

LEARNING THAT LASTS: HOW KYRON'S INTENTIONAL DESIGN LEADS TO DEEPER LEARNING

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Real learning happens when students can see what they do not yet understand, reflect on their thinking, get feedback, and work with new ideas in a way that sticks.

Quick answers can feel useful in the moment, but they rarely lead to lasting knowledge. This paper looks at the limits of chatbots in learning settings and shows how Kyron offers a different path.

INTRODUCTION

Chatbots, AI tools that simulate conversation to answer questions, are everywhere in education right now. They are fast, available at all hours, and can give an answer to almost anything. For learners and institutions looking for scalable support, the promise is appealing. A chatbot seems like a simple way to put a tutor in every pocket, answering questions as soon as they arise.

The problem is that chatbots put the responsibility on the learner to drive the conversation. To get real value, the learner must know what to ask. But in practice, learners often do not know what they do not know. They may ask about details they think matter while missing deeper misunderstandings that hold them back.

Real learning happens when students can see what they do not yet understand, reflect on their thinking, get feedback, and work with new ideas in a way that sticks. Quick answers can feel useful in the moment, but they rarely lead to lasting knowledge.

This paper looks at the limits of chatbots in learning settings and shows how Kyron offers a different path. Kyron designs each lesson to feel like a conversation between a learner and

Kyron builds short, interactive lessons designed to feel like a conversation between a learner and an AI tutor. Learners engage more deeply when they have to talk through ideas — explaining their reasoning or responding to question makes the experience feel more personal and engaging, **leading to lasting knowledge.**

an AI tutor, encouraging learners to explain their reasoning or respond to questions.

Learning objectives are embedded into each lesson so that the AI tutor can guide students along an intentional path, removing the burden from the learner to figure out what they do not know. These types of conversations ensure learners remember the information longer, they understand it on a deeper level, and the experience feels more personal and engaging.



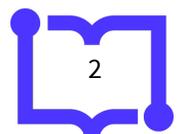
WHAT IS LEARNING

Learning means more than just memorizing facts for a test; it means knowledge and skills that:

- Stay with learners over time (long-term memory)
- Can be applied in new or different settings (transfer)
- Change how learners think and solve problems (growth in expertise)

Research shows that the way learners engage with material shapes whether those goals are met. The Interactive, Constructive, Active, and Passive (ICAP) Framework (Chi & Wylie, 2014) makes this clear. Passive engagement, like listening or reading, leads to weak outcomes. Active engagement, like underlining or highlighting, is stronger. Constructive engagement (explaining or summarizing in your own words) and interactive engagement (dialogue and debate) drive the deepest learning.

Most learners do not reach those higher levels on their own. Without support, they stay on the surface. That is why the design of learning tools and interactions, especially those powered by AI, matters.



WHERE CHATBOTS FALL SHORT



LEARNERS DO NOT KNOW WHAT TO ASK

Graesser and Person (1994) studied the questions students asked during tutoring. Only 29 percent revealed a true gap in knowledge. Most circled around material the learner already half understood. Without a tutor's prompts, students struggled to tell the difference between what they knew and what they did not, so their questions stayed on the surface. Even more striking, 92 percent of those questions focused on facts and definitions rather than reasoning or problem solving.

Early evidence from large-scale analyses of student questions to AI tools shows the same thing. Most queries remain surface-level unless carefully scaffolded. With the right prompts, such as asking students to explain their reasoning or apply an idea to a new situation, they can be nudged into deeper thinking, but that rarely happens by accident. When the burden is on learners to know what to ask, misunderstandings often remain hidden.



