

# AI Wanderlust: A Roadmap to Integrating GenAI Tools in the Classroom Fostering Critical AI Literacy

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**Keywords:** Artificial Intelligence, K12 Education, AI Literacy, GenAI, Project-Based Learning, Critical Thinking, Ethics.

**Abstract:** Embarking on an innovative educational journey, this paper delves into the dynamic integration of Generative AI (GenAI) tools into high school education centering around the implementation of a practical project, "AI Wanderlust." This project goes beyond imparting technical skills; it should serve as a catalyst for instilling a reflective mindset in students. The core task involves students creating an immersive virtual travel experience using GenAI-generated content, aiming to foster creativity, critical thinking, and AI literacy. The overarching objective is to explore the ethical implications associated with GenAI integration within an educational context. Aligned with a roadmap for lesson design to foster critical AI Literacy, this project seeks to develop essential skills crucial in the ever-evolving landscape of AI in education. By extending beyond technical proficiency, the project emphasizes teacher-guided ethical reflection. This combination of hands-on engagement and mentorship ensures that students not only learn to use GenAI tools effectively but also develop a nuanced understanding of the ethical considerations inherent in the field. In essence, the project and its associated roadmap represent a proactive approach to propel high school education into the era of Generative AI. The aim is to cultivate students not merely as users but as informed, critical thinkers equipped with the skills and ethical awareness needed to navigate the multifaceted landscape of GenAI responsibly and thoughtfully in the broader context of Artificial Intelligence education.

## 1 INTRODUCTION

In the ever-evolving landscape of Artificial Intelligence (AI), the emergence of OpenAI's ChatGPT in November 2022 has ignited a wave of curiosity and exploration. With a rapid surge in user numbers attaining one million users within a week of its launch (Polymer, 2023), its widespread acceptance is evident, owing to its user-friendly interface and perceived high usefulness (Leiter et al., 2023; Xu et al., 2023; Karakose, 2023). This paper navigates the intriguing intersection of educational technology and ethical concerns surrounding Generative AI (GenAI) such as ChatGPT. As students increasingly incorporate GenAI into their daily lives (Forman et al., 2023; Chan and Lee, 2023), it becomes imperative for classrooms to not only teach the proper usage of GenAI, emphasizing prompt engineering, but also to instill a reflective mindset. Issues ranging from the potential

for hallucinations within language models to the risk of misuse, such as plagiarism, underscore the need for careful reflection. Additionally, students should learn to reflect the outcome of GenAI tools and their possible impact on society including ethical questions. There is a growing awareness of the potential biases and stereotypical outcomes that might emerge from the use of GenAI.

Under the guiding principle of "Teach GenAI with GenAI", this paper proposes a roadmap for a project-based lesson design titled "AI Wanderlust." It initiates by clarifying essential AI terms, progresses to outline a robust roadmap, introduces the captivating task titled "AI Wanderlust," and meticulously defines educational objectives, aligning with Bloom's taxonomy Bloom (1956). Furthermore, the paper offers advice and strategies to guide students toward critical thinking and addresses general ethical concerns surrounding the integration of ChatGPT in educational contexts. This paper embarks on a journey to equip students with the skills needed to navigate the realm of GenAI responsibly and thoughtfully.

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## 2 BACKGROUND

### 2.1 Understanding the Hierarchical Landscape of AI

#### 2.1.1 AI (Artificial Intelligence)

Artificial Intelligence (AI) stands as the overarching concept that encompasses the development of computers and robots capable of performing tasks that typically require human intelligence. It serves as the foundation for various specialized domains, including Machine Learning, Deep Learning, and Generative AI.

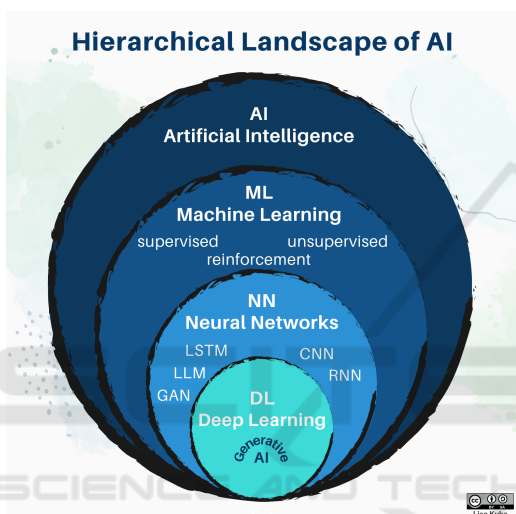


Figure 1: Hierarchical Landscape of AI.

