forum on the learning management system, Canvas. Students could not view suggestions from their peers until they commented. Marks for this element (5% of module) depended on critical thought process leading to the students' suggestions. The lecturer analysed all suggestions, altered the rubric, and recorded a tutorial explaining the rubric, marking criteria and all assignment requirements, and posted this recording on Canvas.

The main assessment task (32%) was to carry out a strategic analysis of the Marina Market and students proposed that this be presented in a 'scrapbook' document, consisting of a mix of visuals to evidence their learning and analysis in text format. An exemplar workshop took place, where students reviewed examples of past assignments, graded, and ranked each assignment and provided feedback. The presentation (30%) focused entirely on the students' event idea for the Marina Market, to tie in with industry partners' requirements. Students submitted drafts of their event ideas anonymously to Canvas. Each idea was reviewed by two peer groups and feedback returned anonymously.

Students were awarded up to 8% for this peer feedback process depending on the quality of the feedback provided. Lecturer-student feed-forward sessions took place before the scrapbook and presentations were completed. Finally, students were asked to reflect on the experience (25%) and express their thoughts on authentic assessments' role in upholding academic integrity. A quantitative survey was utilized to gather empirical data directly from this large student group. A positivist approach was taken to verify students' views on the authentic assessment process through objective analysis of the survey results. Questions on academic integrity were included, therefore, the survey was conducted anonymously in the hope that students would be honest about their experiences. The majority (57%) responded (73 out of 129), providing confidence in the reliability and representativeness of the results. Ethical clearance was received for this research adhering to university policies.

4. Initial Findings

Initial survey results (Figure 3) present definitive evidence that there is a positive alignment between authentic assessment design and academic integrity improvement. The overwhelming majority of students agreed that the authentic assessment 'live case' with the Marina Market improved their engagement with the module, enhanced their employability skills, and helped with academic integrity guidelines. Additional results from the survey show that students believe they could approach the lecturer for support, they felt they received sufficient feedback, and they clearly understood the assessment requirements. It is evident that the authentic assessment framework helped to create a supportive and collaborative learning environment which led to the anticipated framework outcomes being met – improving engagement, employability skills and academic integrity.

Figure 3. Authentic Assessment and Academic Integrity Survey Results

6. Discussion

Along with the survey results, informal student feedback was received through lecturer-student meetings and classes about the authentic assessment experience. Survey results indicate that the framework process reduced student motivations to cheat as students report being engaged, motivated and enthusiastic. There was strong interest and attendance at the rubric co-design and exemplar workshops, and students spoke to the lecturer about how they felt their voice was heard and their opinion was valued. The industry partner's event idea allowed students to develop events targeting their demographic, which they felt was inclusive and meaningful. The top event ideas were chosen by the Marina Market and students presented their ideas to industry representatives. The potential opportunity to be chosen as a finalist served as a further motivator for students. The opportunities to cheat were reduced through scaffolded tasks which began at the beginning of the semester with the rubric co-design. Each task was progressive, therefore,

students had to understand the previous task to move forward. In terms of lecturer detection, each students' input into suggested changes for the rubric was verified by the lecturer on Canvas and the rubric was discussed with each student group in the workshop. Students evidenced their learning with visuals which included pictures of the group visiting the Marina Market and working on the project which reduced opportunities to cheat and aided lecturer detection. The lecturer asked each student a question at the end of the presentation to verify their understanding of the task and their involvement in the project. Students were extremely encouraged by the lecturer-student feed-forward sessions and felt that these were invaluable to their learning and skill development. These sessions also allowed the lecturer to become very familiar with students' work. The personalised nature of students' final reflections made it difficult to cheat, as students needed to participate to be able to reflect deeply.

7. Limitations and Conclusion

The authentic assessment framework proposed in this paper can transfer across academic disciplines, however, it will only be viable where assessment types involve industry interaction. Student reflections continue to be analysed and feedback sought to further probe student views on the experience and improve practice. The framework developed in this study lays the foundations for the emergence of evidence-based approaches to authentic assessment design that foster academic integrity across multiple disciplines and will be a useful tool to offset assessment disruption. This paper provides evidence to support the claim that incorporating authenticity and key theoretical perspectives into assessment design provides a potential solution to the issue of assessing students in a new ChatGPT landscape.

