Building the Future:
A Global Report on Computer Science & AI Education

Opportunities for stronger student
engagement from LEGO® Education

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Not every student will be a computer scientist — but they should all learn to think like one.

All over the world, teachers agree. Computer science (CS) and artificial intelligence (AI) are essential literacies for the next generation. Yet many still struggle to teach these subjects in ways that feel accessible, relevant, and engaging, and the majority feel uncertain about how to teach AI literacy.

Our global study of 1,700 teachers across the United States, Germany, South Korea, and Australia reveals that while educators value computer science and AI education, most feel under-equipped to teach the subjects confidently and effectively.

Hands-on first. Screens second.

Collaborative, hands-on learning has emerged as a proven path forward. Not only does it make computer science and AI literacy accessible and relevant, but it also equips students with the creativity and critical thinking skills they need to adapt and thrive, now and in the future.
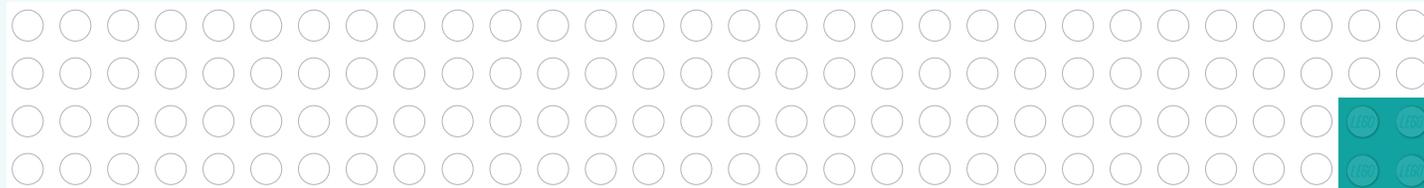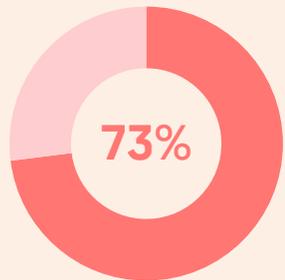
# 1 Computer science isn't child's play, but maybe it should be.

Teachers need more tools and support to teach computer science in ways that connect and resonate with their students.
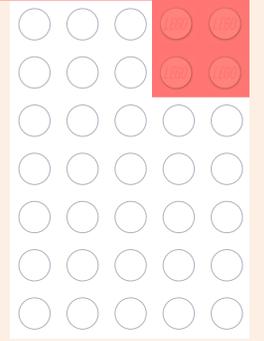
Teachers overwhelmingly see computer science as a core subject, on par with Math, English, and Science.

73% of global teachers say **computer science education is critical for students** now and in the future.
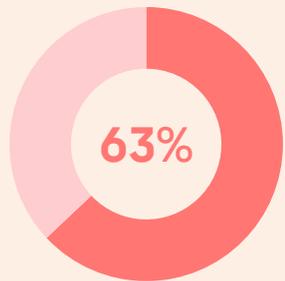
63% of global teachers believe **computer science should be considered a core subject**.

However, even among experienced teachers, many find it challenging to explain computer science concepts, especially in ways that resonate with and excite students.
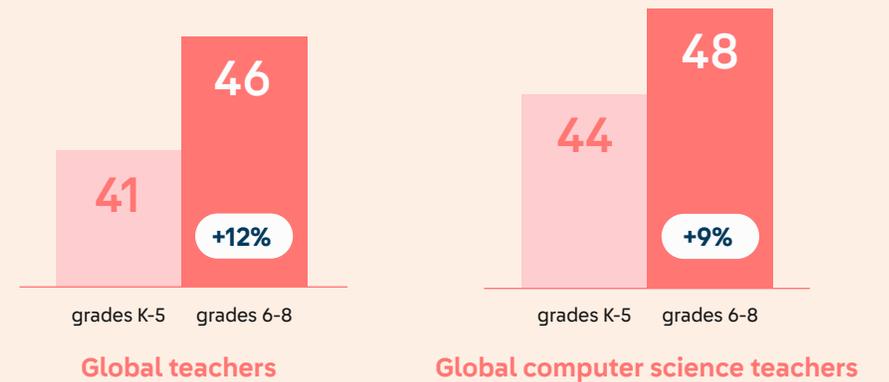
46%

of global teachers find it **difficult to explain computer science in ways that connect** with students.

and

find that **explaining computer science gets tougher as students get older**.

