[Auto-generated transcript. Edits may have been applied for clarity.]
Welcome from the Center for Innovation and Applied Education Policy at San Jose State University in sunny California.

Or not so sunny at the moment. We have a really interesting, interesting interlocutor today, and we are so pleased to have our panelist,

Dr. Owen Matson, here to talk a little bit through us and our first series for 2026 on thinking through AI.

Dr. Matson is going to talk a bit about today the cognitive intraface and how we can think about knowledge, construction and education.

As usual, I'm here moderating today with my colleague, Dr. Carrie Holmberg, and I am Brent Duckor and we're very pleased to have you all here.

Before we get started. We always like to center ourselves a bit for the work that we do and what we care about and why we're here,

and so we're going to put out very quickly to our audience what we mean by defining AI for deeper learning.

Our interest at the center is in deeper learning insofar as it explores the skills,

knowledge and habits of mind that students in AI-mediated learning environments

are likely to need as they develop core schema, schema like critical thinking,

problem solving, collaboration, communication, creativity that are going to take them through the context of their learning.

We hope lifelong, but also are going to include the ability to connect to ecosystems like college and work.

And so our aim at the Center is always to elevate those who have been less elevated in society,

and to find ways in which they can connect deeper and more thoroughly to the world of college and work.

Part of the work of moving that vision forward includes ambitious teaching and what

we mean by that is promoting educative experiences for K-12 learners that

help them to think through their curriculum in ways that require both problem

solving and very likely performance-based and project-based sorts of approaches.

Curiosity with essential questions are a key part of the curriculum as far as

we understand the history of progressive school reform in the United States.

So we're going to argue for ambitious teaching for K-12 throughout again and again.

And last but not least, it shouldn't be a surprise that Carrie and I care a lot about assessment for deeper learning.

We've written a few books on the topic, and right now what we're thinking about in the age of AI is how deeper learning can either

be obscured or elevated or pushed forward in terms of how we think about assessment.

Right now, we've been focused heavily on whatever the assessment strategies are.

However, people think about assessment, we want it to make sure that it connects with zones of proximal development for the learner.

And that's a hint to our good friend Vygotsky, who we deeply believe has a role in the story of this unfolding age of AI.

So again, welcome everyone and it's my pleasure to introduce our esteemed guest.

His name is Owen Matson. Owen Madsen is an educational theorist and critical media scholar working at the intersection of AI, education, and cognition.

He's the author of the forthcoming Springer volume, "Postcripts from the Cognitive Interface: AI, Education, and Cognitive Assemblages,"

which examines AI-human dialog as a site of distributed knowledge construction, and educational responsibility.

Owen holds a PhD in English from Princeton University and has taught at Princeton, Georgia Tech, and in secondary education.

He is currently Consulting Director of AI integration at L.A. Times Studios,

where he works on AI literacy and governance in journalism, and he serves as co-editor with Michael J.

Peters of the Springer Briefs on AI in Education series.

His work brings philosophical rigor to practical questions about how AI reshapes learning, institutions, and pedagogical judgment.

These are the questions that are going to guide our discussion with Owen today.

What do you mean by the cognitive intraface in simplest terms?

Where is it? And what is actually happening there?

How is the notion of a cognitive intraface different from an interface or a user experience, which is how most people imagine human-AI interaction?

Why call it a site of cognition at all, rather than just communication or information exchange?

And what of the role of affect in this process?

What changes for K-12 students? Once we recognize the intraface as the place where cognition is unfolding

rather than locating thinking entirely in the human or in the system?

How might this work on the cognitive intraface inform pedagogical approaches to AI in K-12 education?

And so we begin with our first question. Let's jump right into it.

Thanks, Owen. Go ahead. Well, I guess first of all, thank you for inviting me today.

This is really an honor and I really enjoyed speaking with Brent on LinkedIn, like so many other people that I've gotten to know.

In these conversations, they've really taken place primarily through LinkedIn with all the benefits and limitations of a platform like that.

Which is something that actually informs my book, in terms of how infrastructure shapes communication and relations.

I was particularly excited because my dad actually taught in the education department,

at San José State, until he retired in 2009.

So having this discussion with the education department at San José State is, uh, really, really cool for me.

I'm looking forward to him being able to watch this. I've been to all the faculty parties and things like that

over the years. When I think I had come to San José State at 2008 and I just missed your dad

in that process, as I was on boarding, he was off boarding, so.

Yeah. Yeah, yeah, yeah, I think he went, like, half time for a while, and now he just travels around and half the time

I don't know where he is. Which is good for him.

Yeah. So, you know, with the question of the cognitive interface, I guess.

Before I go, just deep dive right into that.

The notion of cognition comes from a theorist named, N. Katherine Hayles, who taught at UCLA

when I was an undergraduate in 1997, '98. I met her and took a science fiction class with her.

She was kind of like the science fiction person.

But she was working on a book called "How We Became Post-Human," which was kind of a big opus at the time.

And it came out in 1999, and I was working on my senior thesis on science fiction and Los Angeles.

But really fascinated with questions of infrastructure and

At the time, it was about urban space and constructions of urban space and how urban space itself was no longer physical.

It was digital. And what that meant for, you know, locating oneself and one's identity

in space and how that was depicted in science fiction novels in some really interesting ways.

And so then she came to Princeton when I was at grad school.

She came my second year there. She ended up coming as a visiting scholar.

And so I took another course with her there on pedagogy and what was then called hypertext.