8. Acknowledgements and Conflicts of interest - No funding or competing interests.

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CHAPTER 8: CONCLUSIONS

8.1 Visualising the future of Gen AI in Education

Higher education is undergoing a seismic shift as Gen AI disrupts traditional teaching and learning practices, prompting educators to rethink how they do their work. Tasks like content creation, grading, and even personalised feedback can now be handled by AI, challenging the long-held methods of instruction. This shift offers educators the opportunity to re-examine their approaches, with the hope of placing greater emphasis on critical thinking, creativity, and emotional intelligence—areas where human expertise shines. By leveraging AI to enhance learning outcomes and streamline routine tasks, educators can focus on fostering the unique human skills that are vital for the future.

In the next few years, the integration of Gen AI and AI agents (Khalaf, 2024) could dramatically transform education. AI agents may function as personalised learning assistants, capable of answering student questions, offering customised study plans, and providing real-time feedback based on individual progress. These AI tools could also assist educators by automating administrative tasks like grading and monitoring student performance, freeing up time for more meaningful teaching interactions.

What did Gemini, Claude and ChatGPT think lecturers would be doing in 2040?

Prompt: You are a lecturer in higher education in 2040 and AI has progressed what will you be doing in the daily routine in one paragraph

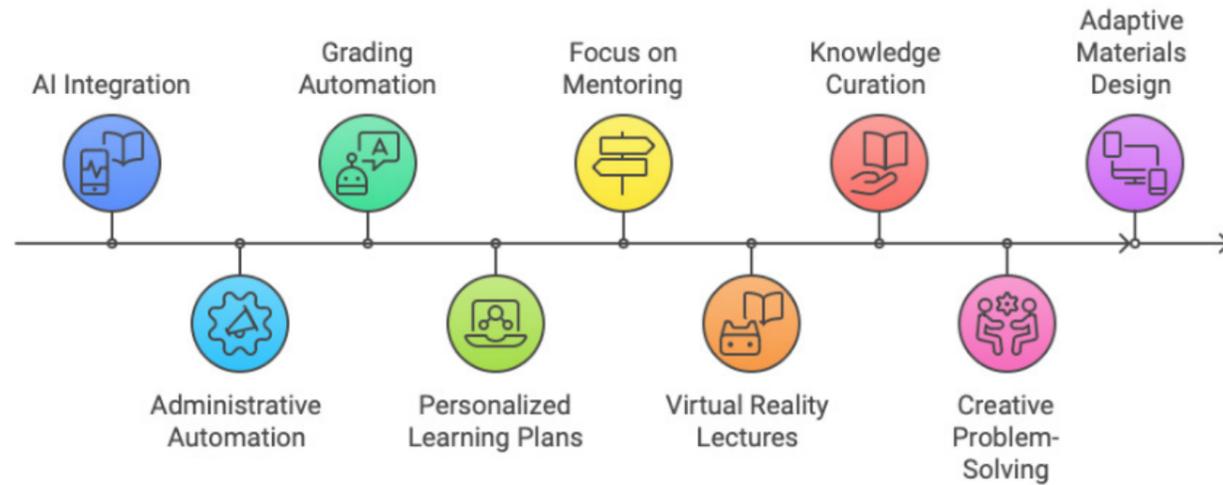
Summarised by ChatGPT

“As a lecturer in 2040, AI will be integral to my daily routine, enhancing the learning experience by automating administrative tasks, grading, and generating personalized learning plans. I will focus on mentoring, facilitating deep discussions, and fostering critical thinking, while AI tools handle routine tasks and provide data-driven insights into student progress.