#### 2.1.2 ML (Machine Learning)

Within the realm of AI, Machine Learning (ML) emerges as a pivotal discipline, emphasizing the ability of algorithms to learn and improve from experience. Machine Learning can be broadly categorized into three main paradigms: In **Supervised Learning**, algorithms are trained on labeled datasets, where the model learns to map inputs to corresponding outputs, facilitating tasks like image classification. **Unsupervised Learning** involves algorithms working with unlabeled data, discovering patterns and relationships within the data, as seen in clustering algorithms, whereas **Reinforcement Learning** focuses on learning through interaction with an environment, receiving feedback in the form of rewards or penalties. This paradigm is applied in scenarios like game playing and robotic control.

#### 2.1.3 Deep Learning:

Deep Learning, a subset of Machine Learning, leverages neural networks with multiple layers to achieve complex data analysis. Within the landscape of Deep Learning, various architectures play distinctive roles: **Large Language Models (LLMs)**, such as GPT-3, are advanced language models designed for natural language understanding and generation, showcasing the potential of deep neural networks in processing and generating textual information. **Generative Adversarial Networks (GANs)** introduce a novel approach to generative tasks, utilizing the interplay between a generator and a discriminator. GANs have been particularly successful in text-to-text and text-to-image generation, demonstrating their prowess in creative content creation.

#### 2.1.4 Special Role of Generative AI (GenAI)

Generative AI occupies a distinctive space within the AI landscape, focusing on systems capable of producing new content. Large Language Models (LLMs) and Generative Adversarial Networks (GANs) stand out as pioneers in this field. In text-to-text and text-to-image generation, the combined capabilities of LLMs and GANs have led to breakthroughs, showcasing the potential of Generative AI in creative content generation.

The relationships between Artificial Intelligence, Machine Learning, Deep Learning, and Generative AI are hierarchical and complementary. As can be seen in Figure 1, AI provides the overarching goal, while Machine Learning serves as a critical methodology within AI. Deep Learning, with its various architectures like LLMs, GANs, CNNs, RNNs, and LSTMs, represents a sophisticated approach within Machine Learning, offering solutions to complex data analysis.

### 2.2 Adapting Baacke’s Media Competence Model as an AI Literacy Framework

Baacke’s Media Competence Model (1996) offers a foundational framework for integrating digital literacy and ethical considerations into education. By emphasizing four dimensions—media criticism, media knowledge, media usage, and media design—the model provides a robust structure for fostering the skills and understanding necessary to navigate the digital world Baacke (1996). This framework can be effectively adapted to address the specific competencies required for AI literacy, focusing on the critical, practical, and ethical engage-