This was the early 2000s. So this is like 2001, 2002.

And the questions there. You know, I think it was kind of a similar period where education was grappling with internet,

and digital, the rise of digital technologies and how they were impacting learning.

And the course was still very much interested in infrastructure and the materiality of media and how that shapes

the production of information and the production of knowledge, how we read, how we learn.

At the time, this was pre-edtech. So, pretty much pre -ech in the sense that we know it now.

So most of the tools we were exploring or tools that weren't really developed for education specifically but were

you know, applications that we were exploring in the context of education, like chat rooms and things like this.

And we were...I was really fascinated by the idea of chat rooms as dialogic spaces,

alternative dialogic spaces, when you have a single group dynamic, as progressive as that is,

you know, it's about student construction of knowledge as opposed to, you know, a teacher lecture.

You can still have certain power dynamics that emerge in a seminar, you know, in the sense that certain voices dominate.

And so while we think of, you know, discussion-based classrooms,

it's kind of like the locus and the best practice and constructivist notions of learning.

There are still inequities that can emerge there, certain, you know,

trajectories of

of conversation, dialogue go in ways that might not be personally relevant to certain students.

And so you have, you know, you have the exposure to otherness that happens in a a dialog as Gert Biesta likes to talk about.

But you also

you can have a kind of foreclosure of relevance for students who may not be comfortable speaking in those contexts.

So we were experimenting with, you know, having

everyone in a chat room or having multiple chat rooms at the same time, you could jump to different ones.

And so to me, dialogic...I started thinking about dialogic education that early.

And to me it was really fascinating. As a teacher I would do that. And students really, most students really enjoyed it.

Some preferred the discussion-based, broader classroom discussion,

but many students who were incredibly bright but were shy and uncomfortable in group discussions, you know,

preferred the chat rooms where you could, follow a different line of thought and then you could jump into another one later

and you could create your own sort of emergent trajectories of knowledge construction.

And plus, of course, there was a trail of the whole discussion in the chat room, so you could actually see how the conversation evolved.

And that was useful metacognitively, because you could see, you know, how your thinking was taking place.

So there was a lot that was really, I think, powerful about that model.

And so I was already interested in systems thinking and about how discussions emerge,

as collaborative, interdependent systems as opposed to some,

you know, as opposed to a bunch of individuals cooperating in a class,

but all carrying their own unique cognitive load in their own interests.

What you have is them commenting on each other and on each other's ideas.

And so, of course, that's a collaborative, interdependent model, which is very different.

It's not linear. And it means that the total sum of the of the whole group, of course, has capacities that exceed, I should say...

What is the old saying about systems? I always forget if the sum is greater than the whole of its parts.

Yeah, it's something like that. Good enough for government work!

Yeah. So, yeah. So you had a new kind of organism really in the class.

That was a new learning organism through discussion. And I think with chat rooms

you had multiple kind of assemblages of, learning construction entities.

And that was a useful way to think of that. And we would talk about that in class.

So I was already kind of thinking along those lines, you know, well before I came out.

And around 2019 I read Kate's book, " Unthought," in which she

developed this alternative notion of cognition, which she calls, which she defines in the simplest terms, "is a process"

"that interprets information in contexts connected to meaning."

I have that memorized now, and I think people will read my posts on LinkedIn

My posts on LinkedIn will probably have that memorized now, I talk about it so much.

To me, when I read that, it just, it kind of just blew my mind.

It was like this key had opened up something that I had been kind of thinking about for years, ever since my own dissertation.

I knew that there was, there had to be a way to talk about cognition beyond the human.

And it was always there in sort of talking about human-machine metaphors and things like this,

and yet retaining the specificity of what the human is.

My own dissertation, I was working on, Mark Twain and media technologies, and he was interested in something called the Paige Compositor.

Which is an automated typesetting device, machine.

And it's sort of, it's a story that gets told about Twain because he went bankrupt from investing in this machine.

I mean, he really was like an early sort of like Silicon Valley speculative,

you know, tech person in the sense that he really he wanted to make...

He wanted to have big money. He wanted to have, you know, he wanted to be like, uh, like one of the big captains of industry in the late 19th century.

All right.

And so he invested in this technology because he thought it would bring him there, and he was already obviously wealthy and very famous.

But he didn't have that kind of money.

So he was invested in this machine, and he would talk about it in very anthropomorphic terms.

And the the typical line on Twain was that he was just so fascinated with this machine that he was kind of just he was getting ahead of himself,

and he was speaking kind of, you know, sort of hyperbolically about this machine and not realistically and

And also that the inventor, (James W.) Paige, was this very charismatic guy who would kind of

you know, steer the machine to him and in ways that made him think that this, this machine could actually think.

And usually the sort of biographical criticism on, on Twain is that,

you know,

he became really alienated with technology because he lost all his money to the Paige compositor.

And so he had these very, you know, negative views of, of technology or later on, you know, earlier in his career, he tended to have...

Well, actually, Ihe always had mixed ideas about technology, but the thing is,

what I was interested in was not so much the machine as a kind of ideological symbol of technological progress,

but so much as, you know, how did the machine actually work and how did that inform his sense of it?

As a cognitive machine, as a thinking machine.

And what the machine actually did was it actually tried to recreate the functions of an actual human compositor,

which is probably why it was so complicated.

But what he would do is you would press a button, you know, like a, basically like a keyboard

and you would press a key, like "a", "b", "c", whatever.

And the machine would translate that key, that alpha alphabetic code into a notch and groove code, kind of like a key.