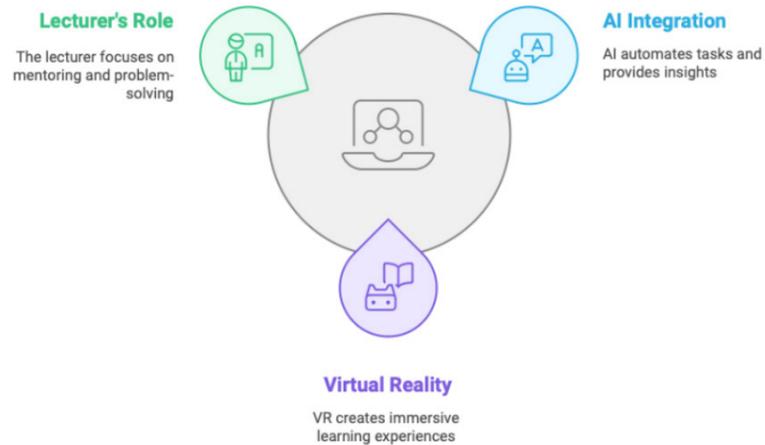
Virtual and augmented reality will enrich my lectures, creating immersive learning experiences. My role will shift towards curating knowledge, guiding students in creative problem-solving, and collaborating with AI to design adaptive, interdisciplinary learning materials.”

Based on this text, Napkin generated the following visuals:

The Evolving Role of Lecturers in 2040



AI-Enhanced Educational Environment



Khalaf, R. (2024, October 22). Anthropic says latest AI model can control users' computers. Financial Times. <https://www.ft.com/stream/15c0cb45-8892-46cd-a086-1d2716ae7246>

8.2 Conclusion and Acknowledgements

This crowd-sourced book has been produced as part of the GenAI:N3 project. It represents the collective knowledge and experience of educators from across the higher education sector, extending far beyond the partner institutes of the N-TUTORR network. It highlights the impact a relatively small group of people were able to make in a very limited time in supporting peers and learners in our immediate and broader educational communities. The resources contained in this book are intended to inform and challenge pedagogical practices in HE while also stimulating thought and discussion around specific approaches of AI application.

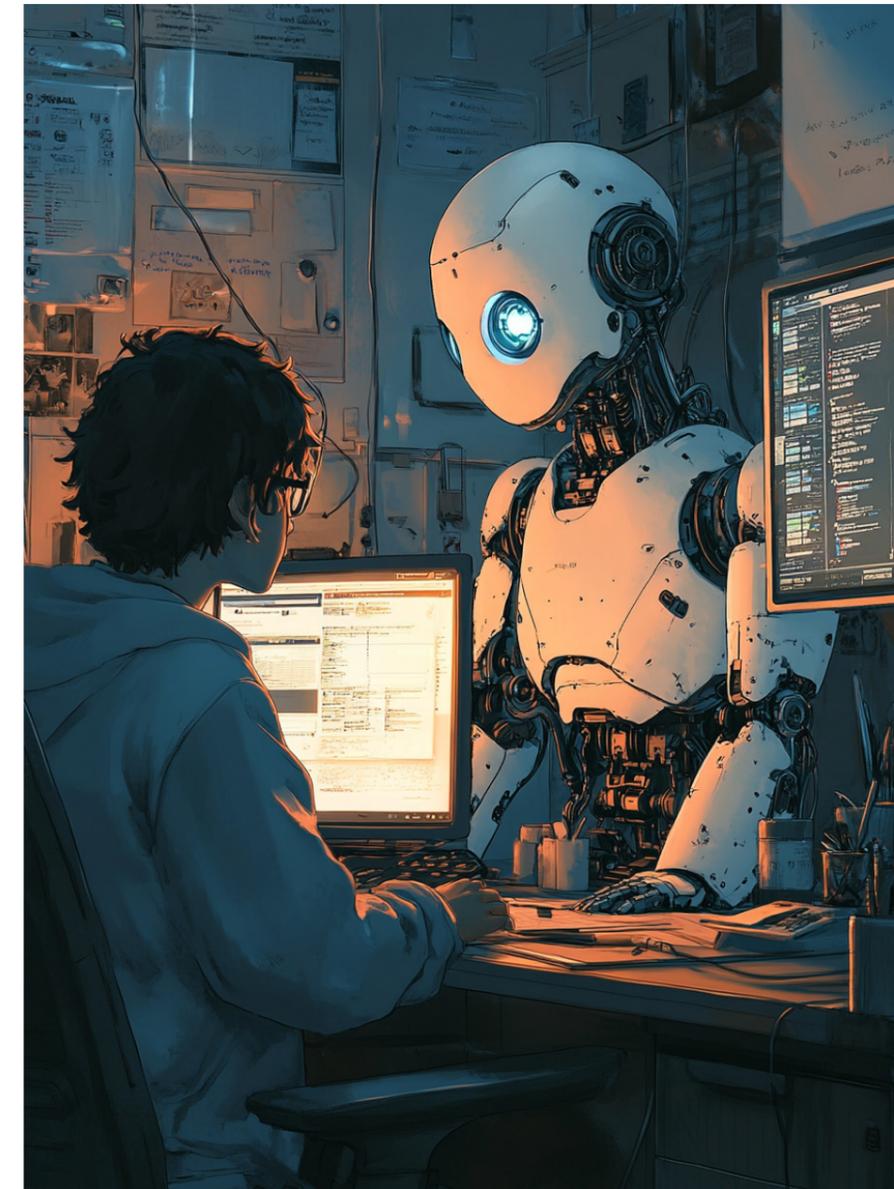
The strength of collaboration is at the forefront of the GenAI:N3 initiative as the diverse skillsets of the group combined to create an innovative and vibrant environment to develop resources and share knowledge. While the project began with a small core group, the network has expanded organically within each partner institution and far beyond to incorporate national and international experts. However, this network is still in its infancy and will continue to grow and stimulate further collaborations to pro-

