# A Framework for Students: Leveraging AI to Promote Inclusion and Widen Access in Higher Education

February 2025

This Framework for Educators is an output from the Collaborative Enhancement Project ‘Using AI to promote Education for Sustainable Development (ESD) and widen access to digital skills’ supported and funded by QAA Membership.

**The project is led by:**

London Metropolitan University (UK)

**in partnership with:**

Coventry University (UK), University of Hertfordshire (UK), University of Staffordshire (UK), Manisa Celal Bayar University (Turkey), Aristotle University of Thessaloniki (Greece), Epoka University (Albania) and University of Elbasan “Aleksander Xhuvani” (Albania).

Find out more about Collaborative Enhancement Projects on QAA’s website.

## Cite this output

Meletiadou, E., Kabuli, H. & Saeed Ul Hassan Raza, M. (2025b*). A Framework for Educators: Leveraging AI to Promote Inclusion and Widen Access in Higher Education.* Quality Assurance Agency of Higher Education.

# Authors and Contact details

**Lead author:**

Eleni Meletiadou
London Metropolitan University, UK
e.meletiadou@londonmet.ac.uk

**Research assistants (postgraduate students):**

Hamzeh Kabuli
London Metropolitan University, UK
hak0989@my.londonmet.ac.uk

Muhammad Saeed Ul Hassan Raza
London Metropolitan University, UK
mur0332@my.londonmet.ac.uk

**Abstract**

The rapid advancement of artificial intelligence (AI) in education presents transformative opportunities for fostering inclusivity, sustainability, and accessibility in higher education. This research proposes a structured framework for students, enabling them to leverage AI tools effectively for academic and professional growth while ensuring ethical and responsible usage. The framework is built upon five core stages of the AI Literacy Pathway—Understanding AI, Applying AI, Creating with AI, Evaluating AI, and Ethical AI Usage—which progressively equip students with AI literacy skills and critical evaluation capabilities. Three foundational layers—Inclusion and Accessibility, Collaboration, and Personalized Learning—support these stages and ensure equitable AI integration, fostering diverse participation and tailored learning experiences. Additionally, the framework incorporates AI applications in higher education for sustainability, empowering students to address global challenges through innovative AI-driven solutions. The research highlights real-world case studies demonstrating AI's potential to enhance student engagement, bridging digital divides, and fostering ethical AI adoption in academic settings. By integrating AI as a personalised and inclusive education facilitator, this study contributes to the broader discourse on sustainable development in higher education. The findings underscore the need for AI literacy as a fundamental competency, ensuring students can navigate and contribute to the evolving landscape of AI-driven learning environments. This framework prepares students for an AI-integrated future and promotes ethical considerations, equity, and sustainable education practices.

**Keywords:** Artificial Intelligence in Higher Education, AI Literacy, Sustainable Education, Inclusive Learning, Higher Education, Teaching Framework, AI for Educators.

# Contents

# 1 Introduction

The transformative potential of artificial intelligence (AI) in higher education has created unprecedented opportunities to enhance learning experiences, foster inclusivity, and bridge digital divides (Laupichler et al., 2022; Ng et al., 2021). However, these advancements have also highlighted critical challenges, including the digital literacy gap among students and concerns over ethical AI usage, particularly in contexts with limited access to technology (European Commission, 2022; Kong et al., 2021). Addressing these challenges aligns with the United Nations' Sustainable Development Goal 4 (SDG 4), which emphasises ensuring inclusive and equitable quality education while promoting lifelong learning opportunities for all (UNESCO, 2017).

This framework provides a structured approach to empower students in higher education to build their AI literacy while promoting an inclusive and collaborative learning environment. As illustrated in Figure 1, the framework is built around five core stages of the AI Literacy Pathway: Understanding AI, Applying AI, Creating with AI, Evaluating AI, and Ethical AI Usage. These stages represent a progressive journey, equipping students with the competencies to understand, apply, and critically evaluate AI technologies while addressing their ethical and societal implications.