Find it difficult to explain computer science concepts in ways that connect with students

(Shown: by grade levels taught; % who somewhat or strongly agree)

	grades K-5	grades 6-8
Global teachers	41	46 (+12%)
Global computer science teachers	44	48 (+9%)

Global teachers
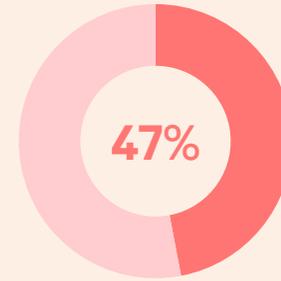
Global computer science teachers

Much of the challenge of teaching computer science in a way that feels relevant to students stems from abstraction. Without tools that make learning tangible, concepts like coding, data, or algorithms can feel disconnected from students' everyday lives.
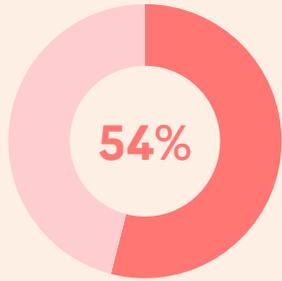
**54%** of global teachers say **current computer science resources are not engaging**, and students are bored.

47% of global teachers say **computer science learning is not relatable** to their students, as it **doesn't reflect their interests or connect to their day-to-day lives**.

"I want tools that increase engagement for students and equip them as future-ready learners."

—Year 1 teacher, Australia
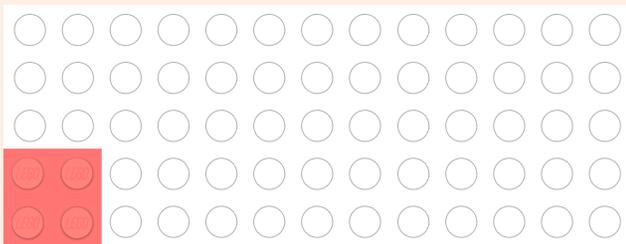
When students can build, experiment, and collaborate, computer science stops feeling intimidating and starts feeling inspiring.

Hands-on exploration gives abstract concepts weight, grounding them in reality and sparking curiosity. By equipping teachers with tools that help students get hands-on and test computer science ideas in ways that resonate with them, we can transform a subject often seen as abstract into one that invites creativity, confidence, and discovery.

2x Teachers with access to hands-on tools are as likely to say they can teach computer science in ways that connect with students.

"My own journey as an educator led me to a powerful realization: Hands-on experiences are essential for making complex concepts easier to understand in a way that makes learning sticky."

—**Dr. Jenny Nash**, Head of Education Impact, U.S., LEGO® Education

Challenge

Teaching computer science in ways that are intangible and "too grown up" is unrelatable, leaving students disengaged and intimidated.

Opportunity

Equip teachers with the means to teach computer science in a tangible, engaging way that feels relevant to students' lives, so students can say "computer science is for me."
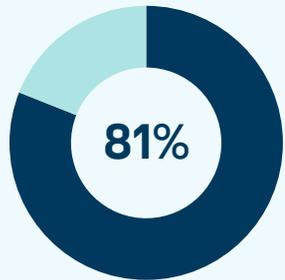
2 It's not screens or hands-on. It's both.

The most promising future prioritizes hands-on learning.