duce high quality resources and professional development opportunities.

As AI technology continues to improve in terms of functionality, innovation, and accessibility, it is our responsibility as educators to evolve and adapt our approaches in response to our changing environment and the AI-enhanced society our learners are navigating. This project represents one small step in addressing the challenges and embracing the opportunities presented by AI.

I would like to extend a sincere thank you to all the contributors to this book. Without you it would not have been possible. I would also like to thank the project team who have worked tirelessly to bring this book to fruition, and to make the GenAI:N3 project such a success. It was a pleasure to work with this wonderful group of people who each made a unique and valuable contribution. Although the N-TUTORR funding has ended, we have established a strong foundation on which we will continue to build.

Dr Hazel Farrell (GenAI:N3 Project Lead)





LIST OF APPENDICES

APPENDIX 1: Crafting Effective Prompts: The Key to Successful AI Communication

JJ Quinlan

Crafting Effective Prompts: The Key to Successful AI Communication

The growing ubiquity of Large Language Models (LLMs) such as OpenAI's ChatGPT, Google's Gemini, and Microsoft's Copilot highlights the importance of effective interaction with these advanced AI systems. Central to this interaction is the art of crafting prompts—clear, purposeful instructions that guide AI systems to generate desired responses. This article draws on insights from AI-focused publications and guides, emphasizing practical strategies for educators, researchers, and professionals to enhance their communication with AI models.

Understanding the Role of Prompts in AI Communication

Prompts serve as the fundamental interface for interacting with LLMs. They directly influence the quality and relevance of the responses generated by the models. These inputs can take various forms, such as textual commands (e.g., "Write a poem about trees") or multi-modal instructions incorporating images, audio, or video (Schulhoff et al., 2024). This versatility enables LLMs to cater to an extensive range of applications, from generating creative content to tackling complex analytical problems. A well-crafted prompt not only determines the output but also defines the role and perspective of the AI, shaping the interaction to meet specific user needs.

Chain-of-Thought (CoT) Prompting

A pivotal technique in this domain is Chain-of-Thought (CoT) prompting, designed to help the model articulate its reasoning in a sequential manner. For example, appending phrases like "Let's think step by step" to a prompt can guide the model to produce more structured and logical answers. Schulhoff et al. (2024) highlight this method's effectiveness in enhancing reliability, particularly for tasks that require detailed problem-solving. An educator might apply CoT prompting with a query such as: "Explain how active learning strategies can improve student engagement in hybrid courses. Let's break it down step by step"

Practical Strategies for Writing Effective Prompts

Insights from industry leaders such as Google (2024) and Microsoft (2024) provide a foundational framework for crafting effective prompts, highlighting strategies like role definition, contextual clarity, and iterative refinement to maximize AI output effectiveness. These strategies emphasize clarity, specificity, and iterative refinement:

Define the AI's Role: Specify the desired persona or perspective for the AI to adopt. For instance, "Act as a creative strategist and generate ideas for a marketing campaign" establishes the context and tone for the response. From a lecturer's perspective, this could look like: "Imagine you are a university lecturer teaching Level 8 students in creative media. Your task is to provide a step-by-step guide on how to begin writing a research paper in this field."