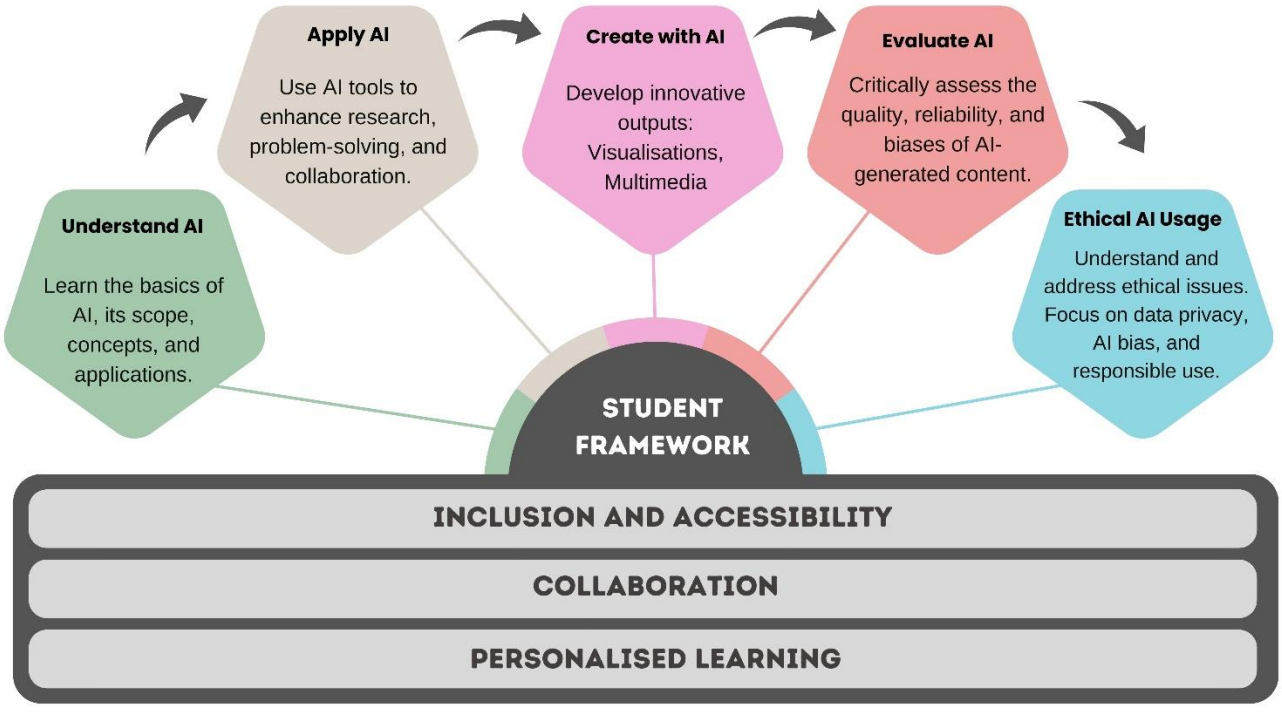


*Figure 1: The Student Framework illustrates the AI Literacy Pathway, supported by inclusion, collaboration, and personalised learning layers to promote equitable access and skill development in higher education*

Three foundational layers support the pathway: Inclusion and Accessibility, Collaboration, and Personalized Learning. These layers span across the entire framework, as shown in the visualisation, ensuring that principles of equity, teamwork, and tailored support inform every stage:

- The Inclusion and Accessibility layer targets barriers faced by non-native speakers, students with limited digital literacy, and underrepresented groups, advocating for equitable access to AI tools.
- The Collaboration layer underscores AI's role in fostering teamwork and enabling shared learning experiences through group projects and interactive tools.
- The Personalized Learning layer supports tailored learning paths and adaptive feedback mechanisms, enabling students to meet individual needs and preferences.

This framework addresses the pressing need to use AI as a force for good in higher education. By fostering AI literacy, students can build confidence, develop critical skills, and contribute to solving global challenges such as sustainability and inclusivity (World Economic Forum, 2024). As depicted in Figure 1, the design emphasises the pathway's interconnectedness and foundational layers to ensure a balanced focus on technical proficiency and equitable access.

This model seeks to redefine the role of AI in higher education, shifting its purpose from mere efficiency enhancement to an enabler of inclusive learning, innovation, and empowerment. Artificial intelligence (AI) integration in higher education is progressively acknowledged as a transforming agent improving efficiency and promoting inclusive learning, creativity, and student empowerment. This viewpoint change helps students become change agents in a society under more AI technology impact.

Firstly, AI's role in personalising education is paramount. Бахмат et al. emphasise that AI tools are designed to cater to the individual needs of students and educators, thereby enhancing the educational experience and promoting inclusivity. (Bakhmat et al., 2024). Shi et al. echo this personalised approach, discussing how AI can provide adaptive learning experiences that align with students' cognitive development, thus facilitating a more effective learning environment. (Shi et al., 2022). Furthermore, as Triplett noted, the integration of AI in STEM education underscores its potential to enhance various educational processes, including teaching and administrative functions, thereby fostering innovation (Triplett, 2023).

Moreover, the ethical implications of AI in higher education cannot be overlooked. Holmes et al. argue for establishing a community-wide framework to address the moral challenges posed by AI in educational contexts, highlighting the need for flexibility in adapting to new understandings and societal norms (Holmes et al., 2022). This ethical framework is essential for ensuring that AI serves

as a tool for empowerment rather than exclusion, aligning with the broader goals of sustainable development in education.

In addition, Yman and Mohamed further explore the concept of AI as an enabler of sustainable development. They propose a comprehensive evaluation framework for integrating AI into higher education systems. Their findings suggest that effective implementation of AI can significantly enhance educational quality and sustainability. (Yman & Mohamed, 2023). Similarly, Tanveer et al. discuss how AI can reshape educational policies to better prepare graduates for a future where AI is prevalent across various disciplines (Tanveer et al., 2020).

Finally, the necessity for AI literacy among educators is highlighted as a critical factor in leveraging AI's full potential. Ibrahim emphasises that educators must navigate the intersection of pedagogy and technology effectively, necessitating targeted training programs to enhance AI proficiency (Ibrahim, 2024). This aligns with the findings of Rütti-Joy et al., who advocate for the development of AI literacy as a fundamental goal for sustainable teacher education (Rütti-Joy et al., 2023).

# 2 Core Pathway: AI Literacy Stages

The Core Pathway of the Student Framework offers a systematic, incremental method for cultivating AI literacy, allowing students to acquire technical skills, use AI tools proficiently, and critically evaluate their results. Each pathway phase—Understand AI, Apply AI, Create with AI, Evaluate AI, and Ethical AI Usage—signifies a crucial milestone in students' educational progression, ranging from fundamental understanding to sophisticated ethical deliberations. These phases are based on practical applications and case studies, illustrating how students have used AI technologies to address obstacles, stimulate creativity, and improve their academic experiences. By incorporating these phases into their educational experience, students acquire the confidence and proficiency to navigate and participate in an AI-driven environment effectively.

## 2.1 Stage 1: Understand AI

The first step in the Core Pathway is to develop a foundational understanding of artificial intelligence (AI). This knowledge is crucial as it enables students to interact effectively with AI tools and understand their relevance in academic and professional contexts. At this stage, students are encouraged to explore key concepts such as how AI processes information, how it generates responses, and its potential to automate tasks, as well as terminologies like prompting, predictive models, and AI-generated content, and applications of AI like summarising articles, creating visual aids, and facilitating collaborative work on projects.

Students can use interactive tools and activities, summarised in Table 1, to explore AI concepts hands-on. Tools like Wordtune and ChatGPT demonstrate how AI can assist in academic writing and problem-solving, generating coherent responses and providing instant solutions (Meletiadou et al. 2024). Visual tools like Midjourney and DALL-E allow students to create visual aids, making abstract concepts more tangible. Platforms like Brainly, with its 'Snap to Solve' feature, showcase how AI can process visual data to provide instant solutions, highlighting the practical utility of AI in everyday academic tasks.