ENGAGEMENT STAYS ON THE SURFACE

Chatbots deliver information, but information is not the same as learning. The ICAP Framework explains that the depth of learning depends on how learners engage with material. Passive and active engagement might feel productive, but only constructive and interactive modes lead to lasting learning. Think about what happens when a student gets a quick fact that answers their question — the chatbot delivers information in a long, static explanation without engaging the learner in reasoning or application. The response feels (and looks) complete, but it leaves the learner passive rather than active, with no opportunity to test understanding or connect the concept to a real situation. The asker is rarely pushed to explain, connect, or reflect in ways that make the knowledge stick.



NO PATH TOWARD MASTERY

Another problem is that chatbots treat each question in isolation. A student may get a decent answer, but the system does not connect it to bigger goals or adjust as the learner grows. There is little progression from basic understanding to advanced application. In higher education, the measure is not whether students can look up a fact but whether they can use knowledge in complex, unfamiliar situations. Without a path forward, chatbot interactions often stop short of that kind of growth.

THE KYRON LEARNING APPROACH

Kyron was built on a different belief. Answers are not enough. What matters is creating conversations that guide learners toward lasting understanding. Every element – from the prompts to the feedback to the visuals – is designed for growth.

In the example lesson below, Kyron Studio created an interactive module based on an **objective** (understanding why correlation does not mean causation) and **audience** (college students).

Figure 1: Kyron Lesson Design

Create a Lesson

Example lesson

Intercultural Communication in Online Courses

Example lesson

SQL Basics for Student Services Analytics

Example lesson

Project Management with Kanban

Title *
What is the title of this lesson? ⓘ

Understanding Why Correlation Does Not Mean Causation

Duration *
How long should this lesson take to complete?

15 minutes ▼

Learning Objectives *
What should students have learned by the end of this lesson? ⓘ

Provide examples of correlational data, identify potential confounding variables, and discuss common examples to illustrate why correlation does not imply causation.

Audience *
Who is this lesson intended for? ⓘ

College students .1Z/255..char.s

Optional Upload Your Own Text-Based Learning Materials ⓘ

If you already have related learning materials you can upload them here and we'll use them to inform the lesson we generate. Suggested materials include PDF textbooks, course syllabi, something else, etc. Right now we can only accept text-based learning materials.

[Upload files](#)

Generate lesson outline →

iPhone Mir

Based on the prompts, Kyron Studio creates a detailed multimedia lesson plan tied to the learning objective.

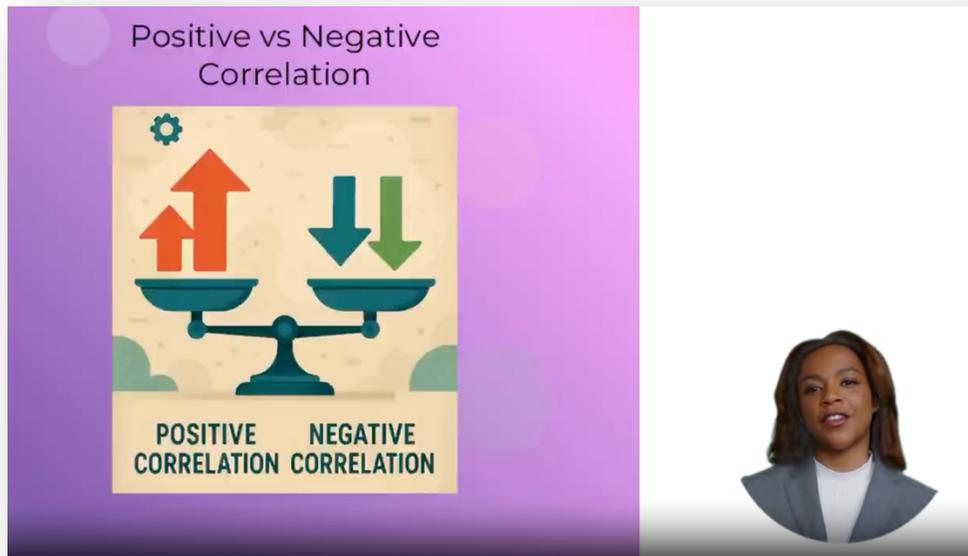
The screenshot displays the Kyron Studio interface for a lesson titled "Understanding Why Correlation Does Not Mean Causation (15 mins)". The interface is divided into several sections:

