“AI from high school to college: considerations for faculty members”

Abstract

This article explores what students entering college from high school are likely to know about artificial intelligence, with a focus on the learning happening in North Carolina public schools. The NC Department of Public Instruction (NC DPI) has created guidance on AI education for elementary, middle, and high schools, and this article details some of the main forms of AI instruction students are likely to encounter. I explore how faculty members in the University of North Carolina System (UNC System) can use an understanding of AI-enhanced teaching practices at the K-12 levels to inform how they approach AI with entering college students.

Introduction

What will students know about artificial intelligence by the time they arrive at college? For most, it will be what they have learned in high school.[1] Educators in the University of North Carolina System must look at how K-12 schools, particularly those in North Carolina, are adapting curricula to respond to emerging AI technologies. As an instructor who has taught AI concepts at both the university and the high school levels, I want to share some insight on how to connect students’ prior knowledge and future expectations to their transition to higher education.

Although some students may study AI in computer science courses or special programs, most high school students graduating in the next few years will not have an in-depth understanding of how data collection, algorithms, and other components of artificially intelligent systems work. That knowledge base among students is likely to expand once the recently adopted computer science graduation requirement goes into effect for the 2026-2027 school year (North Carolina Department of Public Instruction, 2023). However, as of January 2024, current statewide recommendations are already encouraging educators to ensure all students have at least a working knowledge of how to use AI tools responsibly for generating content in ethical and accurate ways. Foremost among these AI tools are generative AI models, especially Large Language Models (LLMs), such as ChatGPT.

[1] Naturally, some students enter the workforce or the military before returning to college, and they may possess advanced knowledge of the use of AI in those settings.

In short, students are already being taught about how to use AI tools in North Carolina's elementary, middle, and high schools. Some AI tools have been part of teachers' toolkits for years: for instance, plagiarism checkers, quiz generators, and feedback tools. Increasingly schools will use more advanced generative AI like ChatGPT, and they will teach students how to use such generative AI tools in creating their own responses to assignments. School administrators expect that learning about AI will become essential in preparing students for future careers. Graduating students will expect to continue learning about and using AI in college, so faculty members need to be ready to adapt accordingly. There is no recommendation, either at the high school or university level, that all courses or all situations must implement AI tools. However, faculty members must understand that AI will and should be integrated into the curriculum at various points and that students need to understand both when the use of AI is acceptable and when it is not.

NCDPI Recommendations and Shifting Use of AI in High Schools

In January 2024, the North Carolina Department of Public Instruction (NCDPI) published guidance on using artificial intelligence in elementary, middle, and high schools as a way to help teachers make informed decisions on how AI should or should not be used in classroom settings (North Carolina Department of Public Instruction, 2024). As their guidance document points out, when ChatGPT first became available to the public in late 2022 / early 2023, many schools immediately banned its use and the use of all similar AI tools. Teachers and administrators were concerned about the potential for students to use such tools to write their papers for them, and many teachers reported experiencing exactly that behavior among students.

Nevertheless, by early 2024 it became apparent that generative AI was not something that schools could ignore or block permanently from their servers. Advocates for generative AI pointed out how ChatGPT and similar tools (such as Google Gemini or Microsoft Copilot) could be used in productive and helpful ways that promote human creativity and agency rather than replacing it. Further guidance for schools from the U. S. Department of Education' s (DOE) Office of Educational Technology recommended recognizing the advantages of AI while also remaining aware of the potential risks. The DOE offered a comparison of technologies to explain their stance on the positive outcomes of AI in learning:

> "We envision a technology-enhanced future more like an electric bike and less like robot vacuums. On an electric bike, the human is fully aware and fully in control,

> but their burden is less, and their effort is multiplied by a complementary technological enhancement. Robot vacuums do their job, freeing the human from involvement or oversight." (U.S. Department of Education, Office of Educational Technology, 2023, p. 53)

The NCDPI listened to those arguments, and they recognized that in their pursuit of career-ready high school graduates, they needed to train students to be smart and capable users of the kinds of generative AI they were almost assured to encounter in the workplace.

Dr. Vanessa Wrenn, NCDPI Chief Information Officer, summarized the reasons for embracing the use and study of AI in schools:

> "AI tools are increasingly prevalent in students' current education experience and in their future professional environments, so empowering learners to understand these technologies is essential. The power of AI tools for education, community engagement and deeper learning will continue to drive innovation and policy. The North Carolina Department of Public Instruction (NCDPI) advocates for the responsible integration of AI technologies in education, aiming to cultivate an educational environment that empowers each individual to reach their full potential and cultivates a lasting passion for continuous learning." (North Carolina Department of Public Instruction, 2024, p. 5)

With this guidance, North Carolina schools will move from banning AI in classrooms to incorporating it into the curriculum. It is essential for institutions of higher education not only to do the same but also to recognize what strategies are being taught and utilized in NC K-12 public schools as well as to understand the concerns that schools must address surrounding AI. Students will attend college already possessing experience using AI tools and also some background in understanding the ethical questions surrounding AI. Higher education classrooms must build on these lessons and experiences in order to produce career-ready graduates.

