

Episode: Interacting with AI in a Meaningful and Positive Way

Series: [AI in the Classroom](#)

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Just getting answers from AI to me isn't very exciting. It's sort of like a glorified Google. But then, you know, are there ways in which we can help students or teachers learn how to interact with AI in a way that can reveal some of the deeper structures of how it comes to these reasonings, inferences? And would that help with the kind of problem solving process?

[series graphic and brief futuristic music interlude]

Obviously AI has been around for a very long time and you know, I think when ChatGPT, I guess about 3.5 or something started coming out and they came out with the open beta, that's when people really started talking about, "Oh my gosh, it can do all these amazing things." And I think that's about the time that, you know, once became kind of in the public sphere of conversation, I started to get very interested in, well, what can it do now? Because I remember back in the day when you worked with AI, it would come up with utterances that made no sense and you can build things from scratch.

But here was a very kind of, more mature product that you can have conversations with. It felt pretty real, engaging. And so this is where my interest in problem solving, the idea of working with technology's social agents and that kind of collaborative relationship between people and machines came into play. And I started kind of toying around with it.

You know, one of the questions in my labs that we're trying to answer is, when you're bringing people into this learning design space, and they don't know much about learning science principles and concepts, how do you get them to see phenomenon like students learning or people struggling or the kinds of mistakes they make? And maybe not diagnose, but to be able to see phenomena and identify what the most important aspects are, that we can teach them or support them in.

And so this is where the question for me became, you know, could AI be a way to help people to see things they normally could not see, to help them represent ideas in ways that maybe they might not without this kind of assistance? And whether that leads to more informed decisions, recognition of more specific issues, and the implications for design.

So some of the ways right now that we're trying are quite exploratory. So for example, I would say one of the more interesting ways that we've been kind of using AI in the class, in the lab, um, we've used certain kinds of principles that we understand. Like for example, there's many ways that people think about learning and the granularity of it. Learning is not a monolithic giant kind of thing. And so some people look at it from motivation, and the different aspects of that. Some people look at it from a cognitive lens. We've been kind of thinking about, well, in general, when we think about learning, we can kind of make a typology out of it.

You know, there's different kinds of outcomes we want. We want people to do things, say things, sense things or even feel things. And so we started thinking, could we get AI to understand these parameters of what these things are? And then for example, either through feeding it cases that maybe teachers or students have experienced in their real life, could they then go in and test their ideas about: This is what I think the learning problem is. How does AI kind of analyze it using this rule set?

And also in reverse, we've had students come up with more parameters to see if AI could actually generate cases so that teachers or new designers can actually practice. And then see not just the result of: this is the diagnostic problem, but how did AI or another peer come to see something in this phenomenon that I did not? Could that be a way that people can then take those ideas, have a more concrete idea of what that looks like in real life, and then make decisions with it?

What I get interested in terms of the results that we're getting so far is when you feed AI certain kinds of parameters, of course it can pick up things that maybe we overlook. Also, it's a way that we can generate multiple, multiple perspectives on a single case. That is kind of hard to do when you only have a limited number of people sharing experiences in the classroom, time or whatnot.

So, this is an opportunity I think, where AI can kind of give these different angles of attack to a singular prompt to make people really think, oh, how did it come to that? And I think that's one of the key things. Just getting answers from AI to me isn't very exciting. It's sort of like a glorified Google. But then, are there ways in which we can help students or teachers learn how to interact with AI in a way that can reveal some of the deeper structures of how it comes to these reasonings, inferences? And would that help with the kind of problem solving process?

So for example, one of the activities was, once we kind of thought about learning as a certain typology, let's say, a case, right, that a student generated. Lily is in a science class, and she's trying to make a diorama of the planet in the solar system, right? You got Mercury, Venus, I guess Earth, Mars, Jupiter, and you know, like she kind of crafts this thing together and the teacher comes over, right?

Teacher asks, Oh Lily, if this is really nice and how did you come about this? What's this? And she kind of goes, "Well, that's Earth, right? And this one, the one next to it that's, that's Jupiter." So, if if we refresh our what, like middle school science or whatever, the actual planet, right, would be Mars. So, for something like that, you know, in a basic science kind of classroom where you're learning about astronomy, like why is it that Lily is struggling with this?