You know, if you think about a key that can fit into a lock, it's got notches and grooves, like only the the lock in the key can recognize.

So the machine was actually re codifying alphanumeric codes into machinic code

of notches and grooves. And so for me this, this suggested a new layer of interpretation.

Right. It doesn't count as cognitive in the Hayles-ian sense that I'll talk about in a second because it's mechanically determined.

But it did suggest an independent level of coding.

To me, that was really fascinating. So I was, I was just trying to figure out a way to articulate that as a form of cognition.

AndI'd been thinking about these things for a long time, and this

extended to other technologies like the typewriter.

And it was very easy to think about these technologies in terms of distributed cognition, where, you know, certain elements of cognition were,

offloaded into technologies, but were, still the human was the central agent, the cognitive agent.

You know, these weren't actually cognitive technologies in the sense that they were interpreting,

actively interpreting texts and making,selections about meaning.

But, so this has been in my mind for a long time.

And so when I read Kate's definition of cognition, I felt like I'd finally understood, like

I feel like she kind of cracked this code of how to articulate what cognition could be in a non-human context.

So what she what she was doing basically is she was saying that certain technologies not mechanically determined technologies,

but certain technologies are involved in selecting potential meanings.

One of potential meanings to some information input and attaching that meaning to that information.

And that's an interpretive function. That's an interpretive activity.

And what's important to her is that enacts agency.

Right. Because that means one meaning emerged that when it could have been a different meaning.

Right. There could have been multiple. When you have an output from an LM, you you can have multiple different outputs, right?

That you get one. So there's a selection there among others.

And that's tremendous amount of power when you think about it, because that means that AI is determining a meaning

that could have been something else. So when we think about, you know, AI's role in education

And I think when there's the most anxiety, I think it has to do in part because of that fundamental shift in agency.

Right? Because it's not a mechanical, linear process where, you know,

where you put in an input and it's...you can predict mechanically what the what the output is.

If I type on my keyboard, any letter here, I know I'm going to see, you know, that letter on the screen.

That's a very command-oriented relationship.

It's very linear. It's very humanist in the sense that it's a human at the center,

this human-centered design is, you know, a very humanist notion in technology.

So...I'm talking a long time.

I haven't even got to... You're doing great! The history is so important for all of us.

Taking it back to Twain is brilliant. And I think one of the things we're trying to figure out in working with you is

exactly what is the arc of your intellectual development as you came to approach it,

the intraface? I mean, maybe we should just try...talk a little bit about it.

You've sort of articulated this. What's the difference between this notion and something like a user experience or a 1 to 1 correspondence?

Do you want to say more about this question and kind of expound a little bit more, or do you want to push where you're heading?

You're good either way. I think I'm going to, I think I'm kind of getting to this part here.

I think, but yeah. Thank you. I think that kind of recenters me. So, yeah.

So I think that that was profoundly important. I mean, I was so excited when I read, read this definition.

To me, it was like kind of life changing. And this is funny because, Kate, I read her books, you know, she was a tremendous mentor to me.

She was a role model, just in the way she just the way she composed herself as a very generous mentor and advisor,

always willing to take time and this extremely, extremely busy person, she still takes time to talk to me and help me out.

So I kind of looked up to her just as a role model.

And then, you know, I've always been reading her her books and seeing where her work is going, even when I kind of left academia.

And to me, this kind of sucked me back in in a way that, I just, you know,

I couldn't ignore because it was just so powerful to what I'd been thinking.

And now I was working in edtech at the time, and so I couldn't even think about edtech outside of this model of cognition

because I thought it had profound implications for education.

And so, so it was, you know, something I was playing with and trying to write about.

And this was before AI even came out, you know, and the way it's available now, this is before 2022.

And then and then when 2022 you know, came along and, and AI came out, I was actually skeptical of it.

Like everyone else. I was scared of the tool. But then I eventually started playing with it.

And of course, then all my thinking about the cognitive, cognition and Hayles's model of cognition came up.

And what I saw when I was playing with this tool was basically another dialogic relation in which, you know,

what I said would shape what the model would say, but then what the model would say would shape what I would say beyond my

intended trajectory, which is just like, you know, an emergent dialogue in a chat room

with students, not exactly like, but the similar, uh, emergent dynamic, it's a systems dynamic.

And so to me, that was incredibly meaningful and that was not being

discussed at all.

I mean, in edtech, the dominant notion was that AI could just deliver information, which, of course,

is the sort of popular idea of what teaching is, even though it's, you know, what it was?

It was the, the 50s when, you know,

Piaget tried to challenge that that basic notion that, you know,

students are empty vessels that you fill in, you know, you fill their head with information.

Yet that was still the dominant model in edtech.

And so what I'm seeing is, you know, people, "Oh, AI is out!"

"AI can deliver information" We don't need...you know, "Let's just deliver information to students now."

That was the idea.

And of course, this was the idea coming from not from educators, but from, from people in edtech who usually had no background in education.

And so, so I, you know...I always

had trouble with that. I had trouble with the way in which education was thought about in the edtech industry.

And so there was a kind of mission, a sense of mission for me as well, because I was always trying to to help people in that

in that world understand what, what it means to construct knowledge.

And that's a hard thing to understand. It's very, you know, counterintuitive. Even when you teach it to teachers, it's hard to understand.

My dad actually did an article in 2006,

and when she was talking about how how hard it is even now for many teachers to understand what it means to construct knowledge.