State the Task Clearly: Use concise language to outline the desired action or goal. Google's (2024) "Prompting Guide 101" underscores the importance of unambiguous instructions such as "Summarize this article in 200

words.” A lecturer might phrase it as: “Please explain the first steps involved in starting a research paper, focusing on topic selection, conducting preliminary research, and developing a thesis.”

Provide Context: Contextualize the request by including relevant background details. For example, “Assume the audience is third-year university students in a Level 8 creative media program. They may have some experience with academic writing but will likely need guidance on how to approach a research paper within the creative media field.”

Specify the Output Format: Clearly define the format for the AI’s output. This could range from a bulleted list to a structured essay or a conversational dialogue. For example: “Please structure your response as a friendly, step-by-step guide with headings for each section (e.g., Topic Selection, Preliminary Research, Thesis Development). Each section should contain practical advice, key tips, and suggestions for further reading.”

Use Natural Language: Write prompts as if speaking to another person. Expressing complete thoughts in full sentences makes it easier for LLMs to interpret and respond effectively.

Iterate for Precision: Experiment with different phrasings and refine prompts based on the AI’s responses. As Microsoft (2024) cautions, LLM outputs may vary due to their stochastic nature, necessitating multiple iterations for optimal results. A lecturer might try: “Analyze the trends in higher education enrollment over the last decade. If possible, include examples from both the U.S. and Europe.”

Final Prompt

Here’s the final version of the prompt, which incorporates all the strategies discussed:

“Imagine you are a university lecturer teaching Level 8 students in creative media. Your task is to provide a step-by-step guide on how to begin writing a research paper. Please explain the first steps in starting a research paper, including topic selection, conducting preliminary research, and developing a thesis. Assume the audience is third-year university students in a Level 8 creative media program. Write as if you are speaking directly to your students in a friendly, encouraging tone. Emphasize the importance of choosing a manageable and engaging topic, conducting preliminary research to identify key sources, and refining the research question into a focused, clear thesis. Please structure your response with headings for each section: Topic Selection, Preliminary Research, Thesis Development. Provide practical advice, key tips, and suggestions for further reading in each section. Let’s think step by step to ensure your answers are correct.”

Reliability and Verification

While LLMs are powerful tools, they are not infallible. They may produce inaccuracies, such as outdated information or misinterpretations of ambiguous prompts,

and can reflect biases present in their training data. For instance, a lecturer asking, “What are the latest trends in pedagogical research?” should critically assess whether the AI’s response includes reputable and current sources. Copilot’s guidance (Microsoft, 2024) emphasizes the need to critically evaluate AI-generated outputs, as models may occasionally produce inaccurate or biased responses. Users are encouraged to cross-reference AI outputs with trusted sources to ensure reliability and accuracy. For example, if a lecturer uses a prompt such as “Provide an overview of the latest research on gamification in education,” they should verify the references and claims presented.

Building a Prompting Skillset

Prompting is a learnable skill, as underscored by Google Workspace’s (2024) “Prompting Guide 101.” Users can practice by experimenting with varied prompt structures, iterating based on the AI’s responses, and analyzing the outcomes to refine their techniques over time. For example, an educator might start with a broad request such as, “Explain constructivist learning theories,” then adjust it to, “Summarize Piaget’s theory of constructivism, focusing on its application in modern classrooms.” By practicing structured approaches and drawing on industry-recommended techniques, users can maximize the effectiveness of their interactions with AI. Whether it’s for drafting business documents, conducting research, or fostering creativity, well-crafted prompts empower users to unlock the full potential of LLMs. For example, an educator might refine a series of prompts: “Summarize this chapter on cognitive development theories,” then iterate to: “Focus on Piaget’s theory and its implications for early childhood education.”

Conclusion

Effective prompting is both an art and a science, requiring clarity, context, and creativity. By leveraging best practices from AI industry leaders, educators and professionals can enhance their engagement with AI systems, transforming these tools into invaluable collaborators. The evolving landscape of AI communication underscores the need for ongoing learning and adaptation, ensuring that users remain at the forefront of this transformative technology.