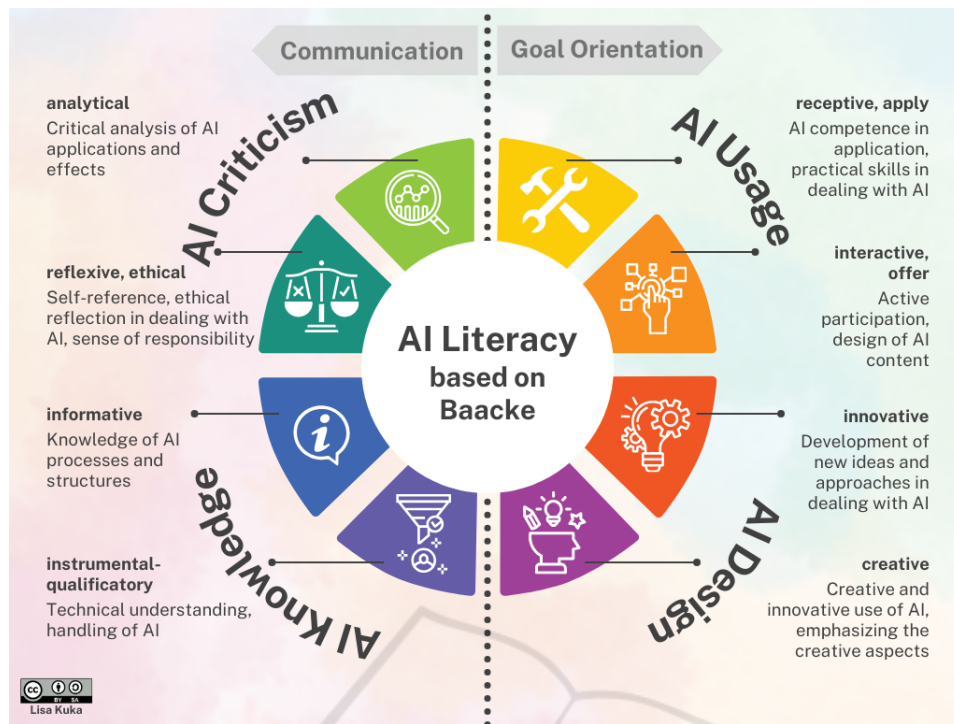


Figure 2: AI Literacy based on Baacke (Kuka et al. (2024)).

ment with AI technologies, as can be seen in Figure 2.

- 1. AI Criticism.** AI criticism, akin to media criticism, focuses on analyzing AI-generated content for biases, stereotypes, inaccuracies, and ethical concerns. By assessing the strengths and limitations of AI tools, students develop critical thinking skills and become more aware of the societal implications of AI.
- 2. AI Knowledge.** AI knowledge involves understanding the functionality of AI systems, including machine learning and natural language processing. Students learn about prompt engineering and the role of datasets, gaining hands-on experience with tools like ChatGPT and text-to-image generators to reinforce their understanding.
- 3. AI Usage.** Practical Application of AI for Problem-Solving AI usage reflects the practical component of media usage, emphasizing the application of AI tools to address real-world challenges. Learners engage in activities that involve generating content, solving problems, or enhancing workflows with AI technologies, allowing them to develop hands-on experience and apply AI solutions creatively and effectively.
- 4. AI Design.** Creating Ethical and Responsible AI Applications AI design extends the dimension

of media design by focusing on the creation of responsible and ethically sound AI applications. This involves integrating considerations such as fairness, transparency, and accountability into the design and deployment of AI tools. Learners are encouraged to reflect on the broader impact of their design choices, ensuring that AI technologies are used thoughtfully and responsibly.

By adapting Baacke's Media Competence Model to the context of AI literacy, educators can provide a comprehensive framework that balances technical proficiency with critical reflection and ethical responsibility. This approach ensures learners are equipped to navigate the complex landscape of AI technologies with confidence and an understanding of their societal impact.

### 3 ROADMAP FOR LESSON DESIGN TO FOSTER CRITICAL AI LITERACY

Exploring the nuances of lesson design for a project-based assignment that aims to build critical AI literacy, this segment uncovers a roadmap guided by the principle "Teach GenAI with Gen AI." As can be seen in Figure 3, the outlined steps encompass the entire

pedagogical journey, beginning with the inspiration phase, where diverse and engaging topics are discovered and selected to stimulate student interest. The creation phase involves GenAI Story Weaving, utilizing ChatGPT for crafting compelling narratives that explicitly encourage critical thinking. The illustration phase emphasizes the incorporation of text-to-image GenAI, such as Ideogram, to enhance visuals, coupled with a conscientious consideration of ethical implications. The showcase phase advises selecting an interactive platform that prioritizes critical engagement. The engagement phase calls for the integration of quizzes, challenges, and decision-making elements to foster active participation while also encouraging ethical reflections. Notably, the paper underscores the pivotal role of critical and ethical reflection throughout the entire process, with an emphasis on the teacher’s guidance. Recognizing that teachers must possess a nuanced understanding of GenAI mechanics, ethical considerations, and effective teaching strategies, the subsequent subsection provides valuable insights and advice on cultivating critical thinking in the classroom.

### 3.1 Project Description

Based on the roadmap this section will provide an example task for educators and students alike, fostering a deep understanding of the multifaceted nature of integrating Generative AI into Upper Secondary projects.