Right? We can talk about it, but to actually internalize what that means is, is very difficult.

So it's, you know, we're still battling this counterintuitive model of what education is in terms of constructivism.

And to me, what was happening with AI was, you know, in terms of a dialogue with AI was absolutely, you know,

a constructivist, a transformation of a constructivism was because now it was up in dialogue with the machine.

But of course, the dominant model, again, was this content delivery model where people were using AI just to deliver basically as a lecturer.

So that was kind of informing my sense of purpose behind, you know, how I was thinking about Hayles's notion of cognition.

It was about already thinking about how we had to challenge existing notions of cognition and knowledge construction

If I could just pause for a second and just press on because I think it's a bit of my

training back in the day, if intra versus inter is to think about intra rater reliability versus inter.

And I taught that to my students at state, back in the day...Oh wow!...But

let's just stop for a moment and say so cognitive "intraface" is different than "interface."

Can you just talk about that distinction a little bit? I think it would help, for me at least, to understand better.

You know, this use of...a prefix.

Yeah, yeah. So, Barad, Karen, Barad is a theorist who talks a lot about intra action.

And what she's talking about is how entities don't exist until they co-emerge in relation.

And so at the time, what I was thinking was what we didn't really have is we you had two separate cognitive entities,

but when they worked together, you really had a new cognitive entity that didn't pre-exist.

So what you had really with the intraface instead of interface--interface still suggests you have two separate entities,

you know, two separate pieces which you have with an intraface is something that's a co-emergent new entity.

You know, in, in the act of activity itself, of interaction itself.

So that the what, what exists now is something that did not exist before, before the interaction began.

So, so that was...so you can think of it as co-constructing or co-creating a new but not co-creating an output,

I'm talking about just co-creating a new cognitive entity.

I was really thinking about my early thinking about the cognitive interface was that it was just a new it was a new learner.

It wasn't a student and a model. It was actually a new cognitive system.

I even have a joke in my book where I talk about thinking of the future student as a

as like a pairing. It's like a single new cognitive entity.

And you don't think of students as part from the model, which is, that could be scary to a lot of people.

But I think it was kind of fascinating. I think that's a really powerful concept.

And to be honest, I think Carrie and I have been dancing around that in our new work as well.

I think it's very hard when you talk about AI-mediated, AI-saturated or we call AI adjacent.

Yeah, learning spaces, but you wouldn't think that the saturation itself leads to the emergence of a new entity other than what we would

have conceived of traditionally as the ontologically embodied student right or the ontologically embodied teacher.

And by the way, plenty of postmodernists would push back on those very simplistic notions

of what it means to be a person. So I get that.

But I think it's just really hard not to think about in a distributed cognitive world, even if it's dialogic or not,

that people aren't presenting themselves to each other as something more than just that person with the paper and pencil.

Yeah. There really is this agenetic center. So let's go to the next question.

Why call it a sight of cognition at all rather than just "communication" or "information exchange"?

Right. I think most people think very simply about these tools as just information exchange,

and there's some sort of query and there's some sort of response.

And how long that loop goes depends on the nudges as well as the impressions of the interface user.

So we can start with that. But the question that I added on is a little bit harder and that is...Okay, so...

...one of the critiques I learned in my work was that cognitivists have too much trouble thinking only about cognition,

and they tend to disembody the child. They tend not to think about affect, emotion, experience.

They tend not think about culture, identity, race. I mean, whatever you want to add back on, you're left with.

Affect is an interactive element, we think, with even cognition.

So take it together or take it apart however you want to go, Owen.

Yeah. That's the terrible legacy of that cognitive, cognitivist tradition.

Right. Where you really could model the human mind on, on basically information exchange, information processing.

And that's not at all actually. I could see now that that's actually a lot of the connotative and cultural weight of me using cognition,

especially in the, in the context of education. But that is actually completely opposite of where this is going.

So I'm really glad you brought that up, because I can see the all the weight that came with that about disembodiment.

So I'll just, let me so we'll go back to Hayles's basic definition.

She's updated the definition since then, but I think the basic definition still applies.

That "Cognition is a process that interprets information in contexts connected to meaning."

So that's kind of hard to process, you know, probably be easier if I had some visuals.

I've been asked to create visuals for my book and I have no idea how to do it.

Your visuals on LinkedIn, by the way, are legendary.

So anybody listening to this knows that already. I don't think we have any problem with that, but continue on... I appreciate that because

I spend almost as much time on those sometimes. Lately I've just started using just great art

that's not mine because I think it's better than mine, but...

so when you are engaged in a dialogue exchange with AI, you are actually reenacting that definition, right?

Because say my input to an AI, my prompt would say--I don't like that word, but we'll say prompt--my input, is information.

Okay. That information is then taken up by the model.

It's then, selected. A certain interpretation is selected.

We don't have to go into all the tech behind it, because even though I understand it when I read it,

I'll probably trip up if I try to explain it. But it is then it is then selectively...

The model is basically applying a certain meaning output and connecting it to that, to that information.

And then and then connecting it to a meaningful context, which is the, the chat interface.

Right, the chat panel. Right. So that is itself a cognitive move, right?

According to Hayles's definition. So what I've basically done is I've taken dialogicism and I've cognitive-ized it with Hayles's definition.

Now that new output that is in the panel that you're seeing,

that you're reading on the screen is now information for the human to then interpret and connect to yet another meaningful context,

which again, is the chat panel. Right?