"Currently, AI literacy practices are screen-based rather than practical, so they sometimes hinder vivid learning through experience."
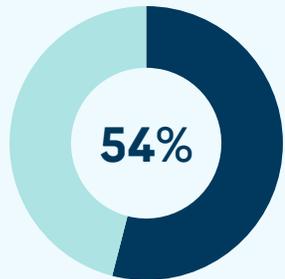
—6th and 8th grade teacher, South Korea

Teachers value technology, but they're clear: screens alone can't sustain engagement. Many current digital computer science tools encourage screen-based solo work, leaving students disengaged.
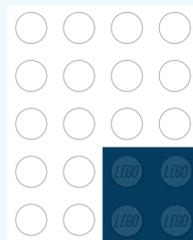
Digital tools must be meaningfully integrated into learning experiences to be effective. Research shows that lessons that combine hands-on learning with digital experiences drive better learning outcomes and improve student engagement. In the words of Head of Education Impact, LEGO® Education, Dr. Bo Stjerne Thomsen, "**We need specific and meaningful practices for digital technologies to support engagement and hands-on learning.**"

81% of global teachers say **screen-based learning adds value**.

but

54% say **current computer science tools are not engaging** and leave students bored.

53% of global teachers report that **students are excited when learning includes hands-on tools**.

67% of global teachers say **current computer science materials lack a hands-on, collaborative component**.

A blended approach, like pairing coding interfaces with physical builds, experimentation, and teamwork, helps students see the real-world impact of computing.

54% of global teachers say **a mix of hands-on and screen-based learning delivers the best outcomes**.

Teachers don't want to eliminate screens and digital learning; they want balance. Blending hands-on experimentation with digital tools deepens understanding, drives creativity, and sustains engagement.

Teachers say a mixed approach to teaching computer science is

3x
more likely to be **effective for creativity and resiliency.**

Nurturing creativity, critical thinking, and resilience is pivotal to setting students up for success today, and in the future, no matter what fields or areas of interest they choose to pursue.
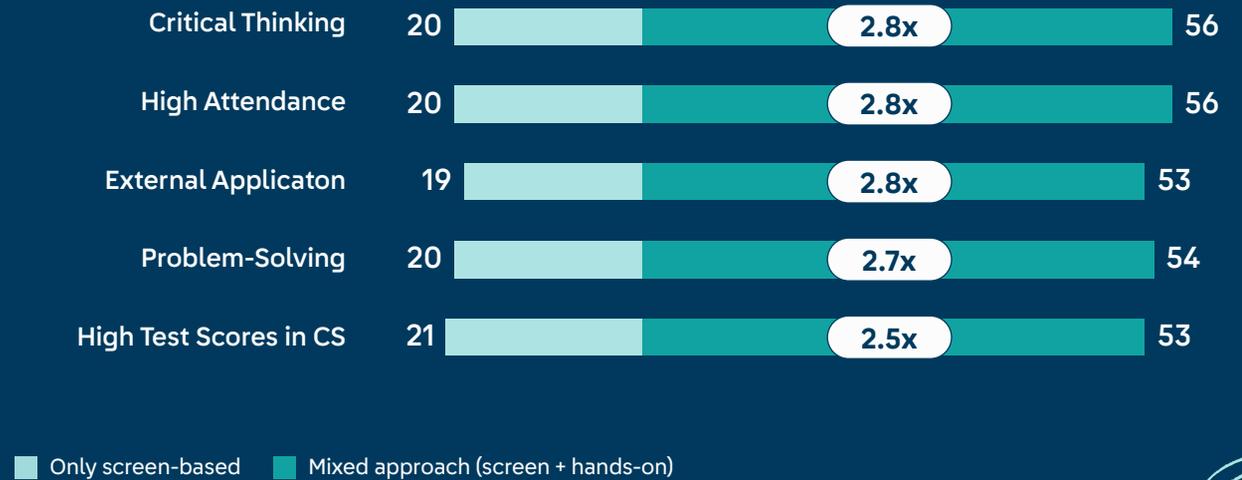
"Learning the fundamentals of Computer Science and AI doesn't always require a screen. Particularly for younger learners, this can help ease onboarding into complex topics and make learning more inviting."