The following description is designed for direct distribution to students, with the option to include the detailed task description if desired. While the task details are available, they are not obligatory to hand out by teachers, allowing for flexibility. This description, tailored for direct dissemination to students, embraces the flexibility to include a detailed task description, emphasizing the objective of engaging with Generative AI tools. Acknowledging the potential influence of vague instructions on creativity, recent research offers nuanced insights. Dove et al. (2017) suggest that constraints and ambiguity can positively support small-scale creativity. Simultaneously, Mascio et al.’s (2018) findings underscore the importance of the wording and placement of task instructions in shaping the novelty and workability of ideas. Levenson’s (2013) emphasis on task features, cognitive demands, emotions, and values aligns with the notion that these factors play pivotal roles in promoting creativity, especially in mathematical contexts. Nevertheless, Halpern’s (2010) cautionary note about a gap between the potential for enhancing creativity and actual practices in university classrooms adds a layer



Figure 3: Roadmap: Lesson Design to Foster Critical AI Literacy.

of complexity to the understanding. In light of these diverse perspectives, the deliberate vagueness in task descriptions is proposed as a means to evoke creative thinking, recognizing that the impact may vary based on the context and the nature of the task. However, in this scenario, the vague description could lead to a more creative outcome and a deeper examination of the topic.

**Project Title.** AI Wanderlust: Exploring Destinations Virtually with GenAI

**Objective.** Create an immersive virtual travel experience using AI-generated content to guide users through various destinations. This project aims to combine the creativity of students with the capabil-

ities of GenAI tools like ChatGPT and Ideogram to offer a unique and engaging exploration of different places.

#### Task Description.

1. Destination Selection:
  - Choose a topic for your travel guide.
  - Choose a list of diverse destinations for the virtual travel experience. These could include historical sites, natural wonders, or culturally rich cities.
2. AI-Generated Content:
 

Use ChatGPT to create travel guides, stories, dialogues, and interesting facts about each destination. Ensure that the AI-generated content adds value to the virtual travel experience.
3. Visual Enhancements:
 

Utilize a text-to-image GenAI (Ideogram, Bing Image Creator, Adobe Firefly, . . .) to visually represent the unique aspects of each destination. This could include creating visual symbols, maps, or illustrations to enhance the overall experience.
4. Interactive Platform:
 

Select a platform for presenting the virtual travel experience. This could be a website, app, or interactive presentation. Consider incorporating multimedia elements like audio, video, and interactive features.
5. User Engagement:
 

Design interactive elements that allow users to engage with the virtual travel experience. This might include quizzes, challenges, or decision-making scenarios based on AI-generated content.
6. Critical Reflection:
 

Throughout the project, you should critically reflect on the use of AI in shaping the virtual travel experience. Consider questions such as:

  - How does AI contribute to the storytelling and engagement of users?
  - Are there potential biases in the AI-generated content, and how can these be addressed?
  - What ethical considerations should be taken into account when using AI in this context?
7. Presentation:
 

You will present your virtual travel experience to the class. Emphasize the importance of effective communication and user experience in your presentation.
8. Peer Evaluation:
 

Encourage your classmates to evaluate and provide constructive feedback on your projects. Consider aspects like creativity, usability, and the incorporation of AI-generated content.

## 3.2 Educational Objectives

The project's objectives are twofold, aiming to provide students with a multifaceted understanding of GenAI tools. Firstly, students will explore text-to-text tools, including platforms like *ChatGPT* and *Poe*, alongside text-to-image tools such as *Ideogram* and *Bing Image Creator*. Through hands-on experiences, they will develop proficiency in prompt engineering, honing their skills to effectively guide AI models and tailor outputs to project-specific requirements. Simultaneously, the second objective underscores the critical need for students to engage in reflective and nuanced discussions about the outputs of GenAI tools, particularly when dealing with sensitive topics like culture. Recognizing the potential biases embedded in AI-generated content, the process is carefully guided by a teacher, fostering an environment where students can explore, question, and heighten their awareness of the ethical implications inherent in utilizing AI. The overarching awareness of AI's capacity to cement bias underscores the importance of a guided, teacher-led approach to ensure responsible and thoughtful integration of Generative AI in educational projects.

Guided by Bloom's Taxonomy (Bloom, 1956), the tasks navigate through the various levels of cognitive skills, the objectives are strategically outlined to facilitate a comprehensive learning experience for students. The objectives progress through remembering, understanding, applying, analyzing, and culminating in the creation of knowledge. Each objective is meticulously crafted to empower students in their exploration of generative AI tools, emphasizing not only the acquisition of knowledge but also the practical application and critical evaluation of these skills.

The students can . . .

1. **Remembering**
  - . . . recall and list Generative AI tools, including text-to-text tools like ChatGPT and Poe, as well as text-to-image tools such as Ideogram and Bing Image Creator.
  - . . . can remember how GenAI tools might influence cultural sensitivity in content generation.
2. **Understanding**
  - . . . explain the process of prompt engineering.
  - . . . understand how specific prompts influence the output of generative AI tools.
  - . . . describe the basic principles underlying the functionality of both text-to-text and text-to-image Generative AI models.