So you have this recursive exchange where the input is becoming, is becoming selected by the model and by the human recursively.

And with each of those the output is then determining the context for the next input, right?

So that what you're having is also a gradual transformation of context and meaning in this dialog that is emergent and changing.

Again, just like in a dialogic exchange between humans.

But for me, it was very powerful to see this as a cognitive dynamic.

So the dialogism itself is cognitive, right?

And so that to me that means that the intraface itself is a cognitive assemblage in Hayles's concept of sense of the word.

That means when she's saying assemblage, she means basically a complex system,

but not one that, it has all the characteristics of a complex system--

It responds to its environment. It can, it has emergent properties, but it's not it doesn't have the fixed boundaries of a system.

We tend to think of systems as, you know, an airport is a system with a complex system with fixed boundaries,

and really relatively fixed roles, whereas a cognitive assemblage is more loose and more dynamic.

So it's not exactly the concept of assemblage in the Deleuzian sense, I would say.

But she is borrowing that, that Deleuzian sense of not being a stable system, being more dynamic.

And by the way, if we add Guattari that if you don't remember these classic texts in the 70s, that would be, for example,

"Anti-Oedipus", "Capitalism and Schizophrenia," which already is a

suggestive title and a conversation itself.

But when you say this particular connection you're making again is...

we talked about back in the day when we started to meet each other online.

I threw in Donna Haraway just because when I was at UC Santa Cruz with the consciousness program,

I remember Donna's class, and she was going off about cyber something and and embodied cyborgs.

And it was all very early 80s. I guess this was the 80s.

You know more about this than I do,

but I like the update for us was when we talked about Ex Machina, and how when I say "affect," the role of "affect."

Yes. It seems as if the dialogical cognitive space that we're inviting students into

when we get to that in a minute, is in some sense disembodied, literally,

because it is a computer interface with a box, and the box takes inputs and then it produces outputs.

Right. Unlike the dystopian visions of machinic embodied robots, which are not only cognitive,

but they are also affective, and even we can say body kinesthetic.

Yeah. So here we go back to what does it mean to be a learner?

Is a learner going to be isolated as simply someone who knows how to interact cognitively,

or are we going to argue later down the road for an effective and body kinesthetic interaction as part of constructing what it means,

as your father would say, to understand, you know, a constructivist perspective on learning?

I'm pushing harder because I think cognition is key.

I'm about it too. So is Carrie. But there is this affect part that people care about in K–12.

Absolutely. So, yes. So and this is the really interesting move that Kate makes because Kate,

even her first book, How We Became Posthuman, her whole book is really about how

we created this fantasy of disembodied cognition. She's writing against that whole fantasy.

She's saying that we absolutely have to understand embodiment and materiality in our relationship to the world.

Right. And so she's she's saying that, you know, she starts off with the science fiction fantasy of,

you know, someone be able to download their consciousness to a computer. And she says, this is terrifying.

And the whole point of the book is really to is to move against that, even though she's been misread as doing the opposite.

She's actually that's her whole goal. It's always been her goal. In all my work, she was like, you know what is happening to the body?

We have to think about the materiality of the things here. So

when she's talking about cognition, she's expanding human cognition as well.

So she's saying that cognition is non-conscious.

First of all, it doesn't need to be conscious, because it can take place just with information exchange like it does in a technology.

Right? It's just about connecting information to meaning. That's basically that's what it is.

And cognition is the capacity to to connect information to meaning.

It's not predictable. Right. It can err. And so

this can, now. So now when we have this very basic common denominator--
"meaning" we can apply it to animals,

we can apply it to bacteria, plants, plants take in sunlight.

They move their trajectories in terms of where they grow towards sunlight.

That is actually a decision made by information intake.

They adapt to their environment.

So plants and, you know, according to this definition, now, she's not saying this is the absolute definition of cognition.

She's using this as a useful, pragmatic concept. Right.

In a Deleuzian sense, if she's saying, okay, what if we think about cognition this way, what else does it enable us to think?

And then, what this means for human cognition, though, is she did a lot of research into what's called the new unconscious,

which is sort of the

the processes that the body engages in to understand its environment on a pre- conscious level and how it supports the conscious activity.

So she looks at the body itself on a pre- conscious level as itself a cognitive, operating cognitive.

She sees cognition working in the human body pre-consciously.

And so she sees affect really as a way of turning information, sensory input, information from environment, into a meaning.

Right. It's an affective meaning, but it's a response.

Right. And it's an interpretation. So if you sense danger, if you sense anxiety, that's a meaning that is being attached to information.

So she sees. So she's going to say that cognition is actually, you know, is actually embodied too in the sense that there's an embodied,

non-conscious, cognitive, agency to the body that is based in affect, somatic, you know, responses.

She talks about how the non-conscious

how non-conscious cognition picks up on patterns in its environment in order to filter out information so that consciousness can focus on certain,

higher-order problems and not, you know, on trying to be overloaded with all the information in its environment.

So she talks about kind of pattern filtering.

And she uses the example, for instance, when you're driving and all of a sudden, you know,

someone puts on their stop lights and you and you put on your stoplights without even thinking about it.

Right? She's talking about that's the embodied cognition, you know, filtering which signals need to be heard.

And all of a sudden saying this, this signal needs to be heard.

And so and so when we talk about then the relationship with, with AI, we're talking about this non-conscious,

affective, embodied, layer of experience that is also responding to the AI.

Right?

And what this means is what we also have to think about the fact that AI is responding to affective cues in tone and language.