Epilogue

In crafting this article, I used AI assistance to organize ideas, refine the structure, and ensure clarity. Multiple iterations and extensive editing were involved to achieve the final version. The information was drawn from various references, integrating insights from key industry leaders. While AI provided valuable support, human oversight and critical evaluation were pivotal in ensuring accuracy and maintaining quality. This article illustrates how AI can serve as effective research and writing tool when combined with careful guidance and thorough review. The initial prompt used for AI-generated content was: “Imagine I am a level 9 lecturer; I have been tasked with writing an article for a third-level education publication. The topic of my article is ‘Crafting Effective Prompts: The Key to Successful AI Communication.’ I would like you to read the following notes from articles I have surveyed to

use for the basis of Crafting Effective Prompts. I would like to emphasize that I am using information from the AI companies themselves, so this is more of a guide rather than an academic paper. I want the text to be Harvard referenced also, let’s take this step by step to ensure it is correct, here is the text: (paste text here)” (Quinlan, 2024).

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APPENDIX 2: List of Gen AI Tools

The GenAI:N3 Project group have reviewed and listed some of the common Gen AI tools that are currently in use in higher education. The table below identifies the Tool Category, link to AI Tool/ Purpose of the Tool and the potential educational use. As this is a rapidly changing area, this list is a guide and will require updating on a regular basis.

Category	AI Tool	Purpose	Educational Use	Paid/Free
Research Assistance	LitMaps https://www.litmaps.com/	Mapping research connections	Organising research ideas visually. Maps the connections chronologically between authors, key papers and topics by keyword in a visual presentation.	Paid/Free
Research Assistance	ConnectedPapers https://www.connectedpapers.com/	Visual research map creation	Research exploration and mapping.	Paid/Free
Research Assistance	ResearchRabbit https://www.researchrabbit.ai/	Research discovery and organization	Supporting research projects	Free
Research Assistance	Consensus https://consensus.app/	Summarizes and evaluates research findings	Supports evidence-based research and learning	Paid/Free
N pasResearch Assistance	Elicit.org https://elicit.org/	Answering research questions	Summarizing research papers	Paid/Free
Qualitative Analysis	MaxQDA with AI Assist https://www.maxqda.com/	Qualitative data analysis assistance. Provides four forms of assistance in qualitative data analysis mostly by frequency but with limited sentiment and thematic analysis options	Compare and contrast text materials. Does the 'legwork' in coding of any text data, e.g. policy papers, plans, brochures, annual reports, or interview transcripts, handles video	Paid/Free
Language Learning & Support	Duolingo https://www.duolingo.com/	AI-powered language lessons - incorporates generative AI features in its premium subscription tier, Duolingo Max	Adaptive language learning. Personalises language learning experiences with adaptive lessons. Provides instant feedback on pronunciation and comprehension.	Paid/Free
Content Creation	Animoto https://animoto.com/	AI-driven video creation	Video projects and storytelling. Empowers educators and students to create professional-looking videos quickly. Uses AI to automate video editing and enhance learning experiences.	Paid/Free

Content Creation	Designrr.io https://designrr.io/	Converting content into eBooks and PDFs	Professional educational resources. Converts content (blog posts, articles, or videos) into eBooks, PDFs, and other media. Useful for educators and students to create quick, professional-looking resources.	Paid/Free
Content Generation	ChatGPT https://chat.openai.com/	Text and content generation	AI assistant for content	Paid/Free
Content Generation	Claude ai. https://claude.ai	Text based generation	This tool works very similar to Chat GPT but is based on ethical principles. IT is highly useful for generating text-based outputs.	Paid/Free
Content Creation	Lumen5 https://lumen5.com/	Video summaries from text	Summarizing educational content. Converts text content into engaging videos. Useful for creating video summaries of educational material	Paid/Free
Content Creation	Gamma https://gamma.app/	Creates engaging presentations and content	Facilitates content creation for classroom use	Paid/Free
Content Creation	Adobe Spark https://spark.adobe.com/	AI design for digital storytelling	Creating educational graphics. Allows students and teachers to create videos, presentations, and graphics. Supports digital storytelling in the classroom.	Paid/Free
Content Creation	Powtoon https://www.powtoon.com/	Animated video presentations	Engaging animations. Allows students and teachers to create animated videos and presentations.	Paid
Interactive Learning	ThingLink https://www.thinglink.com/	Creating interactive content	Engaging virtual tours and visuals. Creates interactive images and videos for virtual tours and educational content. Engages students with immersive learning experiences.	Paid/Free
Tutoring & Personalised Learning	Khan Academy https://www.khanacademy.org/	Personalised math and science tutoring	Tailored tutoring paths. Offers AI-powered tutoring for personalised math and science education. Adapts learning paths based on student performance.	Free