### 3. Applying

... formulate well-crafted prompts for text-to-text and text-to-image Generative AI tools, showcasing their understanding of these tools' functionalities.

... utilize content that enriches the virtual travel experience in alignment with project objectives.

### 4. Analyzing

... examine how GenAI handles cultural aspects, analyzing its impact on cultural sensitivity in content generation.

... compare and contrast the strengths and limitations of text-to-text and text-to-image Generative AI tools within the context of the virtual travel project.

### 5. Evaluating

... assess the ethical implications of AI-generated content, identifying potential biases, stereotypes, or sensitive portrayals.

... evaluate the effectiveness and appropriateness of solutions generated by GenAI in response to specific prompts.

... assess the potential ethical concerns related to manipulating user opinions or reinforcing existing biases through the use of GenAI in virtual experiences.

### 6. Creating

... design a comprehensive and engaging virtual travel experience, integrating AI-generated content with visual enhancements.

... generate and present thoughtful reflections on the impact of AI on cultural representation, considering various perspectives and proposing strategies for mitigating biases in AI-generated content.

## 3.3 Strategies to Foster Critical Thinking

Various strategies in task design have been identified to nurture critical thinking skills among students. In this context, Navarro et al. (2021) emphasize the effectiveness of Design Thinking activities. Bloom and Doss (2019) and Swart (2017) draw attention to the pivotal role of modern technologies in designing tasks aimed at fostering critical thinking. Additionally, Elder and Paul (2008) recommend the implementation of instructional strategies that actively involve students in thoughtful engagement with the fundamental concepts and principles of the subject. These insights collectively highlight diverse approaches to task design that contribute to the development of critical thinking abilities, showcasing the potential impact of

Design Thinking activities, the integration of modern technologies, and the incorporation of instructional strategies for active student involvement.

Chan and Hu (2023) emphasize the critical importance of considering students' perceptions of GenAI, with a specific focus on concerns related to accuracy, privacy, and ethical issues. Understanding these concerns becomes a foundational element in the design of GenAI learning tasks aimed at addressing and alleviating potential apprehensions. Aligning with this perspective, King (1992) advocates for interactive and student-centered learning strategies, asserting their value in promoting critical reflection – an approach that can be effectively integrated into GenAI learning tasks. Furthermore, Fujii's 2015 emphasis on task design as a means to address broader educational values is particularly relevant. This work suggests that GenAI learning tasks should be intricately designed, taking into account anticipated student thinking and solutions, with evaluation facilitated through post-lesson discussions. By incorporating these design strategies, the chapter provides a comprehensive framework for educators aiming to create GenAI learning experiences that not only enhance technical skills but also address ethical considerations and foster critical reflection.

To foster critical reflection on the ethical and social implications of using GenAI in the virtual travel experience project, the following design strategies can be incorporated:

1. **Ethical Dilemma Scenarios.** Introduce ethical dilemma scenarios related to AI-generated content in the travel experience. Ask students to consider situations where AI may unintentionally perpetuate stereotypes or biases. Encourage them to discuss and address these ethical challenges in their project.
2. **Guided Ethical Frameworks.** Provide students with ethical frameworks or guidelines relevant to AI applications. For example, discuss principles like fairness, transparency, and accountability in AI. Encourage students to incorporate these principles in their design and critically reflect on how well they align with ethical considerations.
3. **Expert Perspectives and Guest Speakers.** Invite guest speakers or experts in AI ethics and social implications to provide insights and perspectives. This can offer students a deeper understanding of the ethical challenges associated with AI. Allow time for Q&A sessions to encourage student engagement. Alternatively, YouTube videos can be watched and discussed in the classroom.