*Table 1: Tools and activities recommended for students to build foundational knowledge of AI in Stage 1, Understand AI*

| Tool | Activity | Purpose |
|---|---|---|
| **ChatGPT** | Engaging in Q&A sessions to clarify AI concepts and generate summaries. | Develops foundational understanding through interactive learning. |
| **Wordtune** | Experimenting with rewriting and paraphrasing academic content. | Demonstrates how AI refines and improves text for clarity and precision. |
| **ChatPDF** | Extracting key points from research papers and analysing content. | Enhances comprehension of technical material and critical thinking. |
| **Grammarly** | Writing reflections and summaries on AI concepts with assistance with grammar and clarity. | Improves written communication and encourages articulation of learned knowledge. |
| **Miro** | Creating mind maps to organise AI-related terms and concepts visually. | Promotes structured thinking and better retention of foundational knowledge. |
| **Otter.ai** | Transcribing AI lectures or discussions to review key ideas. | Supports note-taking and reinforces learning through repeated exposure. |
| **Brainly** | The "Snap to Solve" feature is used to analyse images and receive answers. | Explains how AI processes visual data for problem-solving. |
| **Midjourney** | Creating visual content to represent key AI concepts and ideas. | Enhances understanding through visual representation and creativity. |
| **DALL-E** | Generating realistic images based on prompts related to AI topics. | Helps students visualise how AI interprets abstract ideas into concrete images. |

Table 1 outlines some tools and activities that students can use to develop their foundational knowledge of AI. These tools are not just theoretical but designed to provide hands-on learning experiences, promote active engagement, and support understanding in practical and meaningful ways, making students' learning directly applicable to real-world scenarios.

## 2.2 Stage 2: Apply AI

The second step in the Core Pathway focuses on applying artificial intelligence (AI) tools to enhance productivity, refine academic outputs, and address complex research challenges. Students can utilise tools like **Wordtune** to refine academic writing and improve clarity, **Elicit** to streamline literature reviews and synthesise key insights, and **Brainly** to solve academic problems through AI-driven analysis of visual inputs. Students can also utilise tools like **ChatGPT** to generate essay outlines and creative solutions. At the same time, platforms such as **Midjourney** and **Stable Diffusion** support the development of innovative design concepts, showcasing how AI can address complex research challenges and elevate academic outputs (Meletiadou et al., 2024). Several tools and their activities for applying AI in this stage are summarised in Table 2, providing an overview of how each tool can be utilised effectively to achieve academic success.

*Table 2: Tools and activities designed to help students apply AI in practical academic scenarios in Stage 2, Apply AI*

| Tool | Activity | Purpose |
|---|---|---|
| **ChatGPT** | Drafting outlines for essays, generating creative solutions, and exploring academic concepts. | Encourages structured thinking and supports idea generation. |
| **Wordtune** | Refining and paraphrasing academic writing for clarity and improved expression. | Enhances written communication and ensures polished submissions. |
| **Elicit** | Conducting systematic literature reviews to gather and organise research findings. | Facilitates efficient synthesis of existing knowledge and academic resources. |
| **NotebookLM** | Uploading documents and asking questions based on their content to synthesise research. | Promotes deep engagement with materials and critical thinking during research tasks. |
| **Miro** | Creating mind maps to organise AI-related terms and concepts visually. | Promotes structured thinking and better retention of foundational knowledge. |
| **Brainly** | Using "Snap to Solve" to analyse and solve academic queries. | Demonstrates AI's ability to process visual data and provide practical solutions. |

### 2.2.1 Leveraging AI for Academic Writing

AI-powered writing tools are pivotal in helping students produce clear, coherent, and well-structured content. **Wordtune**, for example, assists in paraphrasing and refining text, ensuring that students' ideas are effectively communicated while maintaining academic tone and clarity (Meletiadou et al., 2024). Similarly, **ChatGPT** supports generating essay outlines and brainstorming ideas, enabling students to overcome writer's block and structure their assignments effectively. These tools enhance the quality of academic writing and help students save time and focus on content development.

### 2.2.2 Streamlining Research and Literature Reviews

The research process can be overwhelming due to the vast information available. Tools like **Elicit** simplify this task by efficiently synthesising research findings and identifying relevant studies (Meletiadou et al., 2024). Additionally, students can leverage **NotebookLM** to upload documents, ask context-specific questions, and generate summaries, enabling them to engage deeply with their research materials (Google, 2024). These tools support critical thinking and ensure students can easily manage extensive academic workloads.

### 2.2.3 Problem-Solving with AI

AI tools designed for academic problem-solving, such as **Brainly**, enable students to approach challenges innovatively. With features like "Snap to Solve," Brainly allows students to analyse and resolve queries visually, fostering independent learning and quick resolution of academic

challenges (Meletiadou et al., 2024). Integrating AI into problem-solving promotes resourcefulness and enhances students' ability to tackle diverse academic scenarios.