—**Andrew Sliwinski**, Vice President, LEGO® Education

Combining hands-on and digital tools deepens engagement and offers tangible results in the classroom

Approach/types of computer science tools most effective in delivering outcomes
(shown: % selected; global teachers)

	Only screen-based	Mixed approach
Critical Thinking	20	2.8x — 56
High Attendance	20	2.8x — 56
External Applicaton	19	2.8x — 53
Problem-Solving	20	2.7x — 54
High Test Scores in CS	21	2.5x — 53

■ Only screen-based   ■ Mixed approach (screen + hands-on)

Challenge

Digital-only environments make computer science learning passive and forgettable, fatiguing student curiosity and engagement.

Opportunity

Blend digital and hands-on learning and let students build and experiment on- and off-screen to boost learning outcomes and engagement.

3 Great minds don't think alike. They think together.

Two minds think bigger than one. That's why collaboration isn't a nice-to-have; it's essential. When students work together, they engage with diverse needs and perspectives, mirroring how the real world works. This kind of teamwork creates inclusive, innovative, and meaningful learning outcomes – something teachers around the world recognize as being at the very heart of computer science and AI education.

Over half of global teachers say computer science education builds the skills needed to collaborate effectively: communication, problem-solving, and shared reflection. Most say screens alone can't deliver on those needs, and that collaborative, hands-on methods are needed to create a more well-rounded, engaging learning experience.
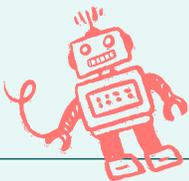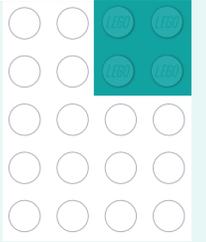
68%

of global teachers believe **students need a balance of screen-based, hands-on, and collaborative activities** to stay engaged and succeed in computer science learning.

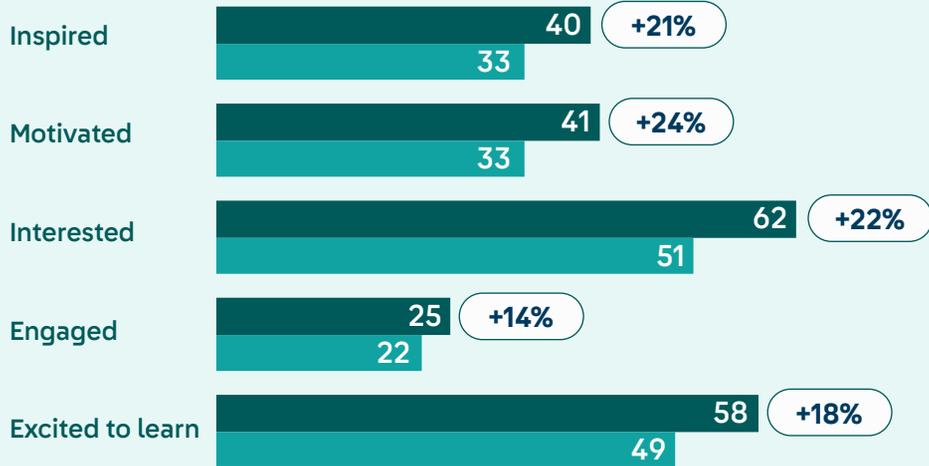Collaboration and sharing ideas spark creativity and improve learning outcomes.

"Collaborative activities make classes more engaging and students more immersed in the subject matter, all while improving communication skills."

—Year 5 teacher, Australia

When teachers make collaboration a core part of computer science lessons, students feel more inspired, motivated, interested, engaged, and excited to learn.

Inspired
40 — **+21%**
33

Motivated
41 — **+24%**
33

Interested
62 — **+22%**
51

Engaged
25 — **+14%**
22

Excited to learn
58 — **+18%**
49

■ Takes a hands-on, collaborative approach   ■ Doesn't take a hands-on, collaborative approach

Survey results show that when students build together, they believe together — in their ideas, in one another, and in their ability to solve problems. Collective problem solving teaches students that others think differently, and that there can be more than one answer to the same question.