- Header:** Includes a back arrow, the lesson title, a "Live" indicator, and buttons for "Analytics" and "Settings".
- Sidebar (Table of Contents):**
 - Overview
 - Section: **Understanding Correlation: Examples, Confounding Variables, and Limitations**
 - Lecture: **Introducing Correlation and Confounding Variables** (highlighted)
 - Clarifying Conversation Question 1
 - Lecture: **How Researchers Address Confounding Variables**
 - Lecture: **Applying the Concept Across Contexts**
 - Clarifying Conversation Question 2
 - [+ Add Section](#)
- Main Content Area:**
 - Slide Title:** "Correlation vs. Causation" (3/15 words)
 - Slide Bullet Points:**
 - Correlation shows variable link (4/10 words)
 - Confounding variables mislead (3/10 words)
 - Ice cream sales & sunburn example (6/10 words)
 - Identify confounders to clarify data (5/10 words)
 - Narration Transcript:**

In research, we often see two things move together and assume one must cause the other. This assumption is powerful—and often wrong. Correlation simply means that two variables are related: as one changes, the other tends to change too. A positive correlation means they rise or fall together; a negative correlation means one increases while the other decreases. But correlation alone doesn't tell us why the relationship exists. Sometimes, both variables are influenced by a third factor—a confounding variable. Confounding variables can make it appear that one variable causes another when, in fact, both are driven by something else. Recognizing this distinction is essential for interpreting research accurately. Let's explore an example to see how this works in practice.

In subsequent learning modules, the learner hears the content from an avatar while seeing visuals on the screen. Research shows that when people both hear and see information, they are more likely to remember and understand it because it reaches two parts of the brain.

Figure 2: Sample Kyron Module



After the video modules play, pre-designed questions tied directly to the learning objective are posed to the learner. The goal is for the learner to use what they just learned and talk through practical scenarios with the AI tutor, which continues to push the learner forward to ensure complete understanding of the concept.

Figure 3: Sample Conversation with Kyron's AI Tutor

Opening question: Researchers find that students who sleep fewer than six hours a night have lower GPAs. Does this mean that lack of sleep causes lower academic performance? Explain your reasoning.

You said:

Yeah, that makes sense... if you don't sleep enough, you can't focus or remember things, so your grades would go down

AI tutor said:

That's a common way to think about it, but does finding a relationship between sleep and GPA always mean that one causes the other? Can you explain why or why not?

You said:

I still think it does. Sleep affects your brain, so it seems obvious that less sleep would cause worse grades.

AI tutor said:

It's true that sleep affects your brain, but just because two things are related doesn't always mean one causes the other. Can you think of any other factors that might affect both sleep and GPA?

You said:

Maybe students who are really stressed or taking hard classes end up sleeping less and getting lower grades. So, it might be something about their workload, not just the sleep itself.

AI tutor said:

That's correct so far! You've identified that other factors, like stress or workload, could influence both sleep and GPA. Can you explain why finding a correlation between two things doesn't always mean one causes the other?

You said:

Because just seeing that two things happen together doesn't tell you why they're related. There could be other factors influencing both, so we can't be sure one is actually causing the other.

AI tutor said:

That's correct! Correlation doesn't mean causation—other factors could be involved. To really know if lack of sleep causes lower grades, what kind of study or evidence would we need?

You said:

Probably an experiment where you control how much people sleep and then measure their grades. That way you'd know if changing sleep actually changes performance.

AI tutor said:

Exactly. A controlled experiment like that would show whether sleep really affects grades. You started by assuming it was a direct cause, but you worked through other possibilities and figured out how to test it. That's the kind of reasoning researchers use to move from correlation to causation. Great work.