## 2.3 Stage 3: Create with AI

The third step in the Core Pathway focuses on leveraging artificial intelligence (AI) tools for creativity, enabling students to design innovative solutions, generate new ideas, and produce engaging outputs. At this stage, students can collaborate with AI tools like **Midjourney**, **Stable Diffusion**, and **ChatGPT** to enhance their creative processes. For example, students in design workshops have used **Midjourney** to generate visual concepts and mood boards and **Stable Diffusion** to refine and adapt designs, showcasing how AI can augment the iterative nature of creative projects. Similarly, students utilised **ChatGPT** to brainstorm sustainable solutions and create initial project frameworks, demonstrating the potential of AI in shaping creative outputs (Meletiadou et al., 2024). Table 3 summarises the tools and activities that facilitate creativity with AI**.**

*Table 3: Tools and activities designed to help students create with AI in Stage 3*

| Tool | Activity | Purpose |
|---|---|---|
| **Midjourney** | Generating conceptual images for projects, such as visualising abstract ideas or designs. | Enables rapid visualisation and refinement of creative concepts. |
| **Stable Diffusion** | Producing high-quality visuals, including prototypes, product designs, or creative artwork. | Supports iterative design and fosters artistic exploration. |
| **ChatGPT** | Expanding brainstorming sessions, generating creative project ideas, and drafting narratives. | Inspires diverse perspectives and enhances creative problem-solving. |
| **DALL-E** | Creating detailed and imaginative visualisations for sustainability and academic projects. | Bridges creativity with practical applications, promoting innovative solutions. |
| **Miro** | Collaborating on mind maps and visual artefacts for group projects. | Enhances teamwork and creating ideas. |

### 2.3.1 Fostering Creativity through AI Tools

AI tools have been shown to significantly enhance creative processes by reducing cognitive load and expanding the possibilities available to users (Floridi et al., 2020). For instance, generative AI tools like **Midjourney** and **Stable Diffusion** provide unique visual ideation and iterative design opportunities. Human-AI collaboration in creative tasks enables users to approach complex problems more effectively by combining computational power with human intuition and critical thinking (Haase & Pokutta, 2024).

### 2.3.2 Designing Innovative and Sustainable Solutions

AI's potential to transform problem-solving extends to addressing global challenges, such as sustainability. Tools like **DALL-E** empower students to create detailed and imaginative visualisations for projects, making abstract concepts tangible and actionable (Meletiadou et al., 2024). Research has highlighted that AI in creative tasks fosters critical thinking and adaptability as students refine outputs to meet specific goals, ensuring their designs are practical and impactful (Woo & Guo, 2023).

### 2.3.3 Expanding Collaborative Creativity

Collaboration is a key component of creativity, and tools like **Miro** enhance teamwork by enabling students to co-create visual artefacts such as mind maps, wireframes, and project workflows. These tools improve group productivity and inclusivity by fostering dynamic interactions and accommodating diverse perspectives (Floridi et al., 2020). Furthermore, co-creativity with AI tools allows for innovative outcomes that neither humans nor AI systems could achieve independently (Haase & Pokutta, 2024).

### 2.3.4 Ethical Considerations in Creativity

As students collaborate with AI to produce creative outputs, ethical considerations should guide their work. Students must ensure that AI-generated outputs are cited appropriately and used as supplements to their original ideas rather than replacements. Ethical AI use also involves understanding the limitations of these tools and evaluating their outputs critically to avoid perpetuating biases or generating misleading information (Floridi et al., 2020).

By engaging with AI tools for creative tasks, students can explore new frontiers of innovation while maintaining ethical standards. This stage enhances their ability to produce impactful academic and professional work and prepares them to navigate a rapidly evolving technological landscape.

## 2.4 Stage 4: Evaluate AI

The fourth step in the Core Pathway focuses on developing students' ability to critically evaluate AI tools and their outputs. This stage equips students with the skills to assess AI's effectiveness, reliability, and ethical implications in academic and professional contexts. Students learn to make informed decisions about integrating and using AI in their work by engaging in reflective practices and critical analysis.

### 2.4.1 Understanding AI Performance and Limitations

Evaluating AI requires understanding how these systems generate outputs and the factors influencing their performance. For example, tools like **NotebookLM** and **ChatGPT** excel in generating text-based outputs but may occasionally produce biased or inaccurate information due

to the limitations of their training data (Bender et al., 2021). Students are encouraged to use evaluation metrics such as relevance, accuracy, and coherence to assess the quality of AI-generated content.

Research suggests that incorporating critical evaluation frameworks in AI usage improves students' ability to identify potential biases and limitations, ensuring that the outputs align with academic and ethical standards (Floridi et al., 2020). By understanding the strengths and weaknesses of AI tools, students become adept at leveraging these technologies effectively.

### 2.4.2 Assessing Ethical Implications

Ethics plays a central role in evaluating AI, mainly when tools are applied in academic and professional environments. Students must consider questions such as: Is the AI-generated content original, or does it replicate existing work? Does the tool align with principles of fairness, transparency, and inclusivity? For instance, while tools like **ChatGPT** and **DALL-E** have shown significant promise in enhancing productivity, they have also raised concerns regarding intellectual property and accountability in their outputs (Cheng & Lee, 2024).

Educators can guide students in applying ethical evaluation frameworks, such as Floridi et al.'s (2020) principles of beneficence, non-maleficence, autonomy, and justice. These principles help students navigate the ethical dilemmas associated with AI use and ensure they adhere to academic integrity and professional standards.

### 2.4.3 Refining AI through Feedback and Learning

AI systems improve when users provide feedback on their outputs, enabling iterative refinements. Students are encouraged to engage with tools that offer interactive learning processes, such as **Elicit**, which refines its responses based on user input (Meletiadou et al., 2024)Through this engagement, Students evaluate and contribute to improving AI tools, fostering a collaborative approach to technology development.

### 2.4.4 Developing Critical Thinking Skills

Critical thinking is essential for evaluating AI effectively. Studies have shown that integrating reflective activities, such as comparing AI-generated outputs with human-generated work, enhances students' analytical skills and fosters a deeper understanding of AI applications (Woo & Guo, 2023). For example, students can use Miro to create comparative analyses and visualisations, which can help them articulate their evaluations more clearly.

Table 4 summarises the tools and activities that support students in evaluating AI and its outputs. It offers a structured approach to critical analysis and ethical considerations.