"We have a vision for kids learning together, building together and coding together - shifting from isolated, individual learning on screens to hands-on, collaborative experiences."

—**Atish Gonsalves**, Head of Product, Computer Science & AI, LEGO® Education

Collaborative learning takes computer science from an individual challenge into a shared adventure; one that builds stronger ideas, stronger connections, and stronger learners.

Challenge

When students learn alone, computer science and AI can feel isolating instead of inspiring, limiting creativity and motivation.
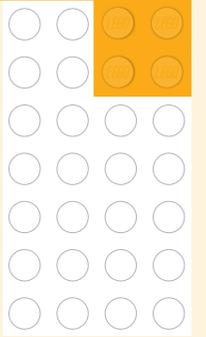
Opportunity

Provide a collaborative environment to spark deeper understanding and allow students to feel that lightbulb moment together.

4 The future is here, but the AI curriculum isn't.

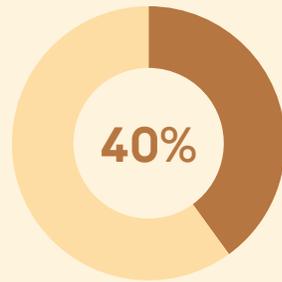AI literacy training is inconsistent, leaving schools and teachers without the tools they need to prepare students.

AI is transforming the world and virtually every field, yet most classrooms aren't ready to teach it responsibly.
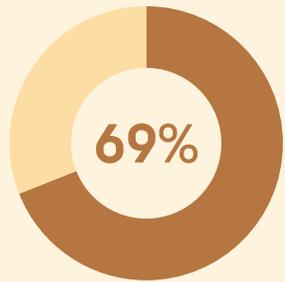
69% of global teachers say **AI literacy is critical for students' futures**.

but

40% report their **schools aren't prepared to teach AI literacy responsibly**.

90% of global computer science teachers have **received high-quality professional training to teach AI literacy**.

yet

49% of global computer science teachers **feel uncomfortable teaching AI literacy to students even after training**.

Without clear guidance, teachers are left navigating fast-evolving technologies without the tools to model responsible use.

"Teachers need comprehensive training to integrate AI into their teaching practice in a safe and pedagogical way."

—4th grade teacher, Germany

"AI is making remarkable progress, but it will never replace how humans learn. Learning means collaborating, creating, and caring – transforming experience into understanding."

—**Dr. Bo Stjerne Thomsen**,
   Head of Education Impact, LEGO® Education

Schools need tools that allow for any teacher to pick up computer science and teach it, whether they're generalists or trained in the field. Teachers also need practical, age-appropriate ways to teach students how to question, evaluate, and ethically apply AI. Hands-on AI activities, like testing bias, evaluating outputs, or exploring model limitations, help make this invisible technology visible. With the right support, teachers can demystify AI, help students become literate in the technology, and empower them to use it responsibly and creatively.

Challenge

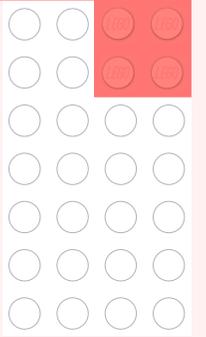Without proper training for teachers, students risk being underprepared for a world shaped by AI.

Opportunity

Provide teachers with the proper training and tools to teach AI confidently, regardless of their level of experience.
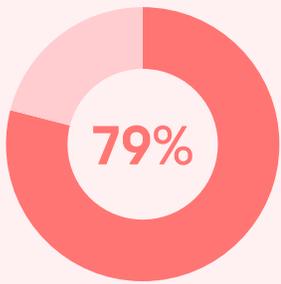
5 It's good to know *how*, but it's better to know *why*.

Students feel confident using AI, but teachers worry they don't understand the risks.
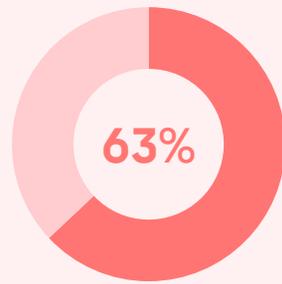
Most students feel comfortable using AI tools, but teachers see a different picture: They report their students approach AI tools with confidence, but not comprehension.