Concerns About Student Input and Investment in Classwork

One of the foremost concerns regarding AI for many high school and college instructors is whether students are using AI to avoid doing work. When students avoid work, the reasoning goes, they do not undertake processes that lead to learning and skill development. How might it be possible to conceive of AI as a tool that does not rob students of learning by reducing their effort in their studies? Perhaps useful to consider is a

comparison to a technology that has a longer history of use in classrooms: calculators. Whereas most mathematics courses still ask students to learn how to perform some calculations with pencil and paper, most also include lessons that allow students to use handheld calculators or web-based calculation software (Kaput et al., 2007). Many instructors would readily agree that allowing the calculator to perform some time-consuming basic calculations can allow students to spend more time on the complexities of a mathematical problem, encouraging their interest in exploring and investigating mathematical concepts (Penglase & Arnold, 1996).

Such comparisons work for the written word as well. Instructors routinely allow students to use spellchecking and grammar-checking technology, and often the use is highly recommended or required. Note, however, the findings from McCarthy et al. (2022) that such tools enhance but do not transform student writing as much as automated tools that provide feedback on writing strategies: they note that "strategy feedback with an opportunity to revise contributed to improved essay quality, but that spelling and grammar feedback provided modest, complementary benefits." Newer forms of AI can take that process of strategy feedback a step further. As Shi and Aryadoust (2024) point out, "the integration of generative AI such as ChatGPT and GPT-4 in AWF research offers exciting opportunities for more in-depth and nuanced feedback that transcends surface error correction and addresses higher-order writing skills." Instructors also routinely ask students to follow formats in their written work, whether that is a nationally accepted guideline like MLA style or one more tailored toward a particular classroom exercise. AI can save students time by helping them follow formatting guidelines, whether at the sentence, paragraph, or report level, thereby leaving them more time and opportunity to refine their ideas about the topic. Students still must generate their own ideas about what belongs in the report, of course.

Whether students generate their ideas or whether they let AI do all the work has been the main point of contention for AI's skeptics. Considering the use of technology in the arts can be helpful in this respect. It has often been a concern for artists that technology will erase the need for human creativity. Time and again, that has proven false. As Hertzmann (2018) argued, "[N]ew AI algorithms will provide new tools for expression and transform our art and culture in positive ways, just as so many other technologies have in the past." Over the years, artists embraced portraiture with camera technology alongside traditional portraiture with physical media. Graphic artists now regularly use computer assistance to create their works, and many human artists are now turning to AI as a tool to help them realize their artistic visions (Cetinic & She, 2022).

Student Input as Prompt Creation and Iterative Revision

What does student involvement look like in the context of generative AI? If the fear is that students are asking the AI to do their work, the answer lies in rethinking the activity of "asking." Teaching students to ask better questions as problem solvers leads to higher-order thinking skills. The NCDPI recommends that both teachers and students learn to use generative AI effectively by learning more about effective ways to ask an AI for a response. This process is often referred to as creating prompts or prompt engineering, and it is one of the career-ready skills high schools hope to teach. In fact, Forbes recently published an article claiming that "The Hot, New High-Paying Career is an AI Prompt Engineer" (Kelly, 2024).

The model promoted by the NCDPI is called the CRAFT Prompting Framework. CRAFT stands for Context, Role, Audience, Format, Task & Tone (Cubero, 2023). The premise is that if users incorporate all of these elements when prompting generative AI for a response, they will receive a better result. The framework is grounded in rhetorical analysis, which historically considers who is speaking, who is receiving that information, what the message is, and in what context that message is being delivered. Teaching students to think through their prompts as rhetorical choices is an in-depth exercise in considering how to work with information. Not only can this process help build a career-ready skill, but it can also improve student agency in an assignment.

The CRAFT framework encourages an iterative approach to prompt generation that invites students to revise a prompt if it does not result in the AI tool providing the information that was desired. That approach builds skills for revision and problem-solving. In addition to the CRAFT framework, the NCDPI also invites instructors to use AI for Education's guidance on "How to Use AI Responsibly EVERY Time," also known as the EVERY framework for iterative revision and evaluation.

The EVERY framework invites learners to think through the results they have received from generative AI tools by considering the following:

- EVALUATE the initial output to see if it meets the intended purpose and your needs.
- VERIFY facts, figures, quotes, and data using reliable sources to ensure there are no hallucinations or bias.
- EDIT your prompt and ask follow up questions to have the AI improve its output.
- REVISE the results to reflect your unique needs, style, and/or tone. AI output is a great starting point, but shouldn't be a final product.