*Table 4: Tools and activities designed to help students critically evaluate AI and its outputs in Stage 4*

| Tool | Activity | Purpose |
|---|---|---|
| **NotebookLM** | Reviewing AI-generated summaries and identifying inaccuracies or gaps in content. | Enhances students' ability to assess AI outputs critically. |
| **ChatGPT** | Comparing AI-generated responses with human-generated content for coherence and accuracy. | Promotes reflective evaluation and understanding of AI limitations. |
| **Elicit** | Providing iterative feedback to improve the relevance and quality of AI outputs. | Supports collaborative improvement of AI tools. |
| **DALL-E** | Assessing the originality and appropriateness of AI-generated visual content. | Encourages ethical considerations and intellectual property awareness. |
| **Miro** | Creating visual representations of evaluation criteria and comparisons. | Facilitates structured critical thinking and analysis. |

#### 2.4.5 Ethical Considerations in Evaluation

Evaluating AI is inherently tied to ethical considerations. Students must ensure transparency by documenting their evaluation processes and citing AI contributions appropriately. They should also advocate for fair AI usage, ensuring that tools are employed to promote equity and not exacerbate existing inequalities (Floridi et al., 2020).

By engaging in evaluation activities, students develop a critical perspective that empowers them to use AI responsibly and effectively. This stage enhances their academic and professional competence and prepares them to contribute meaningfully to the ongoing discourse on AI and its societal impacts.

### 2.5 Stage 5: Ethical AI Usage

The final step in the Core Pathway focuses on fostering a strong ethical foundation for using artificial intelligence (AI) in higher education. Students must develop the skills and understanding necessary to navigate the ethical implications of AI tools while ensuring fairness, accountability, and compliance with academic and professional standards. This stage equips students to critically engage with AI in ways that uphold integrity and societal values.

#### 2.5.1 Understanding the Foundations of Ethical AI

Ethical AI use begins with understanding its underlying principles, including fairness, transparency, accountability, and privacy. These principles ensure that AI serves as a force for good while mitigating risks such as bias, misinformation, and misuse. The framework developed by Floridi and Cowls (Floridi & Cowls, 2019) Highlights four key principles: beneficence (promoting well-being), non-maleficence (avoiding harm), autonomy (ensuring human control), and justice (promoting

fairness). Students can use these principles to assess the implications of AI tools in academic contexts.

For instance, tools like **ChatGPT** can assist with academic writing, but students must ensure their use adheres to originality and appropriate attribution standards to avoid plagiarism. This practice not only upholds academic integrity but also helps students cultivate responsible habits when engaging with technology.

### 2.5.2 Addressing Bias and Fairness

AI systems often inherit biases from their training data, which can lead to unintended consequences. For example, language models may generate outputs that reinforce stereotypes or marginalise certain groups (Binns, 2018). Students must critically evaluate the biases present in AI-generated outputs and take steps to mitigate their impact. This includes cross-referencing AI responses with diverse sources and ensuring that the tools complement rather than replace critical thinking.

In group projects, students can apply inclusive practices by ensuring that AI-generated outputs reflect diverse perspectives. By incorporating discussions on fairness and representation into their workflows, students learn to use AI as a tool for inclusivity.

### 2.5.3 Privacy and Data Security

The ethical use of AI extends to safeguarding privacy and data security. Many AI tools process personal and sensitive information, raising concerns about compliance with regulations such as the General Data Protection Regulation (GDPR). Students must understand how data is collected, stored, and processed by the AI tools they use.

For instance, while tools like **NotebookLM** allow students to upload personal notes and documents for enhanced research capabilities, they must ensure that the data is handled securely. Reading privacy policies, choosing reputable tools, and avoiding sharing sensitive information are critical steps to maintain trust and accountability in AI use (Bender et al., 2021).

### 2.5.4 Promoting Transparency and Accountability

Transparency in AI usage involves documenting how AI tools are integrated into academic work and attributing AI contributions. Studies emphasise the importance of maintaining transparency to ensure accountability and foster trust in AI applications (Morley et al., 2020). Students should log their interactions with AI tools, noting their specific tasks and reflecting on the tool's influence on their outputs. For example, when using **DALL-E** to create visual content for academic presentations, students can include captions that indicate the role of AI in generating the visuals. This practice promotes ethical collaboration between humans and AI while adhering to intellectual property guidelines.

### 2.5.5 Navigating Academic Integrity

Academic integrity is at the core of ethical AI usage. While AI tools can enhance productivity and creativity, their misuse can lead to academic misconduct. Universities increasingly provide guidelines for AI use in coursework, and students are encouraged to consult these policies to ensure compliance. Reflective activities, such as comparing AI-generated outputs with their work, can help students recognise the boundaries of ethical AI use (Cheng & Lee, 2024).

Additionally, engaging in discussions with peers and educators about the ethical implications of AI fosters a deeper understanding of its potential and limitations. This collaborative approach prepares students to address the ethical challenges they may encounter in their academic and professional journeys.

### 2.5.6 Cultivating Ethical AI Practices

Stage 5 equips students with the tools to evaluate and ethically engage with AI in higher education critically. By understanding the principles of fairness, transparency, and accountability, students can navigate the complexities of AI with integrity. This stage enhances their academic performance and prepares them to contribute to a responsible and ethical technological future.

# 3 Supporting Layers

The supporting layers of the framework—personalised Learning, Collaboration, and Inclusion—play a crucial role in ensuring that students effectively and responsibly engage with artificial intelligence (AI). These layers provide the structural foundation for navigating the Core Pathway and support the development of critical skills, ethical awareness, and practical applications of AI in higher education.

## 3.1 Personalised Learning: Tailoring AI to Individual Needs

Personalised learning, supported by AI, adapts educational content and methods to individual learners' needs, preferences, and progress. This layer empowers students by providing tailored resources and feedback, ensuring that learning is engaging and effective.

AI tools like ChatGPT and NotebookLM offer personalised assistance, helping students clarify concepts, summarise complex materials, and receive context-specific feedback. Studies have shown that personalised AI systems improve learning outcomes by addressing diverse learning styles and providing targeted support (Dabbagh & Kitsantas, 2012). For example, AI-driven adaptive learning platforms can identify gaps in students' knowledge and provide customised exercises to address them, promoting continuous skill development.

