**AI-Integrated Design for Educators (AIDE):**

**Teaching & Learning with a Smart, Drunk, Biased, & Supremely Confident Intern**

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**Abstract**

The emergence of Generative AI marks another significant technological advancement that has the potential to revolutionize education. However its integration into teaching and learning requires a nuanced understanding of its possibilities, limitations, and implications. In this paper, we discuss the unique properties of AI and key principles intended to foster inquiry around using AI in education. We introduce the AI-Integrated Design for Education (AIDE) framework, describing key principles in detail, exploring ethical considerations, and provide examples of AIDE in practice through collaborative design processes. AIDE builds on the idea of GenAI as being a "smart drunk (occasionally biased) intern" - incredibly capable and creative, yet sometimes erratic and prone to mistakes and biases. As Koehler et al. (2011) discuss using TPACK with teachers, they encourage the use of “deep play,” an engagement with rich problems of pedagogy, technology, and content, and their inter-relationships. By incorporating “deep play” in professional development, educators can be inspired to use the process of design with their students (Koehler et al, 2011). The goal is to empower educators to approach AI as a collaborative tool that enhances their expertise rather than replaces it, leveraging AI's strengths while compensating for its weaknesses through human judgment and expertise.

**Keywords:** artificial intelligence, generative AI, teacher professional development, educational technology, teaching, learning, creativity, designing education

**Introduction**

The emergence of Generative AI marks another significant technological advancement that has the potential to revolutionize education. However its integration into teaching and learning requires a nuanced understanding of its possibilities, limitations, and implications. While educational frameworks can offer guidance, their impact on learning is dependent on the context of their application and the educator’s ownership of the process. In order to effectively leverage any framework, educators and those that support them must possess a deep understanding of their intended outcomes for students, possible misconceptions held by both teachers and students, and potential challenges that may arise.

This paper aims to move beyond simply introducing another framework in hopes that it is the magic fix, but rather to explore how to use the AIDE framework as the acronym suggests, an aide, guiding educators to critically examine their relationship with generative AI and its transformative potential teaching and learning. Just as Koehler et al. (2011) discussed how the TPACK framework provides a necessary foundation but is not adequate in supporting educators in creatively, effectively, and responsibly integrating technology into instruction, the same applies with the application of a framework for guiding AI in education. Before engaging with AI, it is crucial to acknowledge and understand its inherent characteristics that shape how it functions and how it interacts with humans. Educators must also grasp key principles around how they in turn interact with AI that can inform their approach to using it in teaching. Principles can provide guidance around navigating the complexities of AI integration and ensuring that it enhances, rather than hinders, the learning experience.

The AI-Integrated Design for Education (AIDE) framework seeks to make sense of these principles in application. While the process of exploration may create more questions than answers for educators, it is essential for educators to intentionally engage in these inquiries as they begin integrating AI into their practice. AIDE builds on the idea of GenAI as being a "smart drunk (occasionally biased), yet supremely confident intern" - incredibly capable and creative, yet sometimes erratic and prone to mistakes and biases. This metaphor encourages teachers to approach AI as a collaborative tool that enhances their expertise rather than replaces it— reimagining the educational process as a collaborative endeavor between teachers and AI, akin to working with a brilliant but sometimes unpredictable assistant. The goal is to leverage AI's strengths while compensating for its weaknesses through human judgment and expertise.

**The Unique Properties of AI**

Just as we would not blindly use a curriculum to teach without understanding its components, structure, and alignment to standards, to effectively integrate generative AI into education, it’s crucial to understand its key properties. Some of these properties are similar to those in other technologies, while there are new properties generative AI possesses that set it apart and require acknowledgment and understanding (Mishra et al., 2023). The generative property of AI allows for it to create original, unanticipated content on the fly, producing novel content that varies with each use and each user. The social property of AI encourages anthropomorphism and social interaction due to its conversational nature, which [insert citation]. The multimodal property of AI allows for processing and generating content across various modalities, including text, images, audio, and video. The protean property means AI is highly adaptable and can interact with diverse digital media through natural language. The opaque property highlights the complexity of AI’s neural networks that can make its decision-making processes difficult to understand. Finally, the unstable property results in AI being prone to errors and “hallucinations” generating untethered outputs.