4. **Debates and Discussions.** Organize class debates or discussions on ethical and social aspects of AI. Assign roles to students, such as advocates for AI in education and those who raise ethical concerns. This encourages students to critically analyze different perspectives and strengthens their ability to form well-grounded opinions.
5. **Scenario Planning.** Incorporate a scenario planning exercise where students anticipate potential social consequences of their virtual travel experience. Ask them to consider how different user groups may interpret or be affected by AI-generated content. Encourage proactive thinking about mitigating negative impacts.
6. **User Feedback and Iterative Design.** Emphasize the importance of user feedback in the design process. Encourage students to gather feedback on the ethical and social aspects of their virtual travel experience from peers, teachers, and potential users. Use this feedback as a basis for iterative design and improvement.
7. **Real-world Case Studies.** Introduce real-world case studies where AI technologies have raised ethical concerns. Discuss how companies or organizations have addressed these challenges or the consequences of failing to do so. Relate these case studies to the students' projects, prompting them to consider potential pitfalls and solutions.
8. **Reflective Journals.** Integrate reflective journaling into the project, where students document their thoughts, challenges, and decision-making processes related to ethical considerations. This ongoing reflection helps students develop a deeper understanding of their own evolving perspectives.
9. **Multidisciplinary Collaboration.** Encourage collaboration with students from other disciplines, such as ethics, sociology, or philosophy. This interdisciplinary approach promotes a broader understanding of ethical and social implications and encourages diverse perspectives.
10. **Public Awareness Campaigns.** Task students with creating public awareness campaigns within their virtual travel experiences. This could involve informing users about the ethical considerations of AI, promoting responsible use, and encouraging users to critically reflect on the content.

By incorporating these design strategies, you create an environment that not only teaches students about GenAI but also encourages them to critically reflect on the ethical and social dimensions of their projects.

## 4 CONNECTING THE AI LITERACY MODEL AND THE AI WANDERLUST PROJECT

The AI Literacy Model, adapted from Baacke's Media Competence Model, provides a robust theoretical framework that aligns seamlessly with the practical implementation of the "AI Wanderlust" project. This connection ensures that the project not only introduces students to Generative AI (GenAI) tools but also fosters the critical, practical, and ethical skills needed to navigate AI responsibly. Below is an exploration of how the dimensions of the AI Literacy Model are applied within the context of the project.

The AI Literacy Model encompasses four key dimensions: AI Criticism, AI Knowledge, AI Usage, and AI Design. AI Criticism encourages students to analyze AI-generated content for biases, inaccuracies, and ethical concerns, addressing issues like stereotypes and cultural insensitivity. AI Knowledge focuses on understanding AI tools and systems, including machine learning and prompt engineering, with hands-on experience using tools like ChatGPT and text-to-image generators. AI Usage involves applying AI to solve real-world problems, where students create content and iterate through design and feedback. Finally, AI Design emphasizes ethical AI use, encouraging students to reflect on fairness, transparency, and cultural sensitivity in their projects, fostering a deeper understanding of responsible AI design.

By incorporating these dimensions into the "AI Wanderlust" project, students are not only introduced to the technical aspects of GenAI tools but also encouraged to critically reflect on their applications and ethical implications. This approach ensures that students develop a well-rounded understanding that goes beyond technical proficiency, equipping them with the necessary skills to engage thoughtfully with AI in society.

Through this theoretical framework, the project offers both a practical and reflective educational experience, embodying the principles of the AI Literacy Model and ensuring that students are prepared to navigate the complexities of AI responsibly.

## 5 CONCLUSION

In summary, integrating Generative AI (GenAI) into high school education is a crucial step in preparing students for the demands of an increasingly AI-driven world. As GenAI tools become an integral part of students' daily lives (Forman et al., 2023; Chan and Lee,

2023), the educational system must respond by incorporating these tools into learning environments — not as optional enhancements but as essential components of digital literacy and critical AI education.

The proposed concept, "AI Wanderlust," serves as a practical illustration of how GenAI can be meaningfully embedded into classroom practice. By engaging students in the creation of a virtual travel experience, the project invites them to explore the creative potential of GenAI while reflecting on its broader implications. This approach aligns with a structured roadmap for fostering critical AI literacy, emphasizing the development of key competencies such as creativity, problem-solving, and ethical reasoning.

However, such initiatives must go beyond technical skill development. Teacher guidance plays a pivotal role in helping students critically engage with the ethical dimensions of GenAI, from identifying biases to reflecting on the societal impact of AI-generated content. The combination of hands-on experimentation and guided reflection ensures that students are not merely passive users of AI tools but active, thoughtful participants in shaping how these technologies are used and understood.

Positioned within the broader discourse on AI literacy, this conceptual framework highlights the need for proactive, ethically informed educational practices. It underscores the importance of equipping the next generation with both the skills and critical awareness required to navigate the complex, evolving landscape of AI responsibly and thoughtfully.

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