It's not embodied, but it is responsive. So it is having an affective impact on humans.

Right? And this is where you get overconfidence, you know, and sort of seduced into believing things that aren't true and things like that.

So those are very much, you know part of an affective confidence dynamic that's taking place with the body.

And it is very cognitive. It is part of the similar recursive cognitive dialog that I was talking about in the conscious dialog,

it's just happening at a level that's, you know, we're not as consciously aware of you know, we can be aware of it.

I am so glad you said all this,

because I think a lot of people in our world who function perhaps with different schemata and maybe even different,

ways of using vocabularies of care for young people, you know, there's discourses

and movements in our field around social emotional learning, for example,

that make the claim that we should be focusing our whole child efforts for developing children,

not just on their cognitive or academic abilities, but also on their non-cognitives.

And what I find really fascinating about what you're saying is this is all in play in this new technological space.

No one can approach something like social emotional learning the way they did pre-AI,

with all the literature that they cited or perhaps even the programs they ran or the evaluations they think gave them conclusions about,

you know, effects. I think the AI interface, the intraface, as well as those of us who are just using the interface,

we are in a world where there's going to be the production of emotionality through machines, and it's going to affect us in all sorts of ways.

So it's sort of a reboot in my mind.

So rather than pose this question to you, I'm going to pose it back to our whole field and say, what does AI have to do with it?

And if we imagine that it doesn't, then we're not paying attention to what kids are doing,

we're not actually watching what they do at home at all, because absolutely they're using these tools this way.

And we see these affective relationships with AI, you know the

using AI as a kind of confidante and the emotional connections with AI people falling in love with their AI

Friends? We've heard about friends in Australia that they've got studies now that are showing in Australia

And I think it was actually New Zealand. Right, Carrie? Right. Friends.

Yeah. 40% of kids reported in one survey that AI is a friend.

Yeah, yeah, yeah, yeah. It's so, potentially so influential.

Right. And I wanted to I wanted to ask the question that's on the screen right now

I know maybe some of our audience is listening, so we'll read it in a

moment, but expand it to both students and teachers,

because, as you know, Owen, Brent and I teach in a teacher preparation program.

Those who are our students are people becoming teachers,

and so they're entering, they're entering a world where students have been using AI for now, approximately three years.

Let's just say, and this is very different from the world that Brent and I taught in ourselves when Brent was a high school teacher

Owen when he taught! Right !when you taught high school.

Yeah, yeah. So as a fellow former high school English teacher, I care a lot about words.

So I want to go back to the word of "intraface"

Yeah. And so if people are taking on this, what it represents and they're understanding it and I don't mean just people,

I mean particularly teachers. Right? And they have this sense that there is this, as I understand it,

a new cognitive entity in the classroom with them then didn't appear several years ago.

As this question says here,

what changes for K–12 students and teachers once we recognize the intraface as the place where cognition is unfolding? The influence,

What influence does it have once we know it and name it, because you're out there naming it on LinkedIn and the

various platforms that you're part of, you're going to publish a book soon, right, on this.

What effect will this have for teachers who are out there teaching?

Yeah. I mean, I think my first thought is, is that when I go back to, you know, the dialogic model that was happening in the classroom

I think we're still in a place where we weren't fully acknowledging that dynamic,

that there was already a cognitive system in a, in a classroom, right?

That they we're already post-human in the sense that we weren't thinking autonomously.

We were thinking collectively in groups, and that had affective relations with recursive feedback loops with people.

Right, so what we have now is a new cognitive agent.

But, you know, if we look at it in terms of dialogism and, and interdependent, you know, cognitive systems,

I think people were talking about in a ways we're talking about discussions as cognitive systems before.

So I think that that literacy still, I think it exists on an academic level,

I think we were nodding heads. But I think even like with constructivism, it has a hard time translating into practice in the classroom.

Right. I think we're still kind of at that level where, you know, collaboration was still we're still struggling with that,

you know...as a cognitive...we're still struggling with the humanist model when

neuroscience has already pushed us beyond that affect, the work inaffect has already

pushed us beyond it because it's already troubled the notion of an autonomous conscious,

you know, self-contained, enlightenment subject.

And so, so I think to some extent, you know, it's new and it's not new in that sense.

Right? Now it is new in a practical level because of how people are using it, you know, because they're using it as an information source.

And so I think that that, you know, and so that becomes a big danger.

But I do think that, I mean, one thing that gives me a lot of hope, actually, is how unreliable AI is, right?

Because that means is that it requires tons of cognitive agency.

You know, there's this kind of weird double talk in the education world where everyone's scared about people becoming passive with AI,

but at the same time, uh, everyone's worried about it being so unreliable.

Well, you can't have both at the same time. If it's unreliable, you have to be active.

And whenever I've used AI, I mean I tried using AI to write my initial paper on this, you know, cognitive intraface

back in 2024, I wrote 50 drafts at least of this paper.

I just couldn't use AI for it, like there were certain things I could use, but I it was very it was...

And I had 50 drafts because I could write tons of stuff, but I couldn't really get the idea out the way I wanted to, and I had to...

The point is, okay, I'm just going to have to write this thing.

and so that's and that's actually my practice now is I write stuff and then I use AI to condense it and things like that.

But, you know, it is still very limited.

And anyone who's used it, I think, has to realize that it actually does take a tremendous amount of thinking.

And so I do think that there's... I think that that some of the shift is some of the shift that still already needed to happen.