This dynamic back-and-forth approach focuses on the full design of the lesson, not just on a question-and-answer formula.

Kyron makes learning active and engaging, connecting learners to deeper understanding and lasting knowledge.



KYRON'S DESIGN PRINCIPLES

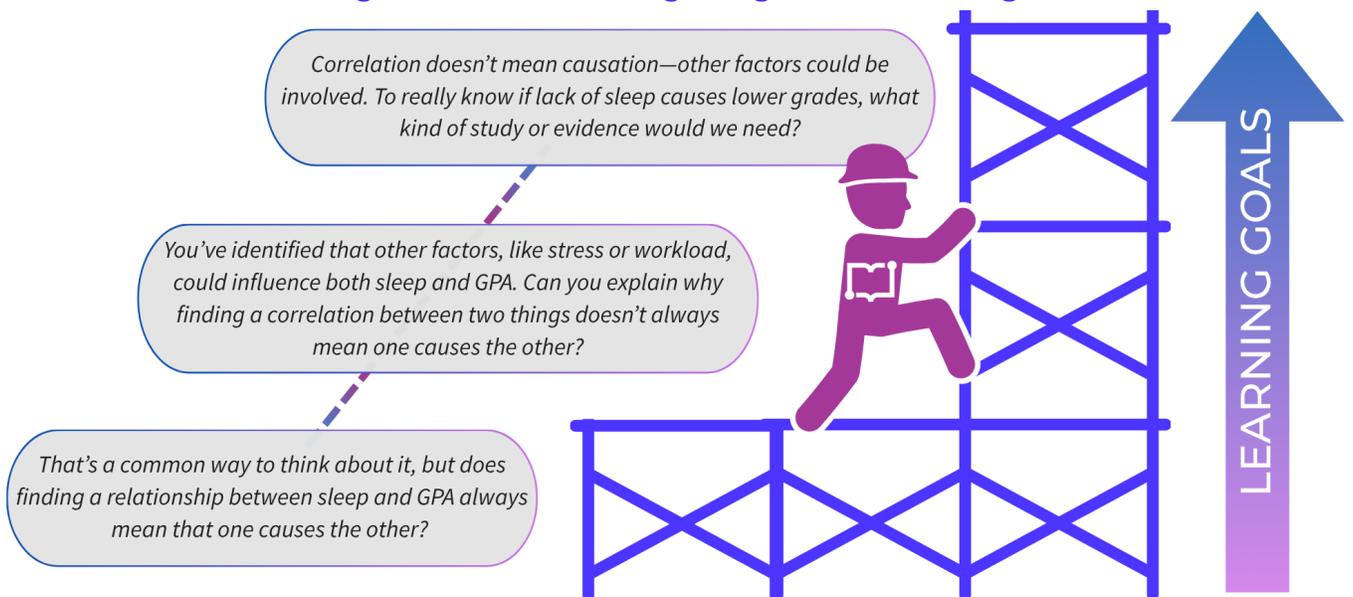
1 DESIGN WITH OUTCOMES IN MIND

Kyron uses the backward design framework (Wiggins & McTighe, 1998), which begins by defining what learners should understand by the end of a learning experience. With those outcomes set, every element and interaction are designed to serve the learner. As seen in the example, the question posed by Kyron's AI is directly tied to the learning objective set at the onset of the lesson. Instead of moving from one answer to the next, learners follow a path that was designed with intention to keep them moving forward without cognitive overload. Each step builds on the last and moves them toward mastery.

2 FEEDBACK DRIVES GROWTH

Decades of research have shown that feedback shapes learning more than almost anything else (Hattie & Timperley, 2007). Learners do not just want to know if they are right. They want to know how to get better. Kyron makes feedback part of the conversation by recognizing where learners have correctly grasped key concepts and by nudging them to think deeper. Misconceptions are surfaced, reasoning is sharpened, and learners are guided to try again with stronger strategies. Feedback is not an afterthought. It is the engine that keeps learning moving.

