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Work Package 2

AI Competence Frameworks and Policies in Higher Education: Analysis and Recommendations

National Report by University College Cork

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Executive Summary

As Artificial Intelligence (AI) tools improve and become part of everyday life and as nations seek to regulate these new technologies, AI literacy is increasingly important. National and international frameworks and policies seek not only to define AI literacy, but to ensure that key values and skills are preserved.

This report offers an overview of the status of AI policy and literacy in Ireland with a more detailed case study exploring work and supports in place at University College Cork. This national analysis is followed by a discussion of a random sample of policy and framework documents from the European Union (EU) and the United States. These are then combined with the national analysis to offer conclusions as to the core traits of AI literacy moving forward, specifically in a Higher Education context.

We conclude that AI literacy as defined by Irish policy, guidance and supports in Irish Higher Education, and international documents, requires both a broad and a deep understanding of AI including:

- Knowledge of what AI is and how it works (specifically large language models and generative AI chatbots)
- Skills in using AI tools (specifically prompting and selecting tools)
- Critically evaluating the outputs of AI tools (specifically critical thinking, contextual analysis)
- Ethically informed decision-making (specifically around environmental, copyright, and privacy concerns).

These conclusions are drawn from analysis of both Irish and international documentation, drawing out key themes and core ideas from both which address dominant concerns and priorities of policymakers, scholars, and educators. Specifically, this report considers national-level guidance and policy from Ireland including:

- Higher Education Authority. (2025, February). *Ten Considerations for Generative Artificial Intelligence Adoption in Irish Higher Education*.
- Department of Enterprise, Trade and Employment. (2024, October). *Ireland's National AI Strategy: AI – Here for Good Refresh 2024*.
- Expert Group of Future Skills Needs (EGFSN). (2022, May). *AI Skills: A Preliminary Assessment of the Skills Needed for the Deployment, Management and Regulation of Artificial Intelligence*. Government of Ireland.
- National Academic Integrity Network (NAIN). (2023, August). *Generative AI Guidelines for Educators*. Quality and Qualifications Ireland (QQI).

It also reviews four randomly-assigned examples of international AI documentation – drawn from a larger collection compiled by consortium members. These include:

- Allen, L and Kendeou, P. (2024). "ED-AI Lit: An Interdisciplinary Framework for AI Literacy in Education," Policy Insights from the Behavioral and Brain Sciences, Vol. 11(1) 3-10.

- Becker, K., Parker, J., and Richter, D. (2024) “Framework for the Future: Building AI Literacy in Higher Education.” Moxie White Paper.
- European Commission. (2021). Proposal for a regulation of the European Parliament and of the Council on harmonized rules on Artificial Intelligence (Artificial Intelligence Act) and amending certain Union Legislative Acts. https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex:52021PC0206
- Vuorikari, R., Kluzer, S. and Punie, Y. (2022) DigComp 2.2: The Digital Competence Framework for Citizens with New Examples of Knowledge, Skills and Attitudes. Joint Research Centre, EU Science Hub.

Taken together, the analysis of existing national and international AI guidance underscored the deep uncertainties surrounding this new technology. The key components of AI literacy outlined above (knowledge, skills, critical thinking, and ethics) offer a useful starting point for thinking about how educators can best support and foster responsible use of these tools.

1. Introduction

In Ireland, policy and guidance on Artificial Intelligence (AI) and Generative Artificial Intelligence (GenAI) has primarily come from the:

- Higher Education Authority (HEA) in the Department of Further and Higher Education, Research, Innovation and Science
- Department of Education
- Department of Enterprise, Trade and Employment

The above are responsible for most national-level policy and strategy around AI/GenAI in education, complementing work by the National Academic Integrity Network (NAIN) to promote a consistent approach to academic integrity in any use of AI/GenAI in an educational context. This national-level guidance and policy includes:

- Higher Education Authority. (2025, February). *Ten Considerations for Generative Artificial Intelligence Adoption in Irish Higher Education*.
- Department of Enterprise, Trade and Employment. (2024, October). *Ireland's National AI Strategy: AI – Here for Good Refresh 2024*.
- Expert Group of Future Skills Needs (EGFSN). (2022, May). *AI Skills: A Preliminary Assessment of the Skills Needed for the Deployment, Management and Regulation of Artificial Intelligence*. Government of Ireland.
- National Academic Integrity Network (NAIN). (2023, August). *Generative AI Guidelines for Educators*. Quality and Qualifications Ireland (QQI).