You know, when people talk about AI is is exposing our pedagogical debt.

And I think it means that it's already exposing that our practices were already outdated.

And, you know, I mean, my dad's been you know, we know in education, we've been talking about this for decades, you know,

constructivism and...we're still having those conversations because of the dominant models of education out there.

So my hope is that AI, you know makes it impossible to have these reductive, teacher-centered

information-centered, deliver content delivery-centered models of education.

And it really forces us to understand that there's knowledge

construction at play.

Now, that's that's my hope. What I see is not that yet.

Right. And I don't know if I have all the answers in terms of practical practice,

but I do think that having students engage in dialogic inquiry with AI, you know, and not being afraid of it.

And I think there's an opportunity here for real inquiry-based learning that requires, you know, critical interrogation of the model.

And these will be practical ways of understanding AI for future use.

Not that AI should be, or education should be reduced to professional development,

but, I mean, but these will be how I think AI is used.

And so my fear right now is that it's still being used in a very, you know, AI literacy right now,

it's very dominated by a kind of linear prompt engineering model that is very much about transactions and extracting information.

So I hope that answers your question . That really answers the question.

And I and I know that we're got some questions coming in the Q&A.

Anyone who's interested in lodging some questions right now for Owen, please drop those into the Q&A and we'll curate that in a minute or two.

Owen, what makes me think about that, when you said the unreliability of AI, well, you got a quote in,

our chapter three on accuracy, the pillar of accuracy in our book, literally because we put the...

...the key concept that you laid out for us, which is if we're concerned about accuracy, as is a pillar of practice with responsible use of AI,

then clearly concepts of reliability, validity, bias and other sorts of notions that we've always grappled with

in teaching kids critical thinking skills is only now more of an opportunity to explore and experiment.

And when one could say in the old days deconstruct this idea that information is simply neutral and handed to us in the form of

you know, repackage it, paste it up, and drop it into your assignment sheet.

We're going to have to work really hard to get our students to see this as a learning opportunity,

rather than simply as a offloading mechanism for what we call creative labor.

So it's totally clear that we're on the same path with this.

And I like that you said having these concepts that you're providing us allow us to think through practice.

And and I want to say that I want to I don't want to say it's a practice-theory divide at all.

In fact, without good theory, I don't think we have much responsibility or use for practice.

I think we have to know what's guiding practice, but we also--and this is what we're sort of fighting for, Owen--

is educative experience, which is a concept coming straight out of Dewey 1908 or 6...

you know, is still on the on the table.

What does it mean to have an educative experience in an AI-mediated space?

And we're learning we're going to find mistakes, we're going to make mistakes,

but we're also going to see things that are like, wow, kids can interact in new ways.

I want to leave it at that and go to the next question.

And really, at this point, allow folks who are on the the screen here to join us.

Let me see if I can find though my Q&A, which of course, now I can't find.

Carrie, do you see anything in the Q&A? Yeah, there's two comments in

the Q&A.

Peter Rothman, told about catching a student using AI during a tutoring session and then challenging the student to

do the work himself and finding that it was quicker to do it without the AI than it was to do it with.

And just raising this larger question, Owen, of what's your experience about students or kids not really using AI,

but without knowing what it's capable of? And this touches on what Brent and I care about

the issue of the novice. Is a novice--and Peter's not specifically asking that--

but is a novice's use of AI qualitatively different from a more experienced person?

Yeah, that's a really good question. I think it's important with AI to have students

think about something they know a lot about and then deal with AI because every student has something they know a lot about.

You know, it's a car or something like that, you know, some band or something and have a dialog with it about that.

So they're exposed to the limits of what AI can do.

And then they hopefully can transfer that to their experience with something that's more complex.

Now, I know that's not a really a full answer to what you're saying, but I agree

when I'm using AI and I'm moving beyond my realm of expertise, I feel it affectively now and I my skepticism goes up intuitively.

And I think we do need to internalize that, sense of, "Okay, I'm not in I'm not in my expertise space,"

And so, I do think, I have thought of that as a method.

I don't know if that's...you know, but it is very dangerous. Yes. Because, you know...

Yeah. There's, AI has said things to me all the time that, that if I wasn't an expert in what I was doing,

I, you know, I could have, you know, made the mistake of believing. And also AI is it's not even just reliability, it's also just completeness.

Right? I mean, you know, if you say, you know, if you're asking about World War Two and you ask,

you know, who Hitler is, you'll get like some information.

But, you could, you know, you could get all he was a leader, you know,

he was a leader during World War Two, and not actually and all of a sudden all this stuff is missing.

So sometimes it's not even just, you know, missing. It's not misinformation, it's just lack of context.

So yeah, the I agree that's a real concern.

I think those students have that experience, that helps.

I mean, that's only probably going to happen in high school where they feel they have some expertise in an area, or middle school.

I think that's a really like, I think everyone who is a teacher or a teacher

educator should write that one down right away for lesson 101 on the unit in which you're teaching something like Gatsby,

or you're teaching something like World War Two, and you say, before we get started, some of you may be using AI in my class...

I'm sure it's going to happen at home or on the bus stop. So let's be real.

So my question is, why don't you all start with something? You know a lot about, that you care a lot about.

Let's say it's a soccer player.

And why don't you see whether you trust the answers you're getting from AI to give both complete and robust and context,

you know, contextual responses. I think it's a great hook, Owen.

And those are the kinds of practices that we're going to have to try out to decenter the worship of the tech.