**Key Principles of AIDE**

Building on what we know about AI, we propose the AIDE framework, reimagining the roles of teachers, students, and AI in a dynamic, interactive ecosystem of knowledge creation and skill development across multiple modalities. In defining how such a transformation can take place in education, we focus on four key principles: collaborative design, embracing AI’s quirkiness, continuous refinement, and multimodal integration.

In collaborative design, teachers and AI work together to create curriculum, lessons, and assessments, with the human educator’s judgment in the driver’s seat. There is an emphasis on the human-centered approach, as teachers should always be the initial sources of expertise and the final decision-maker in the educational process. AI serves as a tool to augment their expertise, not to replace it, and human judgment should always prevail. Activities that require emotional intelligence and adaptability should be completed by the educator, not the machine. This leads to curriculum co-creation, because while AI platforms and tools can generate lesson plans, assessments, rubrics, and other instructional materials based on specific learning objectives, this should be used intentionally as a brainstorming tool, not as a means to the immediate creation of an end-product. Teachers need to thoughtfully and critically review outputs, adapting them to ensure they align with their pedagogical philosophy, the goals of the learning activity or assessment, and their student needs. AI can support assessment innovation, assisting educators in creating personalized assessments and providing more immediate feedback, which has the potential to allow teachers to identify knowledge gaps in a more timely manner to tailor instruction accordingly, and to allow students to receive automated feedback during practice that can aid in their learning and mitigate students repeatedly practicing with misconceptions. Finally, with all aspects of using AI collaboratively, there are ethical considerations. Teachers must be involved in ensuring that the tools are used ethically: not perpetuating biases, not adding to misinformation, and not utilizing private student data.

By embracing AI’s quirkiness, educators can learn to harness AI’s unexpected outputs as opportunities for creativity and critical thinking. Educators can capitalize on AI’s characteristic of generating unconventional or surprising results as inspiration to spark creative thinking and problem solving from a new perspective. Jeffrey and Craft (2004) state that ‘teaching creatively’ and ‘teaching for creativity’ are overlapping concepts for educators, and in an educational world where standardized testing creates a high-stakes environment, we must remember to foster our own creativity and that of our students. It is also imperative that educators use critical analysis to evaluate AI-generated content for accuracy, bias, and relevance. We must remember that AI is trained on vast content across the Internet, all stemming from humans with inherent bias and a propensity for spreading misinformation, and the AI itself may magnify and amplify this bias and misinformation. When presented with an unusual response, educators should analyze why the AI might have made that suggestion, what could be improved, or what new perspectives arose that the educator can build upon.

Continuous refinement emphasizes that the design process is iterative, with teachers using AI to generate ideas, then refining and adapting them based on their expertise and student needs. Using AI tools should not be a “one and done,” simple in-and-out process, but rather an on-going process where suggestions are continually revised. As educators experiment with AI’s outputs, building on each response, innovative ideas can emerge. Educators remain the expert about their students and instruction, and must adapt any outputs generated to fit the unique needs of their classroom. AI also has the potential to provide data-driven insights (with the caveat that identifiable information should never be input) to assist educators in identifying trends and patterns to inform their instructional decision-making. However, what is generated is likely to be generic, and it is the responsibility of the educator to incorporate specific student academic needs and interests into their final plans and instruction. Educators should consider adaptability, being mindful of which AI tool is appropriate for the task they are completing or the needs of the student(s). The tools available continue to change, and educational platforms are adding AI features at a rapid pace. Educational needs and contexts change as well, and educators would benefit from analyzing which tools available to them best meet the current needs of their students, and which platforms meet each specific need best.