At the same time, there is significant scope for Irish universities to devise their own policies and guidelines for AI/GenAI in higher education, including guidance from Trinity College Dublin, University of Limerick, and University College Cork.

This report explores AI/GenAI policy in Ireland at the national and institutional levels as well as providing a more detailed case study of practice at University College Cork. The report then analyses four randomly-assigned documents outlining European and US approaches to AI/Gen to put the Irish approach into a larger context:

- Vuorikari, R., Kluzer, S. and Punie, Y. (2022) DigComp 2.2: The Digital Competence Framework for Citizens with New Examples of Knowledge, Skills and Attitudes. Joint Research Centre, EU Science Hub.
- European Commission. (2021). U Proposal for a regulation of the European Parliament and of the Council on harmonized rules on Artificial Intelligence (Artificial Intelligence Act) and amending certain Union Legislative Acts.
- Allen, L and Kendeou, P. (2024). "ED-AI Lit: An Interdisciplinary Framework for AI Literacy in Education," Policy Insights from the Behavioral and Brain Sciences, Vol. 11(1) 3-10.
- Becker, K., Parker, J., and Richter, D. (2024) "Framework for the Future: Building AI Literacy in Higher Education." Moxie White Paper.

The report concludes with a discussion of the common ground between the Irish, European, and US approaches as explored in this document highlighting ideas and concepts central to a holistic approach to AI/GenAI literacy.

2. National policy and practice regarding AI in Higher Education in Ireland

The Irish government has published a National AI Strategy as well as several reports regarding the country's approach to AI and skills development. In 2021, the *AI – Here for Good: A National Artificial Intelligence Strategy for Ireland* was published. Its focus included building public trust through governance (with EU regulatory frameworks) and education, using AI for economic and societal benefit and various enablers for AI, including a strand on education, skills and talent. This strand includes building AI skills into the curriculum, linked to digital literacy/education (as highlighted in the EU *Digital Education Action Plan 2021-7*), as well as undertaking a review of AI-related future skills and encouraging higher education institutions (HEIs) to deliver AI education and training in a coordinated manner based on the results of this review. Much of this is tied to industry needs and, through initiatives like Springboard+ and Skillnet Ireland, HEIs have partnered with industry to create several courses on AI ranging from Certificates to Masters level programmes.

Ireland's AI Skills report identifies a range of skills, from AI-specific technical skills to general digital skills and transversal skills that will be needed to work with AI; while particular skillsets relate to specific roles, a key message of this report is that everyone will need some knowledge of AI (EGFSN, 2022). This report draws on international evidence as well as national surveys and workshops to identify skills. In the national contexts, responses were separated across four categories, one of which was educators. Educators identified transversal skills (i.e., critical thinking, creativity, collaboration, and data analysis) as important for working with AI, as well as an understanding of AI and its implications; however, they felt unable to impart this understanding of AI until undergoing training themselves (ibid.). The report also identified digital literacy as a foundation for AI skills, recommending it be embedded at all levels of education (supported by the *Digital Strategy for Schools to 2027*); it highlighted lifelong learning and the need for educators to prepare for the future, developing digital and AI skills ahead of other groups in order to embed these in teaching, learning and assessment (ibid.). Separately, the AI Advisory Council to the Irish Government published an advice paper on AI as it relates to education (at primary, secondary, and third level), noting that AI is currently the largest impact on the educational system and requires an appropriate response quickly. Key points of guidance from this paper include:

- Privacy: Any AI tools used by students should be private and secure. Data generated in an educational setting should not be used to train AI models.
- Equity: Tools should be free to use for all instructors and students and the use of AI in education should be inclusive, equitable and accessible. Language support issues are particularly addressed here, with tools not working as well in the Irish language.

- Policy: Guidelines cannot be set in stone as this is a fast-moving area. These should be live documents with regular revision. Each educational setting should have the freedom to create their own guidelines.
- AI Literacy: Currently there is a lack of consistency regarding AI literacy training for educators that needs to be addressed and become a key part of professional development. (AI Advisory Council).