Figure 4: Constructing Long-Term Learning



3 KEEP LEARNERS IN THE SWEET SPOT

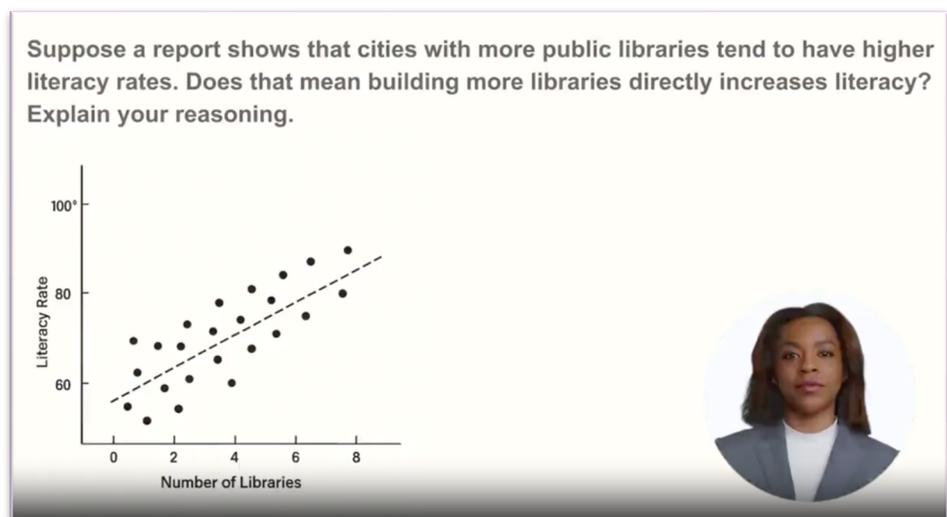
Learning is most powerful when tasks are just beyond what a student can do alone, with the right support close at hand. Vygotsky (1978) called this the Zone of Proximal Development. Kyron's AI adapts in real time to keep learners in that zone. If a question comes easily, the AI prompts deeper thinking or introduces a new way to apply the idea. If a learner is struggling, the AI provides scaffolding that makes the content accessible without lowering the bar. Because this scaffolding is built on the backward design framework, it is not just about getting through the moment. It is about keeping learners on track toward the final outcomes and goals of the learning activity.

4 MAKE KNOWLEDGE LAST

Kyron is designed to help knowledge stick. Every conversation includes practices that strengthen memory, deepen understanding, and build the ability to use what is learned in new contexts. Learners are regularly asked to recall ideas from earlier in the lesson instead of rereading them. They explain concepts in their own words and connect new information to what they already know. They pause to reflect on their understanding and try again with stronger strategies. Because the experience is active, learners spend more time applying and analyzing ideas rather than simply receiving them.

Kyron also uses visuals to make abstract ideas concrete. As learners talk through a concept, they see it illustrated on screen. Seeing and discussing ideas at the same time helps learners organize information and remember it later. When a learner gets stuck, Kyron does not just provide another answer. It identifies where the thinking went off track and uses visuals and guided conversation to help the learner find a way through.