Study Assistance	Quizlet https://quizlet.com/	AI-driven quizzes and memory retention	Custom quizzes for study support. Generates personalized quizzes and study sets based on learning needs. Provides AI-driven spaced repetition for memory retention.	Paid/Free
Personalised Curriculum	Edmentum https://www.edmentum.com/	Tailored curriculum and analytics	Monitoring student progress. Offers AI-based curriculum tailored to individual students. Monitors student progress through real-time analytics .	Paid
Audio Content Creation	wondercraft.ai/studio https://www.wondercraft.ai/	Creating audio content with script generation	Podcast and audiobook creation. Wondercraft AI Audio Studio helps educators create engaging audio content, like podcasts and audiobooks, using AI for script generation, voice customization, and sound enhancements. It supports multilingual content and collaboration, making educational materials accessible and engaging for diverse learners .	Paid/Free
Chatbot Support	Claude https://claude.ai/	Chatbot for natural language tasks	Personalized learning and tutoring. Claude is an AI chatbot developed by Anthropic that can assist with natural language processing tasks. In education, it can be used to provide personalised learning support, help with essay writing, tutoring, summarisation of complex texts, and even for conducting interactive Q&A sessions, making learning more accessible and tailored to individual needs .	Paid/Free
Creative Media	Runway ML https://runwayml.com/	AI-based creative media exploration	Media creation in visual arts education. A creative AI platform allowing educators and students to explore media creation like videos, animation, and graphics through machine learning. It fosters creativity in multimedia learning and can be integrated into visual arts and media studies .	Paid/Free

Image Generation	Pika https://pika.art/	Pika offers AI-powered image generation.	Exploring visual arts concepts useful in education for teaching visual arts, design, and creative thinking. It provides students with a tool to experiment with visual ideas and engage with AI-driven creativity. Pika offers AI-powered image generation, useful in education for teaching visual arts, design, and creative thinking. It provides students with a tool to experiment with visual ideas and engage with AI-driven creativity .	Paid/Free
Image Generation	Lu.ma's Dream Machine https://lumalabs.ai/dream-machine	Visual content from text prompts	Creating visuals from written ideas. AI tool that generates custom visuals from text prompts, enhancing creativity and visual learning in education. It allows students and educators to create engaging images for various subjects, making complex concepts easier to understand .	Paid/Free
Image Generation	Craiyon https://www.craiyon.com/	Quick image generation for storytelling	Art and design experiments. Formerly known as DALL-E mini, Craiyon is an AI image generator that students and educators can use for quick visualizations in projects, aiding in creative thinking, concept generation, and visual storytelling .	Paid/Free
Image Generation	Recraft AI https://www.recraft.ai/	Generates and edits visuals using AI	Assists in visual projects and creative tasks	Paid/Free
Image Generation	Midjourney https://www.midjourney.com/	Editing media content Art and design projects Generating artistic visuals	Generating artistic visuals	Paid/Free
Image Generation	Stable Diffusion https://stability.ai/	Visual storytelling	Visual storytelling	Paid/Free
Real-time Assessment	Socrative https://socrative.com/	Real-time quiz assessments	Assessing student comprehension. Allows real-time assessment through AI-based quizzes and polls. Tracks student understanding and provides instant feedback .	Paid/Free