As the national strategy and the skills report were published prior to the launch of generative AI (GenAI) technology and other AI developments, and given the rapid pace of these, these national documents require revisiting. In 2024, the Government published an update to the National AI Strategy. Strategic actions in this update refer to implementation of the *EU AI Act* and innovation, research, and impact across a number of sectors; in terms of education, the updated strategy plans to update the 2022 study on AI Skills, aligning this to targets set by the *EU Digital Decade Policy/The Digital Ireland Framework* and to expand the range of digital upskilling and reskilling initiatives available across the country (Department of Enterprise Trade and Employment, 2024). A reform of primary and post-primary school curriculum is underway, incorporating digital skills, but also empathetic and cognitive skills that will be key for using AI; national guidelines on the use of AI for teachers at these levels are being developed, based on those available from the European Commission (ibid.). Equally, a priority action of the updated national strategy is to make AI literacy (understanding of the benefits, risks, safeguards, rights, and obligations in relation to the use of AI systems) a core aspect of *Ireland's Literacy, Numeracy and Digital Literacy Strategy 2024-2033: Implementation Plan to 2028*, which applies to learners from birth to young adulthood. At the level of HE, Ireland plans significant investment into specialised programmes for high-level AI research skills, including PhD programmes and research fellowships (ibid.). Equally, upskilling and reskilling programmes aim to support a variety of AI-related skills for the labour market, aiming for safer, more productive workplaces where workers are supported by AI, not replaced by it (ibid.).

While there is currently no survey data available at the national level for use of GenAI in HE (though institutions have conducted surveys individually), there is data on enterprises' use of GenAI in Ireland, which indicates the employment landscape we may need to prepare our graduates for. Trinity College Dublin's Business School and Microsoft surveyed 400 senior managers across Ireland (private and public sector), finding that 49% of these organisations use GenAI in some capacity and that the technology, science and media sectors have the highest planned adoption rates for GenAI (McCorry, 2024). Equally, figures from the Central Statistics Office illustrate that the use of AI (more broadly) in enterprises is on the rise. In 2023, 8% of all enterprises and 37% of large enterprises (250 or more employees) used AI, increasing to more than 15% of all enterprises and 51% of large enterprises in 2024 (CSO, 2024; 2025). Specific uses of AI across all enterprises include natural language generation (7%) and data mining (7%), with large enterprises using it for automating workflows or decision making (30%) and data mining (28%) (CSO, 2025).

In the context of learning and teaching in HE more specifically, national guidance has been issued from the National Academic Integrity Network (NAIN) and the Higher Education

Authority (HEA). While this does not take the form of official policy or regulation, it does offer a framework of key considerations for institutions to address regarding AI use in HE. The NAIN guidelines offer recommendations for what everyone needs to know, and what educators, programme managers/institutional leaders, and students need to know and do. These recommendations address: having an awareness of the capabilities and limitations of GenAI tools as well as ethical concerns regarding their development and training; reviewing/adapting assessments as needed for validity and ensuring students are aware of authorised/unauthorised use of GenAI; emphasising values of integrity, honesty, trust and respect as part of learning; providing regular training for staff and students; and updating policies and ensuring these are accessible and applied consistently (NAIN, 2023). The HEA published key considerations for adopting GenAI in Irish HE, which includes ten points: AI literacy, allowable AI, academic integrity, critical AI, second-degree plagiarism, privacy, equitable access, sustainability, AI sovereignty, and enhancement (2025). Among recommendations from these are: AI literacy training for all staff and students to use AI responsibly and effectively, clear guidelines that set acceptable/unacceptable use considering purpose, transparency, extent and disciplinary norms, and evaluation of where AI can enhance learning and teaching (i.e., personalised learning, interactive and creative content, and efficiency in workflows) and how this can be achieved in sustainable and equitable ways (ibid.). In addition to these general guidelines at the national level, there are also published collections of case studies of GenAI use in Irish HE (i.e., *Using GenAI in Teaching, Learning and Assessment in Irish Universities*) which offer practical examples for integrating GenAI across a range of disciplines.

While there is no national policy regulating the use of AI in Irish HEIs, institutions have updated their academic integrity policies to include reference to GenAI or AI, largely considering unacknowledged use of GenAI as a form of plagiarism and therefore requiring acknowledgement and authorisation for use to meet academic integrity standards. This devolves responsibility regarding authorisation to individual departments or lecturers. Some institutions have also produced additional statements with principles regarding AI and GenAI use. For example, Trinity College Dublin refers to transparency and honesty, responsibility and accountability, respect, and innovation as principles underpinning AI use in their institution (2025) and the University of Limerick states its principles for GenAI as GenAI literacy, integrity, innovation, equity, and ethical and secure use (2025).