Moreover, personalised learning fosters autonomy as students can set their learning pace and explore topics of interest. This self-directed approach enhances motivation and critical thinking, preparing students for lifelong learning in rapidly evolving fields (Holmes et al., 2019).

## 3.2 Collaboration: Enhancing Teamwork with AI Tools

Collaboration is essential in academic and professional contexts, and AI tools offer unique opportunities to enhance teamwork. Platforms like Miro facilitate real-time co-creation, enabling students to collaborate on projects, create mind maps, and brainstorm ideas dynamically. Research highlights that collaborative AI tools improve team productivity by streamlining workflows and fostering inclusivity.

AI can also act as a neutral mediator in collaborative settings, providing objective insights and suggestions to support group decision-making. For instance, tools like Elicit can synthesise literature for research projects, ensuring all team members can access the same foundational knowledge (Bender et al., 2021). This shared understanding promotes cohesion and reduces potential conflicts.

Additionally, collaborative AI supports cross-disciplinary projects by bridging communication gaps between team members from different fields. This aspect is particularly valuable in addressing complex global challenges, where diverse expertise and perspectives are necessary.

### 3.3 Inclusion: Bridging Gaps in AI Access and Literacy

The inclusion layer ensures equitable access to AI tools and fosters digital literacy among all students, regardless of their background. Addressing digital divides is critical, as unequal access to technology can exacerbate existing educational disparities.

AI tools like Brainly, with its multilingual support, enable students from diverse linguistic backgrounds to engage effectively with educational content. Similarly, platforms such as Letrus enhance writing skills for students facing language barriers, providing opportunities for meaningful academic participation (Meletiadou et al., 2024).

Inclusion also involves addressing biases within AI systems. Studies have emphasised the need for AI models to be designed and evaluated with fairness and diversity to ensure that marginalised groups are not adversely impacted (Binns, 2018). Educators can support inclusion by integrating discussions about bias, fairness, and accessibility into their curricula, preparing students to evaluate AI systems critically. This layer promotes inclusive practices, ensuring that all students can benefit from AI educational advancements regardless of socioeconomic status, geographic location, or ability.

### 3.4 The Interplay of Supporting Layers

These supporting layers—personalised Learning, Collaboration, and Inclusion—are interconnected and mutually reinforcing. Personalised learning fosters autonomy, which enhances collaborative efforts by allowing individuals to contribute unique perspectives. Collaboration, in turn, creates inclusive environments where diverse voices are valued, leading to richer learning experiences.

For example, students using NotebookLM to personalise their learning can share their insights through Miro during a collaborative session. Integrating these tools ensures that students benefit individually and contribute to collective success. This synergy prepares students for dynamic and inclusive academic and professional environments.

The supporting layers of the framework provide a robust foundation for navigating the Core Pathway. Students can maximise their engagement with AI by leveraging personalised learning, fostering collaboration, and ensuring inclusion. These layers enhance academic performance and prepare students to contribute meaningfully to an equitable and technology-driven future.

# 4 Implementation Strategy: A Roadmap for Effective AI Integration

The Implementation Strategy delineates a structured framework for students to ethically and effectively integrate artificial intelligence (AI) tools into their academic endeavours. This strategy emphasises aligning AI applications with educational goals, critically evaluating AI outputs, and adhering to ethical principles while fostering inclusivity and widening access to education.

## 4.1 Defining Academic Goals

A clear understanding of academic objectives forms the foundation of effective AI integration. Students can leverage AI tools to address diverse needs, from research synthesis to creative outputs. For instance, tools such as ChatGPT facilitate brainstorming and generating structured essay outlines, while NotebookLM supports organising and analysing research materials (Nguyen-Trung et al., 2024). By aligning AI capabilities with specific goals, students ensure purposeful and focused use of these technologies, ultimately enhancing productivity and learning outcomes (Mudawy, 2024).

## 4.2 Selection and Evaluation of AI Tools

The choice of AI tools should be guided by their relevance, ethical considerations, and alignment with academic tasks. Tools like Elicit enable efficient synthesis of academic literature, while DALL-E and Midjourney support creative processes by generating visual content tailored to specific academic needs. However, adopting these tools must also account for ethical dimensions such as privacy, inclusivity, and transparency. For example, selecting tools that comply with data protection standards and offer multilingual support ensures equitable access (Edeni et al., 2024). Critical evaluation of AI tools further enables students to identify potential biases or limitations in their functionalities, fostering a balanced and informed approach (Roshanaei et al., 2023).

## 4.3 Integration into Academic Workflows

Integrating AI tools into academic practices involves embedding them into established workflows, enabling a seamless productivity enhancement. For research activities, tools like NotebookLM organise and annotate academic materials, facilitating comprehensive analysis. Platforms such as Midjourney and Stable Diffusion in creative endeavours generate innovative visualisations that enrich presentations or projects (Meletiadou et al., 2024). However, strategic integration also requires the active participation of students, balancing AI's utility with traditional academic methods and ensuring students retain ownership of their intellectual contributions while leveraging the efficiency of AI tools (Fabiano et al., 2024). This central role in the integration process makes students feel important and integral to the academic process.

### 4.4 Critical Evaluation of AI Outputs

Engaging critically with AI-generated content is paramount to maintaining academic rigour and integrity. While capable of generating high-quality outputs, AI tools may occasionally produce inaccurate or biased information. Students must scrutinise the validity and relevance of these outputs by cross-referencing them with credible academic sources (Tlili et al., 2023). Furthermore, evaluating creative outputs for originality and alignment with academic requirements mitigates potential ethical and intellectual property concerns, ensuring that AI is a reliable aid rather than an unquestioned authority (Zielinski et al., 2023).

### 4.5 Ethical Considerations and Academic Integrity

The ethical integration of AI necessitates adherence to principles of fairness, accountability, and transparency. Ethical practices include proper attribution of AI tools when they contribute to academic outputs, avoiding over-reliance on AI to ensure that it complements rather than replaces critical thinking and analytical skills, and identifying and addressing biases in AI-generated outputs to promote fairness and inclusivity (Edeni et al., 2024; Roshanaei et al., 2023). These practices cultivate a culture of responsible AI usage, aligning academic pursuits with broader societal values. This emphasis on ethical considerations instils students' sense of responsibility and conscientiousness.