Adaptive Learning	Smart Sparrow https://www.smartsparrow.com/	Adaptive learning customization	Real-time lesson adaptation. AI-driven adaptive learning platform that customizes lessons based on student needs. Provides real-time analytics for instructors.	Paid
Assessment & Feedback	Peergrade, GradeScope https://www.peergrade.io/ https://www.gradscope.com/	Automated grading and feedback	Efficient grading and peer review. Automates grading and provides AI-enhanced feedback. Facilitates peer assessment and enhances collaboration in higher education.	Paid
Data Visualization	Piktochart https://piktochart.com/	Infographic and report creation	Data visualization in projects. Simplifies the creation of infographics, presentations, and reports using AI-assisted design. Helps visualize data for educational projects.	Paid/Free
Speech Recognition & Accessibility	Whisper https://openai.com/research/whisper	Speech transcription for accessibility	Accessibility for diverse learners. OpenAI's speech recognition model, can enhance educational accessibility by enabling accurate transcription of lectures, discussions, and study materials, making learning more inclusive for students with diverse needs, including those with hearing impairments or language barriers.	Paid/Free
Academic Writing	Paperpal https://www.paperpal.com/	Academic writing correction	Editing academic articles	Paid/Free
Library & Research Support	Zotero with Aria AI https://www.zotero.org/	Research material organization	Library building for research. Zotero is a free, easy-to-use tool to help collect, organise, annotate, cite, and share research. Pay for more storage.	Paid/Free
AI Assistant	Google Bard (Gemini) https://bard.google.com/	Content generation and assistance	Generating answers and content	Paid/Free

AI Tools	Hugging Face HuggingChat - Tools	Open community sourced generative AI tool for	Creative images and text, additionally this does have functionality adding extra tools for generating other elements such as 3D, text to video and code.	Paid/Free
AI writing assistant	Jasper AI https://www.jasper.ai/	Writing correction and suggestions	Improving writing quality	Paid/Free
AI writing assistant	Grammarly https://www.grammarly.com/	Various content generation tasks	Writing and content generation	Paid/Free
AI writing assistant	Rytr https://rytr.me/	Content writing and assistance	Content for various needs	Paid/Free
AI writing assistant	Hemingway App https://hemingwayapp.com/	Improves writing clarity and readability	Helps students refine and simplify their writing	Paid/Free
Paraphrasing Tool	Copy AI https://www.copy.ai/	Text paraphrasing	Rewriting text	Paid
Paraphrasing Tool	Quillbot https://quillbot.com/	AI paraphrasing tool	Rewriting text	Paid/Free
Transcription & Editing	Otter.ai https://otter.ai/	Creating transcripts for education	Creating transcripts for education & research	Paid/Free
Transcription & Editing	Descript https://www.descript.com/	AI transcription and editing tool	Transcription and Editing Tool	Paid/Free
Creative Suite	Canva https://www.canva.com/	Creative projects and resources	Creative projects and resources	Paid/Free
Creative Suite	Napkin AI Napkin AI - The visual AI for business storytelling	Creative image creation, for info – graphics and charts	This is useful brainstorming tool for creating charts and info graphics.	Paid/Free
Creative Suite	Synthesia https://www.synthesia.io/	For creative videos and Avatars	This is a useful tool to create avatars for explainer videos	Paid/Free
Creative suite	Sky Box labs ai Skybox AI	Creative presentation ideation.	This is a useful tool for creating 360 backgrounds that can be embedded into presentations.	Paid/Free
Creative Suite	Get Munch https://www.getmunch.com/	Creative ideation and for presentations	A super useful tool for creating titles and credits, captions for video.	Paid/Free

Learning tool	7 Taps Microlearning platform for training 7taps microlearning	For creating fun quizzes	Creates flash cards for learning, a useful tool, this also allows for the functionality of adding avatars and multimedia. A good use for summary quizzes in class.	Paid/Free
Learning tool	Google Notebook LM https://notebooklm.google/	Creative tool for creating podcasts	This tool is very useful for making a heavy theory-based topic interesting. A user can generate a podcast out of a web page, word document or a piece of text.	Paid/Free
Learning Tool	Ai For Education.io. https://www.aiforeducation.io/prompt-library	For general education	This is a useful portal for general prompt tips and techniques.	Free
Organisation- al tool	Notion.ai https://www.notion.so/	For project management and organisation, creative brainstorming.	A very useful tool for keeping organised	Paid/Free
Music Cre- ation	Suno https://suno.com	Songwriting tool	Creates a song instantly based on text or a suggested topic	Paid/Free
Music Cre- ation	AIVA https://www.aiva.ai/	Music generation tool	Creates music in a wide range of styles. Control over a selection of musical parameters	Paid/Free



“The future of education isn’t about resisting AI—it’s about harnessing it. By embracing innovation, we empower educators to focus on what truly matters: critical thinking, creativity, and human connection.”

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