3. Policy and practice at University College Cork: case study

University College Cork updated its *Academic Integrity for Examinations and Assessments Policy* to specifically refer to AI/GenAI. This policy is owned by the Deputy President and Registrar; updates were discussed in a policy working group consisting of academic and professional staff and Student Union representation and subsequently approved by Academic Board and Academic Council.

The GenAI updates to this policy address both students and academic staff. Regarding student use, the policy refers to the unethical use of AI, noting that "Academic Integrity is breached if students submit the products of GenAI as their own work without acknowledgement and without authorisation to use GenAI in fulfilling the task" (2024). This policy change was communicated to staff and students via email and website updates and the specific details around authorised use are determined by individual instructors, departments or programmes (where a consistent approach across modules may be taken), or, often, per assessment. Module and programme coordinators are then responsible for communicating these expectations to their students. Regarding staff, the policy states that "the use of GenAI detection software for the detection or investigation of alleged academic misconduct is not sanctioned by the University" but does not refer to specifics around personal, teaching, or research use (ibid.). Additionally, the policy directs both staff and students to additional guidance on responsible use of GenAI provided by the University through the Skills Centre, Centre for the Integration of Teaching, Learning and Research (CIRTL) and the library, along with the requirement to familiarise themselves with this.

Further guidance within the University includes the *Toolkit for the Ethical Use of GenAI in Learning and Teaching,* the *Short Guide 9: Assessment in the Age of AI*, both aimed primarily at academic staff, and an upcoming *GenAI Learning Hub* aimed primarily at students. The *Toolkit* is the result of a project that paired students and staff to experiment with assessment design and learning activities that integrated GenAI or mitigated against its misuse. Case studies of these are available in the *Toolkit* along with contextual information on what GenAI is, critical AI literacy (bias/misinformation, copyright/intellectual property/privacy, environmental impact, and exploitation of workers), and an academic integrity framework for considering GenAI use based on the values of honesty, trust, fairness, respect, responsibility, and courage. Supplementing this is practical guidance for academic staff to support academic integrity in the age of AI, including Writing a GenAI Statement to clarify for students their expectations around GenAI use and the purpose of their assessments. The *Short Guide* includes information on GenAI and academic integrity before offering suggestions for assessment design, incorporating examples from UCC. The forthcoming (April/May 2025) *GenAI Learning Hub* will support students (and others) in their responsible and effective use of GenAI, highlighting the human role/responsibility when engaging with GenAI and supporting

evaluative decision-making and critical use. This resource is divided into three sections: what to know before you use GenAI (how it works/uses data, ethical considerations, evaluating tools), what to know when you use GenAI (deciding when to use, your role, effective prompting, critical appraisal, and various uses for study), and what to know about AI-generated content and assessment (academic integrity, acknowledgement, and uses during stages of assessment).

In addition to these digital resources, information on GenAI is incorporated into academic integrity courses for staff and students, and various sessions related to GenAI are regularly offered. The Skills Centre (student support) offers a workshop on "Responsible Use of GenAI" that highlights the importance of AI literacy, suggests responsible uses and refers to the University policy. The Library holds workshops on "Artificial Intelligence and Searching for Information" for both staff and students. CIRTL/Skills Centre offer workshops for staff on "AI and Assessment" and "Writing a GenAI Statement", weekly "GenAI and Academic Integrity Office Hours" for staff to drop in with questions, and a monthly "GenAI Journal Club" to discuss academic articles on GenAI across various topics (i.e., accessibility, policy, the writing process, harms vs. benefits, assessment). Finally, the Digital Advisory Centre offers practical sessions for staff on various uses of Microsoft CoPilot (which UCC has institutional access to) and prompting.