79%

of global teachers say their **students feel confident using AI**.

yet

63%

of global teachers also say **students don't know how to use AI responsibly**.

And even though global **computer science teachers are 13% more confident in their students' use of AI than generalist teachers are**, **they share similar levels of concern** about whether their students truly understand the risks in using the technology.

Teacher concerns about use of AI
(Shown: % selected)

40%
of global teachers

and

37%
of global computer science teachers

say their **students don't know when AI is appropriate** for a task, and/or can't identify an AI model's purpose (NET).

39%
of global teachers

and

39%
of global computer science teachers

say their students **don't know how to properly elicit feedback** and/or the proper inputs or criteria to train AI (NET).

From identifying when AI is appropriate to understanding how models are trained, students often lack the foundational literacy to use AI safely.

Nearly half of teachers say students don't understand the risks involved in using AI.

Many classrooms use AI-enabled tools without explicitly teaching AI literacy.

42%

of global teachers say their **classroom tools integrate AI, but don't teach students the right way to use it**.

66%

of global teachers **wish they had a tool to help navigate issues related to responsible AI use** for students.

Students learn best when they can test ideas, ask questions, and see the results for themselves. When they experiment with AI — not just use it — they can build the confidence and curiosity that make lifelong learners.

"By helping children understand how AI fundamentally works at its core, we can future-proof their learning. These core concepts – probability, machine perception, reasoning, machine learning – apply to all AI tools today and for years to come."

—**Andrew Sliwinski**, Vice President, LEGO® Education

"Rather than using AI as a tool to learn, students are using it as a substitute for learning and finding the correct answer. There needs to be an understanding of how technology can help us, and not just give us the answer or replace learning."

—6-8th grade teacher, USA

Challenge

Jumping into AI without guardrails or critical frameworks can leave students exposed to bias, misrepresentation, and misuse.

Opportunity

Bridge the confidence–comprehension gap through hands-on AI learning that teaches students to question, test, and use AI responsibly.

Looking ahead

The research above suggests that whether in Australia or South Korea, Germany or the United States, students and educators all over the world share a similar intrigue – and some concerns – about computer science and AI. These foundational literacies are changing our world; and with the right approach, we can change how students effectively understand and engage with these technologies.

Educators need the right support and guidance to help students engage in computer science while empowering them to understand, apply, and evaluate AI in a world that demands AI literacy skills. Today's classrooms still lack the tools, training, and methods to teach these subjects in ways that truly engage and empower both students and teachers.

Together, we can help every student think like a computer scientist, problem solver, and innovator – ready to thrive in a world powered by technology.

How LEGO® Education Computer Science & AI can help

After years of research and development, we designed **LEGO® Education Computer Science & AI** — a hands-on, collaborative learning experience that brings computer science and AI to life for both students and teachers. It wasn't built overnight, or from a single survey. It's the culmination of years of research, testing, and collaboration with teachers and students around the world.

We developed this offering with a deep understanding of how students learn best. When students can see and experience the systems they're studying, and when teachers have the tools to guide exploration, computer science and AI stop being intimidating and start being inspiring. Our unique approach makes the abstract concepts of computer science and AI tangible, relevant, and engaging – better equipping students for today and the future.

Schools and teachers have a unique opportunity to set their students up for success and prepare the next generation to navigate our fast-evolving world.

Learn more at LEGOeducation.com/CS-AI.

Methodology

Survey of 1,700 teachers across the United States, Germany, South Korea, and Australia. Respondents included both general educators and computer science specialists. Student ages and classes vary per market as follows:

United States
K-5 ≈ 5-11 years old
6-8 ≈ 11-14 years old

Germany
K-5 ≈ 6-11 years old
6-8 ≈ 11-14 years old

South Korea
K-5 ≈ 6-11 years old
6-8 ≈ 11-14 years old

Australia
K-5 ≈ 5-11 years old
6-8 ≈ 11-14 years old