### 4.6 Promoting Inclusivity and Widening Access

AI has the potential to bridge educational gaps by enhancing accessibility and inclusivity. Tools like Brainly, with its multilingual features, support diverse learners by providing equitable access to academic resources. Similarly, platforms such as Letrus address language-related challenges, enabling students to improve their writing skills and participate fully in educational activities (Edeni et al., 2024). By leveraging AI's inclusivity features, students can contribute to fostering equitable educational environments, ensuring that technological advancements benefit all learners (Roshanaei et al., 2023).

### 4.7 Reflective Practices for Continuous Improvement

Reflection is integral to the effective integration of AI in academic contexts. By evaluating their experiences with AI tools, students can identify strengths, limitations, and areas for improvement. Key reflective questions include how effectively the AI tool contributed to achieving the academic objective, challenges encountered in using the tool, and what adjustments can enhance future use of AI technologies (Edeni et al., 2024; Roshanaei et al., 2023). This iterative process enhances digital literacy and fosters a learning mindset, preparing students for dynamic technological landscapes.

The Implementation Strategy provides a robust framework for students to navigate the complexities of AI integration in higher education. Students can responsibly and effectively harness AI's transformative potential by aligning tools with academic goals, critically evaluating outputs, adhering to ethical principles, and fostering inclusivity. This approach enriches academic experiences and equips students to contribute meaningfully to a more equitable and technologically advanced society.

## 5 Conclusion

The Student Framework for AI Literacy offers a detailed guide for incorporating artificial intelligence (AI) into higher education, promoting academic development, inclusion, and ethical consciousness. By concentrating on the five steps of the Core Pathway—Understand AI, Apply AI, Create with AI, Evaluate AI, and Ethical AI Usage—students acquire technical skills, leverage AI's innovative potential, and critically analyse its ramifications. These phases, underpinned by essential elements of personalised learning, collaboration, and inclusiveness, guarantee that students traverse their educational paths with intention and flexibility.

This paradigm highlights the need for technical expertise and the ethical issues for responsible AI use. By following equity, openness, and accountability principles, students may proficiently use AI technologies while maintaining academic integrity and social values. Furthermore, incorporating reflective practices allows students to consistently assess and improve their methodologies, promoting lifelong learning and adaptation in an AI-centric environment.

The systematic implementation technique enables students to match AI with their academic objectives, critically evaluate its outcomes, and address educational disparities. This plan highlights AI's revolutionary potential to improve productivity, stimulate innovation, and advance inclusion in higher education. By using AI ethically, students are more equipped to significantly contribute to global issues such as sustainability, equality, and technical progress.

The framework ultimately equips students to excel in complex, dynamic contexts, preparing them to lead in a future where AI is crucial. As higher education progresses, this approach exemplifies AI's capacity to augment learning and empower students as innovators, critical thinkers, and ethical members of society.

## References


Bakhmat, N., Romanova, I., Oronovska, L., Rudenko, O., & Mogyl, O. (2024). Ukrainian education for peace and security 2023: Technological convergence, artificial intelligence. *Multidisciplinary Reviews*, *6*, 2023spe016. https://doi.org/10.31893/multirev.2023spe016

Bender, E. M., Gebru, T., McMillan-Major, A., & Shmitchell, S. (2021). On the dangers of stochastic parrots: Can language models be too big? *FAccT 2021 - Proceedings of the 2021 ACM Conference on Fairness, Accountability, and Transparency*, 610–623. https://doi.org/10.1145/3442188.3445922

Binns, R. (2018). Fairness in Machine Learning: Lessons from Political Philosophy. In *Proceedings of Machine Learning Research* (Vol. 81).

Cheng, I.-H., & Lee, S. T. (2024). The Impact of Ethics Instruction and Internship on Students' Ethical Perceptions About Social Media, Artificial Intelligence, and ChatGPT. *Journal of Media Ethics*, *39*(2), 114–129. https://doi.org/10.1080/23736992.2024.2333486

Chima Abimbola Edeni, Olabisi Oluwakemi Adeleye, & Idowu Sulaimon Adeniyi. (2024). The role of AI-enhanced tools in overcoming socioeconomic barriers in education: A conceptual analysis. *World Journal of Advanced Research and Reviews*, *21*(3), 944–951. https://doi.org/10.30574/wjarr.2024.21.3.0780

Dabbagh, N., & Kitsantas, A. (2012). Personal Learning Environments, social media, and self-regulated learning: A natural formula for connecting formal and informal learning. *Internet and Higher Education*, *15*(1), 3–8. https://doi.org/10.1016/j.iheduc.2011.06.002

European Commission. (2022). *Ethical guidelines on the use of artificial intelligence (AI) and data in teaching and learning for Educators*. https://doi.org/10.2766/127030

Fabiano, N., Gupta, A., Bhambra, N., Luu, B., Wong, S., Maaz, M., Fiedorowicz, J. G., Smith, A. L., & Solmi, M. (2024). How to optimize the systematic review process using AI tools. In *JCPP Advances* (Vol. 4, Issue 2). John Wiley and Sons Inc. https://doi.org/10.1002/jcv2.12234

Floridi, L., & Cowls, J. (2019). A Unified Framework of Five Principles for AI in Society. *Harvard Data Science Review*. https://doi.org/10.1162/99608f92.8cd550d1

Floridi, L., Cowls, J., King, T. C., & Taddeo, M. (2020). How to Design AI for Social Good: Seven Essential Factors. *Science and Engineering Ethics*, *26*(3), 1771–1796. https://doi.org/10.1007/s11948-020-00213-5