UCC also has several ongoing initiatives related to AI for those with specific expertise in this area, including the research prioritisation of UCC Futures: Artificial Intelligence & Data Analytics. This brings together significant expertise through the Insight SFI Research Centre for Data Analytics, the SFI CRT in Artificial Intelligence, along with the new SFI Empower Spoke on Data Governance in which UCC played a founding role. The AI and Data Analytics area of UCC Futures has over 150 members from across all the UCC Colleges and its high-level research focus areas are:

- Science of AI and data analytics

- Applications of AI and data analytics

- Business Analytics for Financial services, including payments

- Health Tech and Business Analytics for Healthcare

- Automation, algorithmic management, and the future of work

- Philosophy, Ethics and Social Implications of AI

- Legal, Regulatory, and Policy issues

Both AI and GenAI are topics of interest across UCC and the University Leadership Team has formed a committee to monitor and evaluate institutional progress with these technologies across core areas of institutional strategy, research, and learning and teaching.

4. Analysis of AI competence frameworks

4.1 Methodology and documents included in the analysis

Consortium members contributed to a collection of non-country-specific frameworks which was, in turn, divided amongst the consortium with each partner analysing their subset of documents. It is worth noting that the frameworks were not organised by theme or approach before this subdivision and, as such, the assignment of frameworks and the resulting sub-collections is effectively randomly determined. The frameworks analysed by UCC are detailed on the next page with a composite analysis on the following pages. For a full picture of the international context, ensure that the documents below are reviewed in conversation with the other national reports.

	DigComp 2.2: The Digital Competence Framework for Citizens	Proposal for a regulation of the European Parliament and of the Council on harmonised rules on Artificial Intelligence (Artificial Intelligence Act) and amending certain Union Legislative Acts	ED-AI Lit: An Interdisciplinary Framework for AI Literacy in Education	Framework for the Future: Building AI Literacy in Higher Education
Type of document (Framework, Policy, Guideline, ...)	Framework	Policy proposal	Framework	Framework
Date of publication	2022	2021	2024	2024
Responsible Institution(s)	EU, Joint Research Centre	EU	University of Minnesota	Moxie (company)
Responsible Persons/Authors (Position and Role)	Riina Vuorikari, Stefano Kluzer, and Yves Punie	n/a	Laura Kristen Allen and Panayiota Kendeou	Kimberly P. Becker, Jessica L. Parker, and Desi Richter

Stakeholders who play a role in the frameworks/ policies	EU citizens, relevant EU offices and teams	Policymakers, regulators, businesses	Teachers, students, policymakers	Teachers, students, policymakers
Target group(s)	EU citizens	EU policymakers	K-12 educators (US)	Higher Education policymakers

4.2 Findings

4.2.1 Key concepts used in the documents to define AI literacy – for students and for teachers

While all documents in this sample recognise the importance of AI literacy, only two – Allen and Kendeou (2024) and Becker, Parker, and Richter (2024) attempt to define the concept.

Allen and Kendeou (2024) define AI literacy as:

- an understanding of how AI works
- the ability to critically evaluate AI outputs
- having the skills required to "effectively communicate and collaborate" with these systems.

Their proposed ED-AI Lit framework centres media and AI literacy and emphasises the importance of scepticism and transparency on the part of users and designers.

Similarly, Becker, Parker, and Richter (2024) place a high value on systems comprehension as central to AI literacy while emphasising the need for a "balanced" literacy including understanding, analysing, and ethically interacting with AI systems. Furthermore, the authors identify four foundational literacies which they see as vital to AI literacy including:

- **"Academic literacy**: Proficiency in navigating scholarly texts, conducting research, and engaging with academic discourse. …
- **Digital literacy**: Familiarity with using digital tools, platforms, and technologies for various purposes, enabling a smoother adaptation to AI systems and interfaces. …
- **Domain/content knowledge**: Expertise in specific fields of study, providing a contextual framework for understanding and applying AI concepts. …
- **Life experience**: A mature perspective and critical thinking skills developed through varied life experiences."

Both Allen and Kendeou (2024) and Becker, Parker, and Richter (2024) see the ability to make informed decisions around the use of AI as the primary goal of AI literacy and emphasise the importance of developing these skills in the educational context – K-12 (primary and secondary) schools for Allen and Kendeou (2024) and higher education for Becker, Parker, and Richter (2024).

4.2.2 Key AI competences (for students and for teachers)

While the definitions of AI literacy are fairly consistent in this sample, the specific competencies which make up the larger themes of understanding, critical thinking, and constructive engagement with AI systems are more varied. It is worth noting as well that the authors in this sample do not tend to differentiate between students and teachers when articulating the core competencies of AI literacy. The exception is a discussion of risks of AI illiteracy in Baker, Parker, and Richter (2024) which will be discussed in 4.2.3 below.