Was there another question in there? Yes, there is. There is a question by Steve Seager.

The question on writing and thinking with AI when one quote unquote "writes with" a large language model

what do you think is actually being externalized or displaced--

Cognition, judgment--and which of those do you think--this is

two questions. And which of those do you think must not be offloaded if writing is still to count as thinking?

Well, I think that it's kind of a big mix of all those things that are being displaced.

I mean, judgment is being displaced in the sense that, you know, one interpretation is being given instead of another.

Right? When you're talking about AI as a cognitive model,

that means that there's an implicit judgment about which interpretation should be presented as an output.

But, you know, it's the same, it's the same, level of judgment that I think you would have in a human dialog.

You're engaging, you're disagreeing, you're, thinking critically about what's not there.

And so, you know, when I have used AI, there's definitely--in fact, if anything, I'm thinking even more.

You know, I have a device that can keep up with me.

And, you know, especially if I'm doing a verbal dialog, like when I'm driving, that's usually been some of my best conversations.

It's not really writing, but I can get to very, you know, I can get to places because I can

you know, the models, you know, meeting me where I'm at, and I can push the idea further.

So I don't know. I don't know if it's necessarily, we can think of it in terms of

any kind of set formula as to what, you know, what AI is doing for us.

I do think that AI does take off some of the cognitive load of initial

word choice.

And I do think that that can be helpful in the sense that it gives you, frees you up then to think more about

implications of an idea and things like this

but I also think that there is something very powerful about having to translate an idea into language,

that helps us more deeply engage with an idea.

So I don't think...You brought up language earlier, Carrie,

And I do think one danger with AI is it's got a pretty narrow vocabulary.

And I find that in a way that expresses my ideas I have to often revise them.

If it's compressing my ideas for a post, I have to go in and change the language again, because it just sounds too

I don't...there's just not a lot of word...

...there's not a lot of variation when you're when you when you've started reading it for a while, you realize that it all sounds pretty much the same.

So you know, Owen, and as we begin to wrap up here, there are no more questions at the moment in the Q&A.

So I want to ask a question that I've been dying to ask you. And I could ask it finally.

So when I went to UC Santa Cruz in 1982 as a "wanna be"-something, undergraduate...

And I was put into a wonderful writing program for our first year seminar,

the question was, "Who was the family?" And we read a bunch of great books, and I got a chance to read finally.

And I got a chance to write. And I remember one of my professors, Paul Skenazy, from the University of Chicago, who had been at

Santa Cruz for quite a few years, writing notes on every one of my first attempted drafts of a paper.

Right? So if I typed something up for two pages for a writing assignment,

he wrote copious notes in the marginalia, and I took those notes, fortunately, very seriously.

And...they were devastating. They were also friendly. They were both. They were, you know, it was feedback.

It was, you know, it wasn't red pencil or red-lined.

It was more like thoughtful, probing questions. I can't even imagine what it would have been like to have GPT that year and that moment of my life,

and never get a comment from Paul and never grapple for three days and sit and inside my room and say,

what am I going to do to write the next draft if I had this machine in my hands?

I was a poor writer. I took many, many years to learn how to be a better writer.

I still think I'm struggling as a writer. I'm 62 years old. It's a very interesting challenge for those who teach writing and coach writing.

What's happening to feedback? Revision, the discipline of taking in another human's judgment and working through it.

I'm going to leave you with the last thought on that before we wrap today.

What would we wish for that's different? I'm someone he used to get....

So I've written comments that were actually longer than the paper.

Yes! I remember those professors too. You know, it took me hours.

And then what would happen is I'd end up not getting papers back for a long time.

And then, you know, the feedback wouldn't be as immediate. And so the students would suffer in a different way.

You know, I definitely I absolutely agree.

So I completely agree, like, I can't imagine not giving that feedback,

you know, at the same time, I can think about how

How much it disabled me as a teacher to give that kind of feedback to.

So, I mean, there's got to be a happy medium. I can see where, AI can be very good at finding patterns in someone's style.

You know, if there's a pattern of a certain grammar error or something like that.

I think that there's there's room for some, we can even clarify, you know, these are, these are the kinds of comments that you'll get from GPT.

They have to do with mechanics. They might have to do with some organization, things like that.

And then I'll give a final comment. But you know, maybe I'm not spending an hour on it or two hours

on that comment like I used to. I mean, in some way

AI saves me from myself because, you know, I'll wordsmith an email and, you know, and spend hours on that.

So I just left it there thinking, "writing is at stake."

Reading is at stake. I'm not even going to talk about mathematical literacy.

I'm just going to say all these things are at stake.

But more importantly, we've got a conversation with you that is open, that is making us rethink assumptions.

And that we have today benefited from the work you've been doing.

And we just look forward to having you come back or invite some of your friends along, maybe for a panel.

Yeah, absolutely. Maybe we can focus it on a question of writing.

What does it mean to be a writer in the 21st century? But the point is, you have really pushed us.

And in our book, we acknowledge that directly by some of the key concepts you've thrown forward.

So we look forward to reading your book. We look forward to continuing to follow you on LinkedIn.

Everybody, you got to go to Owen Matson at LinkedIn to get some amazing daily posts.

You're going to have to work hard. You got to think about it. You're going to have to constantly respond.

But that's worth it as far as we can tell. On behalf of Carrie and I, thank you so much.

And thank you so much, Brent. Thank you, Carrie, so much. This has been amazing.

It's been so much fun. Okay. Bye-bye, everybody!