And so students were thinking a lot about, what kind of learning does that represent? Is it that for example, when she looks at this big planet, she actually can't visually recognize that that's different than, you know, the red Mars planet? Is it that she doesn't understand the facts that

there's a certain sequence and order to these things? And this kind of thing matters, I think to be able to see learning in a very specific way.

You could imagine how a teacher might support a student like that based on that case, would be very different if it was a fact-based problem versus if it was, for example, I don't know, if the case gets extended. What would happen if the plan's orbit and they crossed? Now it's an inference question.

So, you know, these are the kinds of cases that students have been kind of putting together, to test, first can AI kind of give us very reasonable answers that a human would, like an experienced teacher would be able to see? Is the AI answer different than say, what a novice teacher might look at and diagnose? Oh, maybe it's a motivation problem, right? Motivation is the answer to everything, right? So that's kind of a more specific example of how we've been going.

And then the other end of things then, we've had students go to AI and be like, so then can you generate a case for us that a new teacher might be able to look at and then make inferences about and to give feedback on whether they're seeing all the different nuances that they might be able to see? And this is where things in our experiments have gotten kind of interesting.

At first we had difficulty coming up or getting AI to come up with cases that were similar to what a human might generate in a very rich story. But we're getting more promising results as we kind of investigate: what other parameters should we give AI to help it to think about what a case could be for the purpose of being something that new teachers or designers can study?

So for example, students came up with some brilliant prompts such as, well, in your case building, right? I like these parts, but here's why. This part of the case is very good, because it emphasizes the structure of this physics problem, or it emphasizes the vocabulary of the syntax necessary for this code. Or for example, you give hints as to what this character in the case might be feeling emotionally without telling explicitly what it is.

And once we started feeding those kinds of prompts in, AI started creating some very interesting cases, which would have things like, "Oh, well Lily sat down and looked at her planets and inquisitively kind of looked and grunted, 'Ugh.'"

Those kinds of things. And so then the after effect of that, after we built these cases through AI and had other people look at it, people interpret these things in many, many different ways.

And clearly, with complex problems like analyzing a case, there isn't any one answer. But what we're finding is that human dialogue, after seeing different kinds of ways that people are approaching it, as well as how AI explains, "Well, this is how I've come to understand it." It challenges them to think, what does familiarity really mean? What does it mean to recognize something? What is the difference between that and discerning between two visual things and noticing features?

How could I help with that? And so that's kind of where we're at in our investigation. And so what I find fascinating is, through this kind of iterative process of playing around with AI and understanding, what are the kinds of constraints and ways we need to focus on providing these constraints in order to achieve this type of purpose?

Now, I would imagine in learning endeavors, depending on whether you want to help people solve more defined problems or ill-defined problems, it's the ways we talk about it to AI and the kind of understanding of how it works is going to matter greatly in terms of getting the kinds of useful products out of it that we are hoping for.

So when it comes to how students are currently utilizing technology, I see a wide range of different kinds of ways people are using it. So, for example, in one of my classes, exploring computational problem spaces and representations, the main goal of that class is to think about phenomena and think about what are different ways that we can represent things and computationally represent them.

So for example, in that class, students have used AI in order to create data sets. So for example, it's very difficult, right, to go out into the real world and capture a hundred points of data. But if they can start to understand these are the kinds of variables I want as part of an analysis I want to do, or because I wanna represent something visually, these are the kinds of states of a human or a building or a flower that I want to capture, that kind of domain knowledge of how data is structured, they use to then tell AI, "This is what I'm looking for. Here's an example of what I'm looking for. Can you create a hundred of these so that then I can feed that into different kinds of output, whether that is an art program or whether that's data visualization?"

Other kinds of ways that students have used this is to try to break problems down. So for students going into areas like computer programming and code, it can be really daunting to go from a conceptual idea to the actual logic in code, which has very rigid syntax and whatnot.