Through multimodal integration, AIDE leverages AI's ability to work across text, image, audio, and video, creating rich, diverse learning experiences. AI can be used in creating diverse content, using multimedia resources (including videos, images, audio, simulations, and interactive activities) to assist educators in catering to different learning preferences, address gaps in diverse representation within existing curriculum, and help make learning more dynamic, meaningful, and interactive for students. Some AI tools can help make educational content more accessible for students through alternative formats, speech-to-text tools, and translation tools, with a capability that exceeds that of prior technologies.

**Ethical Considerations in AIDE**

Prior to the release of generative AI into our society, both adults and children have struggled in applying a critical lens to media and the Internet, grappling with the challenge of discerning truth from fiction (and all of the gray areas between). The spread of misinformation stems back to origins of print media, the advent of search engines opened up the world of an Internet created by humans with little accountability on what was published, and the rise of social media brought forth algorithms tailored to reinforce individuals’ existing beliefs and opinions (Omoregie & Ryall, 2023). Generative AI has brought a new era of misinformation, deepfakes, and biased narratives that only increase the difficulty of evaluating the credibility of online content. In an effort to empower educators to make informed decisions, we briefly discuss ethical considerations that focus on transparency, critical AI literacy, bias awareness and evaluation, and data privacy.

The key to transparency is to ensure that the role of AI in the learning process is openly discussed and examined by all who are using it. Educators and educational leaders should be transparent and clear in their communication about not only the benefits and purposes of using AI in schools, but also about the limitations, risks, and potential biases of AI tools, as well as ensuring informed consent. Educators at all levels need to be familiar with the expectations and policies of their organization, and have the courage to advocate for effective processes for evaluating the use of AI tools in school.

In building critical AI literacy, it requires developing skills to understand, question, and effectively use AI in learning. As with any information found online, it is crucial to use critical evaluation of the information to determine validity of sources and what is presented, ensuring that AI is not treated as an infallible source. Additionally, AI literacy involves understanding how, when, and why to use AI tools in their work and lives. Digital citizenship tenets that apply to all technology can also be applied to use of AI, and educators should learn and explicitly teach about ethical and responsible use of AI. These teachings should go beyond giving rules and directives, but be a component of engaging learning experiences that encourage creativity, self-reflection, and ownership of the learning process. Additionally, lessons on AI basics, informing users of how machine learning works, the role of data in AI decision-making, and real-world examples and applications can help users better understand the relationship between human and machine.

Bias awareness is a term frequently used, but we need to go beyond that and push for bias evaluation, having regular discussions with students to address potential biases in AI outputs and the importance of diverse perspectives. Buyl et al. (2024) discuss how human design choices occur in the creation of large language models, and that those choices “may, intentionally or inadvertently, engrain particular ideological views into its behavior” (p. 2). Activities that allow for collaborative analysis of outputs can become teachable moments that enhance this understanding and awareness, and provide opportunities for correcting biases found, rather than settling for just an awareness that biases may exist. Through a critical lens and using human judgment, educators can work to counter biases found in AI tools with supplemental materials and rich evaluative discussions about AI outputs (Shin et al., 2022).

Data privacy is a risk within any technology, and clear guidelines should be established for the use of student data in AI-assisted learning processes. Educators and students must be informed about how to use minimal, necessary data with AI, what personal identifiers could put their data privacy at risk, and how to format inputs with language that avoids the use of personal information. All users should have access through transparent communication about how their data is being collected and used, who has access to the data, and the ability to withdraw consent at any time.

**AIDE in Practice: Collaborative Design Processes**

In applying the key principles of the AIDE framework, this could take form in a variety of ways. We present some examples of collaborative design processes that could be utilized across content areas and grade levels. Case studies reveal mixed results of quality and efficiency of use as educators explore how AI tools may assist in their tasks, so in all examples provided, the educator is placed as the expert in the AI-human thought-partner relationship (UK Department of Education, 2024). It is important to emphasize that any time AI is used in supporting instruction, it must be treated as a “first draft,” jump starting an iterative process that is driven by the educator. As Koehler et al. (2011) discuss using TPACK with teachers, they encourage the use of “deep play,” an engagement with rich problems of pedagogy, technology, and content, and their inter-relationships. Deep play is creative, seeking to construct new ways of seeing the world, and new approaches to using technology, in order to develop creative pedagogical solutions, and in this way, using deep play is an ideal approach to inquiring how AI might be integrated into education.