DigComp 2.2: the Digital Competence Framework for Citizens with New Examples of Knowledge, Skills, and Attitudes (Vuorikari, Kluzer, and Punie 2022) presents AI as a subset of digital literacy more broadly within a social (not educational) context and so does not differentiate between teachers and students in its identification of competencies. While AI is not singled out in the main framework, Annex 2 organising examples of AI competence into categories of knowledge, skills, and attitudes across five key areas of AI competence:

- What do AI systems do and what do they not do?
- How do AI systems work?
- Interacting with AI systems
- The challenges and ethics of AI
- Attitudes regarding human agency and control.

These examples are all then linked to the general digital competences, categorised as: information and data literacy, communication and collaboration, digital content creation, safety, and problem solving.

In contrast, Allen and Kendeou offer a "multidimensional framework" for AI literacy which incorporates six areas of competence:

- **Knowledge**: to gain an understanding of how AI technologies work and their underlying principles;
- **Evaluation**: to develop the ability to critically judge AI technologies, considering their strengths, limitations, and potential biases;
- **Collaboration**: to develop skills for effective communication and collaboration with AI systems and individuals
- **Contextualization**: to understand how to use AI as a tool in real-world settings;
- **Autonomy**: to develop self-determination in actions and decision-making when interacting with AI;
- **Ethics**: to recognize and address moral issues related to AI technologies, including fairness, accountability, transparency, and privacy." (4)

Becker, Parker, and Richter (2024) recognise similar competencies, but have opted to organise them more thematically and based upon a digital literacy framework originally proposed by Selber (2024). The authors propose an AI literacy framework with three main dimensions – functional, critical, and rhetorical literacies – incorporating a number of subsidiary competencies:

- **Functional AI Literacy**
    - Understand the core mechanisms of how AI works
    - Identify the capabilities and limitations of various AI technologies

    - Become familiar with standard AI interfaces and platforms
    - Interact with AI-driven tools and applications through effective prompting

- **Critical AI Literacy**

    - Question and evaluate the credibility and trustworthiness of AI systems and applications
    - Recognize potential biases in AI interactions and outputs
    - Mitigate GIGO (Garbage In, Garbage Out)
    - Consider the ethical implications of AI use

- **Rhetorical AI Literacy**

    - Understand the role of rhetoric in communication" (20) – "By considering these elements within the rhetorical situation, educations and students can make informed decisions about when and how to integrate AI into their writing processes
    - Synthesize prompts + output synergies to shape communication
    - Identify and analyze rhetorical patterns in AI-generated text
    - Analyze the style, tone, and voice of AI-generated content including
        - Tone Assessment
        - Structural Complexity
        - Uniqueness and Engagement
        - Persona Impact
        - Purpose Alignment
    - Compare and contrast AI vs. human-generated content"

As clear from the detailed delineation of rhetorical literacy competencies, rhetorical literacy is a key priority for Becker, Parker, and Richter (2024).

4.2.3 Challenges of AI use for Teaching & Learning addressed in the document

The competencies outlined above seek to address key challenges AI poses for teaching and learning including bias, discrimination, and incomplete understandings of AI shaping policy and decision making.

Specifically, the EU proposal for regulation (2021) highlights the risk of bias and discrimination in AI systems and proposes a requirement that sectors adopting such tools – including teaching and learning – make their use and adoption as transparent as possible.

Similarly, Allen and Kendeou's ED-AI Lit framework seeks to promote AI literacy to limit the risks of:

- Students using AI tools to produce essays and other assessments and thereby depriving themselves of key learning opportunities
- Misinterpretation of AI outputs
- Overlooking potentially useful AI tools
- Failing to critically evaluate digital content more generally

Building on this last point, Allen and Kendeou (2024) emphasise the ways that AI systems and tools can replicate and expand misinformation both in the context of a teaching and learning risk and also as another argument in favour of adopting an AI literacy framework such as ED-AI Lit.