Then this brings up the question of, what are we hoping for when students go through and learn things like computation? Is it that they understand a particular language and can write a certain kind of code in a certain way? Or is it more interesting that they can look at something meaningful in their life and decompose it into parts or abstract the most important elements of it, to be able to kind of then identify, again, the pieces of it and come up with some simple algorithm to represent it? And so students in that class have gone through AI and talked about it in different ways. Like, here's my idea, right? I want to represent this, from psychology. This means happiness. And you know, maybe slower speeds means sadness. That's a very interesting qualitative human experience. But can an AI then turn that into things?

And the answer to that is it requires some level of more computational talk, which is really kind of the goal with these courses, right? So, what is speed? You know, when you're thinking about, I want to express something artistically as exciting and happy, so I want a faster tone or a faster

pace, or a brighter color. I mean, what is color to a computer? And in these kinds of ways, when students are interacting, how do I represent color? Oh, well, color can be represented in these kinds of ways. Whoa, what's this number? What's this "RGB 152"?

But from there, it allows students to then engage and inquire about what those things mean. And it's a lot more effective in getting that point across because it has that meaningful context than: just memorize this structure, memorize this pattern. So those are maybe two examples of how students have been using it in my class.

The faculty and colleagues that I've talked to, we've been kind of exploring a range of different kinds of things. So a lot of things are coming up. So for example, one of my colleagues is wondering about the ethical issues involved with AI. Clearly with a tool like this, more and more people will be engaged in this tool and producing works. And fundamentally for us, we're at a place where we're really rethinking, Well, what is that kind of fine line? You know, what is the point of the kinds of work that we do?

You know, from my perspective, in comparison, I definitely feel that there's an opportunity for us to explore more, to be thoughtful about it, to come up with creative new ways to get people to engage actively with the issues that we want them to be engaging in. But at the same time, one could use the tool to cut corners, right? And just produce the output. So what does that mean for us as educators in terms of encouraging people to use this as an opportunity to learn, as opposed to do a task or do the work?

Some other kinds of areas that people have been playing around with are things like creative writing. So for example, you know, if you have an AI and you give it a prompt and to some certain extent, it can generate a whole bunch of different kinds of stories. But is that enough that we generate a story?

You know, the bigger question I think is, how do you get students or learners to engage with that process or think about the elements in the story so that eventually they can make more decisive decisions from the human side? Again, AI could be used to accomplish the task, or AI could be used to kind of get people to reflect and think about their own process.

So, across our field, there are tons of different kinds of conversations, which I think is fascinating. I was just at a conference last week on Learning Under Algorithmic Conditions and I was not sure what I was getting into. My background is in learning, obviously, learning sciences, design, as well as computer programming, "Com Sci". And I was really at first afraid of the very deep Com Sci kinds of things that might come up. Like, oh, let's go very, very deep into what a Markov chain is and the statistics.

But it turned out, most of the papers and discussions around AI, were very, very different than what I was expecting. I think maybe only a fraction of the papers went very technical, and those are the ones I understood the most. But you know, there were fascinating ideas about how different fields from philosophy, using different approaches, qualitative approaches to think

about what these things mean, the kind of bringing out stories, right, to ground, how should we be dialoguing this? Areas and ways in which we're talking about the same topic of ethics that maybe might not be the way I think about it and talk about it.

And so it's really refreshing to see fellow colleagues across academia engaging in very different ways with very different values. That's probably something that will continue to come up, right? I think we need to be very thoughtful about: What are the kinds of values that we are testing as we go down this very exploratory, exciting, sometimes frightening space?

When it comes to whether my opinions about AI and the usage has changed. Yes and no, I think. Overall, I still think that there's a lot of promise. I think it's not something that's going to go away. It's going to continue to march on. I still think that we should be very vigilant, and deliberate about the kinds of ways we're interacting with it, the ways we talk about it, so we can learn, right?

What has changed maybe is, the more I get into it, the more I start to see what certain limitations of it can be. Or through actually seeing how a student might interact with it, start to question whether certain kinds of other supports and guidances should be offered to help people look at it and interact with it in a meaningful and positive way. Those are the things that I think are currently new ideas that I've been grappling with. And I think the only thing we can really do is go on that ride and mindfully approach each problem and address it as we go along.