Educators may use AI to co-design learning experiences. The educator, as the expert in their area of teaching would first outline the core concepts and learning objectives. An AI platform could then be used for suggestions on potential connections, analogies, and interdisciplinary links. The educator steps back in to curate and refine these suggestions, ensuring alignment with educational goals and student needs, again relying on their role as the human holding expert knowledge of their craft and their students.

Educators may turn to AI as an assistant in co-delivering instruction. AI tools can assist in creating multimodal content (text, images, and videos) to support lessons, prepared ahead of time or as needed throughout instruction. During lessons, AI can act as a real-time resource, providing additional analogies or alternative explanations as needed. Educators should continuously guide the flow of information, contextualizing AI inputs and fostering critical discussion.

In collaborative content creation, educators can prompt AI to generate draft materials across various modalities. Educators should always critically review and edit AI-generated content, ensuring accuracy and appropriateness. But the collaborative process itself often leads to unexpected creative directions, sparking new ideas along the way. One of the most powerful aspects of AI in education is its ability to generate novel analogies and metaphors, providing creative support for educators through concept explanation of complex concepts, cross-disciplinary connections to foster interdisciplinary thinking, memorable mnemonics as effective aids for students, creative problem-solving across different contexts, making abstract concepts more relatable and emotionally engaging, and tailoring explanations for cultural relevance.

AI is increasingly embedded into existing educational platforms, specifically with features for adaptive learning pathways. These features use AI to analyze student performance data to suggest individualized learning paths. Educators interpret these suggestions, using their knowledge of students to make informed decisions about interventions and extensions.

AI has potential in encouraging process-oriented assessment, where assessment of students is integrated throughout the learning process, not just at the end. AI can provide real-time feedback on student work and suggest areas for improvement. Educators should guide students in interpreting AI feedback, therefore turning assessment into a learning opportunity. The focus then shifts to evaluating the learning journey, including how students interact with and learn from AI.

**Conclusion**

AI can and will change education and the futures our students will live in. It is already here, being frequently used by educators and students, with or without guidance or professional development, so providing that support is urgent (Common Sense Media, 2024). The guidance of the AIDE framework has the potential to transform teaching and learning. The interplay between teacher expertise and AI capabilities can lead to novel approaches and materials, enhancing creativity. Through a critical-thinking focus, students can learn to evaluate AI-generated content thoughtfully, developing essential digital literacy skills. AI can assist in tailoring learning experiences to individual student needs, with teachers guiding the process towards creating those personalized pathways. Rapid AI-assisted prototyping allows teachers to experiment with and refine ideas quickly, resulting in an efficient iteration process of planning instruction. As teachers engage in deep play through professional development, they engage in continuous learning as they develop skills for effectively collaborating with AI, preparing them for an AI-integrated future.

In everything discussed, the primary objective is to critically think about how we intentionally approach teacher professional development in an empowering manner, encouraging engagement in inquiry around innovative possibilities for teaching and learning (Horton et al., 2018). Those creating professional development for teachers must be mindful that “new technologies are rarely, if ever, designed for educational purposes,” but that their expertise allows them to capitalize on technology to enhance learning experiences (Koehler et al., 2011, p. 148). Frameworks, guidance, and professional development around AI must emphasize teacher agency and the approach of teachers as designers, as central decision-makers in how technology can be integrated into their classrooms through innovative approaches, guided by their expertise and tailored to their students (Koehler & Mishra, 2008). As technology continues to evolve, it is imperative to value teacher expertise and judgment throughout the process, and frame our interactions with technology as collaboration rather than replacement. Through the key principles of the AIDE framework (collaborative design, embracing AI’s quirkiness, continuous refinement, and multimodal integration), the overarching themes to keep at the forefront are to keep teachers in control, embrace the process, and simply, do the right thing.

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