Similarly, Becker, Parker, and Richter (2024) note two key risks of AI in teaching and learning:

- Students and teachers misinterpreting AI outputs
- Teachers rushing to adopt **or** prohibit AI tools

At the same time, they note some key concerns which go beyond classroom experiences or academic integrity including:

- **Conflation with previous technologies**: Unlike earlier rules-based systems, AI adapts and learns from data in novel ways (Parker at al., 2023).
- **Misunderstandings and misuse**: Recognizing both logistical and ethical challenges in AI deployment helps to ensure AI enhances rather than undermines educational integrity.
- **Evolving capabilities and responsibilities**: As AI capabilities rapidly evolve, we must keep pace by carefully examining its unique properties and implications to ensure responsible development and deployment.

Both Becker, Parker, and Richter (2024) and Allen and Kendeou (2024) argue that their proposed AI literacy frameworks will address the above risks and concerns, but there is as yet very little research to support either claim.

4.2.4 Recommendations for using AI in the context of teaching and learning

The implicit recommendation in these documents is that adopting the proposed framework or regulations would address the risks and hazards of AI adoption. The EU proposal for regulation (2021) advocates for transparency and the proactive identification of high-risk systems with related notification and mitigation processes and explicitly identifies educational contexts as an important area for this regulatory transparency.

More explicitly focused on teaching and learning, Allen and Kendeou (2024) advocate for the adoption of AI literacy standards (presumably informed by the ED-AI Lit framework) across the school curriculum as well as in pre-service and CPD training for teachers. Notably, they advocate that AI training be integrated into the disciplines for both students and teachers.

Similarly, Parker, Baker, and Richter (2024) propose their framework as informing a higher education approach to AI which casts users (whether students or teachers) as “intentional collaborators” and therefore advocate for an approach which recognises that the boundaries between human- and AI-generated material are blurred. Therefore, they argue that rhetorical literacy (of the three core literacies in their framework) is central to any future adoption of AI in higher education.

4.2.5 Examples of the use of AI in the teaching and learning

The policy and frameworks reviewed here are not particularly interested in considerations of the practicalities of AI use in teaching and learning. DigComp 2.2 (2022) does not explicitly address teaching and learning beyond a reference to “lifelong learning” while the EU policy proposal

(2021) includes education as a regulatory and use category without any discussion of what such use might entail.

Allen and Kendeou (2024) offer examples of how to teach their framework's component competencies through a range of practices including:

- interactive learning experiences
- critical thinking prompts
- collaborative discussions
- debates
- team-based projects
- applying AI concepts in different scenarios
- interdisciplinary projects
- open-ended scenarios
- discussing real-world examples
- case studies

They also note that teachers can use AI to create assessments, lesson plans, or can even use AI to provide feedback, but neglect to address the implications of such practices within their framework.

Parker, Baker, and Richter (2024) note that AI could be used in outlining, research, revision, and co-writing, but do not provide any specific examples or discuss the potential ways such adoption might change the learning process for both students and teachers.

4.2.7 Values, ethical principles, and security framework

Ethics are an important element of the four documents under review here, albeit to varying degrees and functionalities. DigComp 2.2 recognises the risk of bias, but does not provide any guidance or advice as to how to avoid, limit, or mitigate that ethical concern.

Conversely, the regulatory regime outlined in the EU regulatory proposal (2021) is explicitly designed to minimise the risks and consequences of such biases by "ensuring that AI systems are safe, respect fundamental rights and EU values, provide legal certainty to encourage innovation, enhance governance and enforcement of safety laws, and facilitate a unified market for trustworthy AI applications." (paragraph 1)

Similarly, Parker, Baker, and Richter (2024) place a very vague nod toward the importance of ethics at the centre of their framework, with "Fostering ethical and responsible use of AI technologies" the first of four core principles of their framework.

Allen and Kendeou (2024) argue for an AI literacy framework which recognises – and supports teachers and students in recognising – the ways that ethical considerations shape the design, operation, and outputs of AI systems. Furthermore, they are careful to acknowledge the role of teachers in the inculcation of ethics: "Educators play a pivotal role in instilling the significance of ethics, stressing its omnipresence across AI literacy domains." (7)

4.2.8 Future trends in AI and education

Anticipating future trends is an important – if often implicit – aspect of the creation of literacy, competency, or regulatory frameworks and this sample follows this pattern. The priorities of the frameworks – individual competence, understanding, rhetorical literacy, etc. -- reflect the priorities of the authors as well as their assumptions for future development and implementation of AI systems. Despite this, there is little explicit discussion of these future trends in this sample. Annex 2 from DigComp 2.2 includes some specific examples of how AI competencies could be integrated into future iterations of the DigComp framework, but little discussion of those competencies outside of that context.