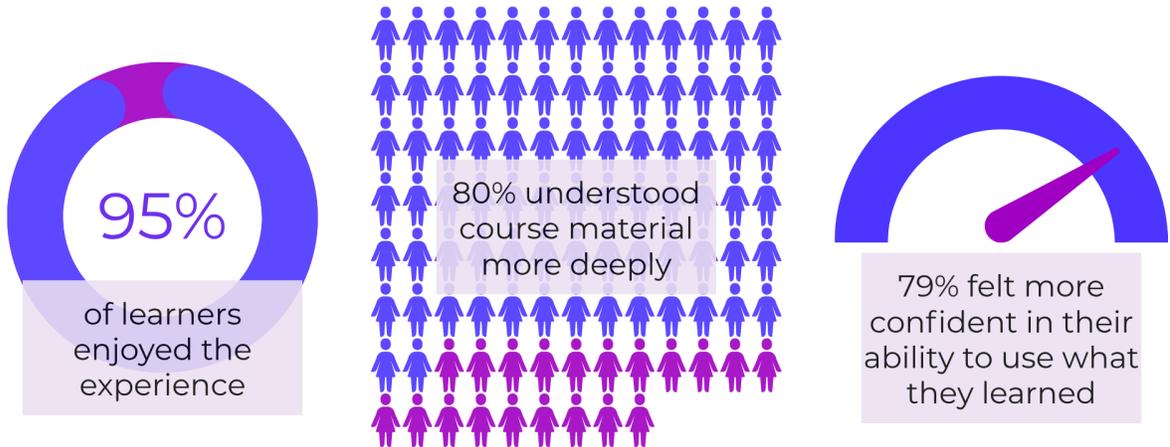
Figure 5: Visuals Underscore Concepts



These practices reflect decades of learning research, but what makes them powerful is how Kyron weaves them into every interaction. The result is not just information gained in the moment but understanding that endures and transfers.

EVIDENCE OF IMPACT

Of nearly 43,000 unique users over the last 12 months:



Kyron’s design is not only rooted in research but is also showing results in practice. Learners described Kyron’s conversations as engaging and thought provoking. They noticed that Kyron did not just provide answers but helped them uncover gaps in their understanding. They valued how the system asked questions that pushed their thinking further, paired with visuals that made complex ideas easier to grasp. They highlighted how this combination of interaction and multimedia support gave them new ways to approach challenges.

These outcomes matter because they go beyond satisfaction. Learners not only understood material in the moment, but they also felt better prepared to use it later. That is the kind of growth higher education is aiming for.

“I like how [Kyron] asks questions and makes me think about what I need to do. I like to be able to ask questions [back] to see if I am on the right track. I like the feedback that it gives, which helps me feel more confident.”

“I feel like I’m being taught by an actual instructor. I haven’t had that type of experience yet [at school] ...I know I can reach out to instructors, but this is so convenient.”

WHY THIS MATTERS

Learning that lasts matters everywhere, but the challenge is especially clear in higher education, where leaders face constant pressure to raise outcomes while keeping costs down. It is tempting to choose solutions that promise speed and scale. Chatbots fit that description. They respond instantly, they never tire, and they are easy to imagine as a quick fix. But the real goal is not just efficiency. It is helping learners build knowledge that endures and understanding that changes how they think.

But answers alone are not learning. A chatbot might clear up a point of confusion, and sometimes that is helpful, but most of the time it does not surface hidden misconceptions, provide feedback that changes performance, or guide students through the steps that make knowledge last.

Kyron takes a different path. Every conversation is designed with outcomes in mind. Learners reflect, explain, practice, and apply. They receive feedback that helps them grow. They are kept in the productive zone where challenge fuels progress, not frustration. And because Kyron is video based, they learn through both words and visuals, which research shows makes knowledge more memorable and transferable. The conversation builds understanding step by step and prompts reflection and application, turning a quick exchange into learning that lasts.

As AI becomes more common on campuses, the real question is not *whether* to use it but *how*. Quick responses may meet immediate needs. Conversations that draw on research in cognitive engagement, feedback, scaffolding, and multimedia learning create knowledge that lasts. **That is the Kyron difference.**

The stakes are high. Higher education is not measured by how many answers students can find but by how well they can use what they know when they need to analyze unfamiliar problems, make informed decisions, or apply knowledge to real-world challenges. As AI becomes more common on campuses, the real question is not *whether* to use it but *how*. Quick responses may meet immediate needs. Conversations that draw on research in cognitive engagement, feedback, scaffolding, and multimedia learning create knowledge that lasts. That is the Kyron difference.

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