- YOU are ultimately responsible for everything you create with AI. Always be transparent about if and how you used AI. (AI for Education & Cubero, 2023)

Far from passive consumers of AI's output, students following these steps become active participants in the creative process. A focus on evaluating puts these activities on a high level of Bloom's taxonomy and situates them as partners at the highest level: creating (Forehand, 2005).

Inviting Students to Consider the Validity Of Sources in the AI-Enhanced Landscape

The EVERY model asks students to verify information received from generative AI, but instructors must still help students understand which kinds of sources are reliable. These lessons on reliable sources are taught at both the high school and college levels, and they are the foundation of good research skills. A common framework for evaluating research espoused by many instructors is the CRAAP test for Currency, Relevance, Authority, Accuracy, and Purpose of sources. If students use their knowledge to verify the validity of the output they receive from AI tools, they again become partners in research, checking facts and enhancing their analytical skills.

As students move from high school to college, however, those strategies must be supplemented with lessons about another aspect of AI: the false content produced by deepfakes or machine hallucinations. Whereas schools may use generative AI tools with students, most still operate in a locked-down environment in terms of what content students can access via the Internet. Most North Carolina schools block many sites on their servers, and some districts are more restrictive than others. Students will likely struggle with many of these deepfake issues outside of school, for instance on social media sites. It may be that high school students do not encounter as much misinformation from AI sources in their school-based research during high school as they might find on the open web that they have access to as adults in college. They may therefore continue to benefit from additional guidance.

Ideally, students will arrive at college with at least some knowledge of these issues surrounding misinformation. One resource I have used in my own high school teaching, and which is used by K-12 instructors nationwide, is the MIT Day of AI Curriculum (Massachusetts Institute of Technology, 2024). They offer free lesson plans on various AI topics, including deepfakes, misinformation, and algorithmic bias. For many students, though, these are special topics taught on a STEAM topics day (hence the name "Day of AI"). Spending a day on such topics is useful, but more sustained conversations should be undertaken. Current students will likely not have as deep an understanding of AI-generated

misinformation upon graduating high school as they will need throughout their college careers, and faculty members should help instruct students as needed.

Data Privacy for Students

A major concern when using AI for education is student data privacy. AI systems rely on data to function, and using these systems often requires data input. Even creating prompts for a system like ChatGPT involves the user entering data from which the AI learns in order to create responses. The guidance from NCDPI simply advocates that students understand what personally identifying information is and that teachers remind students not to enter such information into a chat (North Carolina Department of Public Instruction, 2024, p. 32).

As high school students enter college, they may need additional guidance, especially as they become more sophisticated users of social media. Increasingly AI tools are able to create convincing photos and videos that mimic real people. For instance, many AI image creators offer the ability to upload selfies that can be converted into professional portraits (headshots). That may seem a benign use of the tool, but students may need to learn about how and why creating altered images (including filters or Photoshop) or voice replications of themselves and others may or may not be ethical. Much has been made of student athletes' recent ability to earn revenue from name, image, and likeness (NIL). With AI tools constantly changing and improving, students will likely need lessons also about the right to privacy and ownership over NIL for all individuals.

Also worth considering in the context of instruction is the vast amount of data collected on individuals that companies learn from through AI. Although many high schoolers have some social media presence, young adults entering college may be involved in many more opportunities in which their data can be collected (for instance additional social accounts, shopping habits, internet browsing habits, etc.). Younger audiences tend to have some protections from data collection that adults over 18 do not.[2] Helping college students navigate their digital footprint is a beneficial teaching opportunity about the ways companies can and do use AI.

Conclusion

[2] Technically the Children's Online Privacy Protection Rule (COPPA) applies to children under 13 (Federal Trade Commission, n.d.), but some parents may limit online participation until their child is an adult through house rules or through automated parental controls.

Though student experiences with AI during high school will vary a great deal, an important takeaway from the North Carolina Department of Public Instruction's guidance is that almost all North Carolina public school students are likely to enter college having used AI tools. There is no going backward on AI. Students may have positive experiences with AI assisting their creative processes, or they may have concerns and fears about what the AI landscape means for data privacy or misinformation. Either way, students will expect to use AI in the university setting because they are aware that many employers will view the ability to use AI as a career-ready skill. Ideally, UNC faculty members will rise to this challenge and think about ways AI tools can be positive contributors to student learning. However, if a faculty member decides not to allow AI for a single assignment or an entire course, that instructor should make clear policies that understand students' assumptions that it is permissible to use AI unless otherwise informed. Faculty members not wanting to permit AI in their courses must explain why and establish clear guidelines.

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