The regulatory proposal (EU 2021) assumes that AI will be involved in "determining access or assigning persons to educational and vocational training institutions or to evaluate persons on tests as part of or as a precondition for their education" (paragraph 35) and identifies such future systems as high-risk. Similarly, Allen and Kendeou (2024) propose their framework with an underlying assumption that AI integration across education and society more broadly is "becoming increasingly inescapable" (3).

Parker, Baker, and Richter (2024) anticipate a future that AI spreads into most aspects of education and culture, requiring a shift in perspective framing AI tools as "intrinsic elements of thinking, communicating, and interacting," and they therefore advocate for the integration of AI across education, blurring the boundaries between "digital" and "non-digital" literacies and knowledge.

4.3 Discussion

There is very little agreement beyond the basics of AI literacy in this collection of documents. There is a general sense of the need for people (whether citizens, students, or teachers) to:

- Understand how GenAI works
- Critically evaluate what GenAI tools produce
- Ensure ethical use of this new technology

Beyond the above, though, there is very little agreement as to what competencies are needed for someone to be "AI literate," much less of how to achieve these competencies. There are significant efforts from Becker, Parker, and Richter (2024) and Allen and Kendeou (2024) to explore the ways AI literacy does and does not parallel digital literacy while DigComp 2.2 explicitly situates AI literacy as one of many digital competencies.

An initial synthesis of the works discussed here suggests the following core competences and skills as being crucial to AI literacy:

- A working knowledge of AI (functional literacy)
- Evaluative and critical thinking skills (critical literacy)
- Autonomy and ethics (functional literacy)
- Collaboration and prompting (rhetorical literacy)

But this is a very rough, forced synthesis as the works examined here have very little overlap beyond their initiating concern with AI. Perhaps when taken in context with the larger corpus of

international frameworks and policies, the linkages between the proposals discussed here will become clearer.

Lastly, it is worth explicitly noting that two of the documents included in this sample – the Proposal for a regulation of the European Parliament and the DigComp 2.2 framework – do not explicitly engage the question of AI in higher education. They are perhaps useful to help us understand how the EU as a body is approaching questions around digital literacy (very closely linked to AI, of course) and regulation of this new technology, but they have little to contribute to the larger discussion of AI literacy at the core of this project. When relevant, points from both have been integrated into the analysis above, but the bulk of this section of the report is based on the two formal frameworks even though only one of them explicitly speaks to Higher Education. Although the ED-AI Lit framework targets primary and secondary education, it has important insights for Higher Education and is perhaps, the most directly useful framework in this sample. The fourth and final document in this analysis was produced by researchers employed by an AI research tool, Moxie, and while their transparency is appreciated (both in terms of the authors' use of AI tools and the potential biases implicit in their employment circumstances) the framework as proposed is quite vague, so much so there is little direct relationship between the proposed framework and the realities of higher education.

5. Conclusions and recommendations

The range of approaches and perspectives in the frameworks and policies examined here highlights that there is no single approach to AI literacy. More importantly, frameworks and policies often tell us more about the authors (or supporters) than about AI itself – as, for example, in the heavy emphasis on rhetorical literacy in Becker, Parker, and Richter (2024) as compared with the broad range of competencies in the DigComp 2.2 framework.

Even so, there are some clear trends and foundational competencies in the documents analysed in this report. These can be distilled down to four key areas which must inform any future definition or framework of AI literacy including:

- Knowledge of what AI is and how it works (specifically large language models and generative AI chatbots)
- Skills in using AI tools (specifically prompting and selecting tools)
- Critically evaluating the outputs of AI tools (specifically critical thinking, contextual analysis)
- Ethically informed decision-making (specifically around environmental, copyright, and privacy concerns.

These areas reflect priorities and conclusions from both Irish and international documentation and provide a useful starting point for most targeted conceptions of AI literacy and foundational competencies which will support future engagement with AI and related technologies.

Even as we identify key skills and habits of mind necessary for responsible engagement with and use of AI, we must recognise that this is a constantly evolving area. Just as the technologies are ever-changing, so, too, must the responses and approaches of educators.

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Appendix