Haase, J., & Pokutta, S. (2024). *Human-AI Co-Creativity: Exploring Synergies Across Levels of Creative Collaboration*. http://arxiv.org/abs/2411.12527

Holmes, W., Bialik, M., & Fadel, C. (2019). *Artificial Intelligence in Education. Promise and Implications for Teaching and Learning*. https://www.researchgate.net/publication/332180327

Holmes, W., Porayska-Pomsta, K., Holstein, K., Sutherland, E., Baker, T., Shum, S. B., Santos, O. C., Rodrigo, M. T., Cukurova, M., Bittencourt, I. I., & Koedinger, K. R. (2022). Ethics of AI in Education: Towards a Community-Wide Framework. *International Journal of Artificial Intelligence in Education*, *32*(3), 504–526. https://doi.org/10.1007/s40593-021-00239-1

Ibrahim, A. B. (2024). Assessing the Knowledge and Perception of Artificial Intelligence for Teaching and Research among Lecturers in the Faculties of Arts in Nigeria. *Journal of Global Research in Education and Social Science*, *18*(2), 25–33. https://doi.org/10.56557/jogress/2024/v18i28671

Kong, S. C., Man-Yin Cheung, W., & Zhang, G. (2021). Evaluation of an artificial intelligence literacy course for university students with diverse study backgrounds. *Computers and Education: Artificial Intelligence*, *2*. https://doi.org/10.1016/j.caeai.2021.100026

Laupichler, M. C., Aster, A., Schirch, J., & Raupach, T. (2022). Artificial intelligence literacy in higher and adult education: A scoping literature review. In *Computers and Education: Artificial Intelligence* (Vol. 3). Elsevier B.V. https://doi.org/10.1016/j.caeai.2022.100101

Meletiadou, E., Pouransari, S., Hazizi, T., Alhasani, M., Karakis, S., Rousoulioti, T., Rayeni Pour, & A. N. (2024). *Using AI to promote E ducation for S ustainable D evelopment ( ESD) and widen access to digital skills : List of Case Studies*.

Mohammed Ahmed Mudawy, A. (2024). Investigating EFL Faculty Members' Perceptions of Integrating Artificial Intelligence Applications to Improve the Research Writing Process: A Case Study at Majmaah University. *Arab World English Journal*, *1*(1), 169–183. https://doi.org/10.24093/awej/chatgpt.11

Morley, J., Floridi, L., Kinsey, L., & Elhalal, A. (2020). From What to How: An Initial Review of Publicly Available AI Ethics Tools, Methods and Research to Translate Principles into Practices. *Science and Engineering Ethics*, *26*(4), 2141–2168. https://doi.org/10.1007/s11948-019-00165-5

Ng, D. T. K., Leung, J. K. L., Chu, S. K. W., & Qiao, M. S. (2021). Conceptualizing AI literacy: An exploratory review. *Computers and Education: Artificial Intelligence*, *2*. https://doi.org/10.1016/j.caeai.2021.100041

Nguyen-Trung, K., Saeri, A. K., & Kaufman, S. (2024). Applying ChatGPT and AI-Powered Tools to Accelerate Evidence Reviews. *Human Behavior and Emerging Technologies*, *2024*(1). https://doi.org/10.1155/2024/8815424

Roshanaei, M., Olivares, H., & Lopez, R. R. (2023). Harnessing AI to Foster Equity in Education: Opportunities, Challenges, and Emerging Strategies. *Journal of Intelligent Learning Systems and Applications*, *15*(04), 123–143. https://doi.org/10.4236/jilsa.2023.154009

Rütti-Joy, O., Winder, G., & Biedermann, H. (2023). Building AI Literacy for Sustainable Teacher Education. *Zeitschrift Für Hochschulentwicklung*, *18*(4), 175–189. https://doi.org/10.21240/zfhe/18-04/10

Shi, D., Zhou, J., Wang, D., & Wu, X. (2022). Research Status, Hotspots, and Evolutionary Trends of Intelligent Education from the Perspective of Knowledge Graph. *Sustainability*, *14*(17), 10934. https://doi.org/10.3390/su141710934

Tanveer, M., Hassan, S., & Bhaumik, A. (2020). Academic Policy Regarding Sustainability and Artificial Intelligence (AI). *Sustainability*, *12*(22), 9435. https://doi.org/10.3390/su12229435

Tlili, A., Shehata, B., Adarkwah, M. A., Bozkurt, A., Hickey, D. T., Huang, R., & Agyemang, B. (2023). What if the devil is my guardian angel: ChatGPT as a case study of using chatbots in education. *Smart Learning Environments*, *10*(1). https://doi.org/10.1186/s40561-023-00237-x

Triplett, W. J. (2023). Artificial Intelligence in STEM Education. *Cybersecurity and Innovative Technology Journal*, *1*(1), 23–29. https://doi.org/10.53889/citj.v1i1.296

UNESCO. (2017). *Education for sustainable development goals : learning objectives*. UNESCO.

Woo, D. J., & Guo, K. (2023). *Exploring an AI-supported approach to creative writing: Effects on secondary school students' creativity*. https://doi.org/10.13140/RG.2.2.24489.06247

World Economic Forum. (2024). *AI for Impact: Strengthening AI Ecosystems for Social Innovation*.

yman, chemlal, & Mohamed, A. (2023). *Fostering sustainable Development Through Artificial Intelligence in Education (ESD): A Comprehensive Evaluation Framework and Key Criteria Analysis*. https://doi.org/10.21203/rs.3.rs-3372485/v1

Zielinski, C., Winker, M., Aggarwal, R., Ferris, L., Heinemann, M., Lapeña, Jr, J. F., Pai, S., Ing, E., & Citrome, L. (2023). Chatbots, ChatGPT, and Scholarly Manuscripts: WAME Recommendations on ChatGPT and Chatbots in Relation to Scholarly Publications. *Open Access Macedonian Journal of Medical Sciences*, *11*(A), 83–86. https://doi.org/10.3889/oamjms.2023.11502