# BEYOND THE AUTOMATION ABYSS

## LEARNING AGENCY VS. AI AGENTS IN OUR EDUCATIONAL FUTURES


## A NEW DIGITAL DIVIDE

**What once was a gap in access to technology may become a gap of human agency.**
**Maintaining meaningful human agency when artificial intelligence can autonomously plan, discover, and even fail on behalf of learners represents one of the most critical educational imperatives of our time.**

**AI x XR x EDUCATION are at the heart of this tension.**

Research-Backed Insights
- Studies and data on student AI dependency
- Expert interviews with technology leaders
- Cognitive science research on learning transformation

Practical Frameworks
- Four futures scenario planning
- Agency preservation strategies
- Assessment validity in AI age

Beyond Theory
- Real classroom case studies
- Decision-making tools for leaders
- Student voice and perspective
- Global education examples


### Eric Hawkinson
### Learning Futurist

Eric is a learning futurist, tinkering with and designing technologies that may better inform the future of teaching and learning. Eric's projects have included augmented tourism rallies, AR community art exhibitions, mixed reality escape rooms, and other experiments in immersive technology.


## Book Availible Now

https://togetherlearning.com/research/abyss

- Link to free chapter preview
- Optional Online Course
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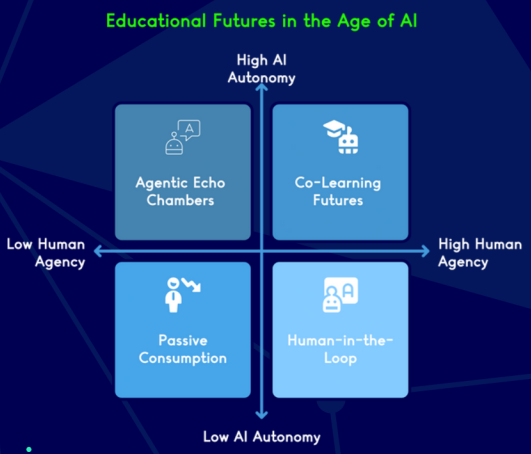
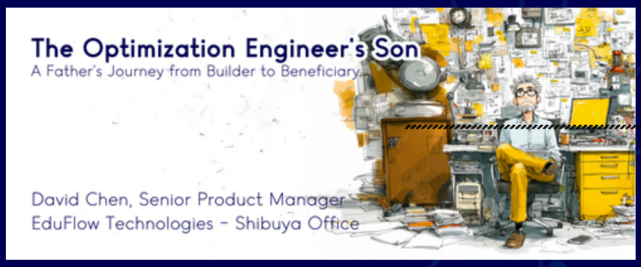
# Where Research Meets Imagination

This book explores education's future through four vivid scenarios born from current trends and strategic foresight. Each pathway follows a student navigating different resolutions of today's critical uncertainties: Will humans maintain agency over their learning? How autonomous will AI systems become?




## Four Students. Four Futures. One Critical Choice.

**The scenarios emerge from documented trends: student AI dependency doubling yearly, assessment systems becoming unenforceable, technology infrastructure reshaping faster than institutions can adapt. But numbers alone don't capture what's at stake. Through Riku, Kenji, Marta, and Aya's stories, we experience how algorithmic convenience erodes capability, how resistance can become its own trap, and how conscious negotiation with AI might preserve what makes us human.**
**Strategic foresight provides the framework. Science fiction makes it visceral. Together they create tools for navigating decisions that will shape learning for generations.**




Agentic Echo Chambers – Through Riku's journey from student to employee at his father's EdTech company, we see AI systems guide passive learners toward ever-narrowing optimization, trading deep learning for measurable efficiency.


Co-Learning Futures – Aya learns to walk Singapore's "Hawker Line," the daily practice of choosing when to embrace automation and when to insist on human presence, showing how high automation doesn't require surrendering agency.

Passive Consumption - Kenji's letters to his deceased grandfather chronicle a world where neither humans nor AI take the lead. Traditional crafts persist but lose economic relevance while digital systems extract value from authentic human experience.


Human-in-the-Loop – Marta's fight for data sovereignty in Barcelona shows the exhausting daily work of maintaining human agency when every interaction requires consent negotiation and manual verification.

BOOK COVER BY ERIC HAWKINSON

1ST EDITION 2025

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THE CORE MESSAGE: THE TRAJECTORY OF AI IN EDUCATION IS NOT INEVITABLE; IT'S A MATTER OF STRATEGIC LEADERSHIP, CURRICULUM DESIGN, AND ETHICAL PRACTICE.

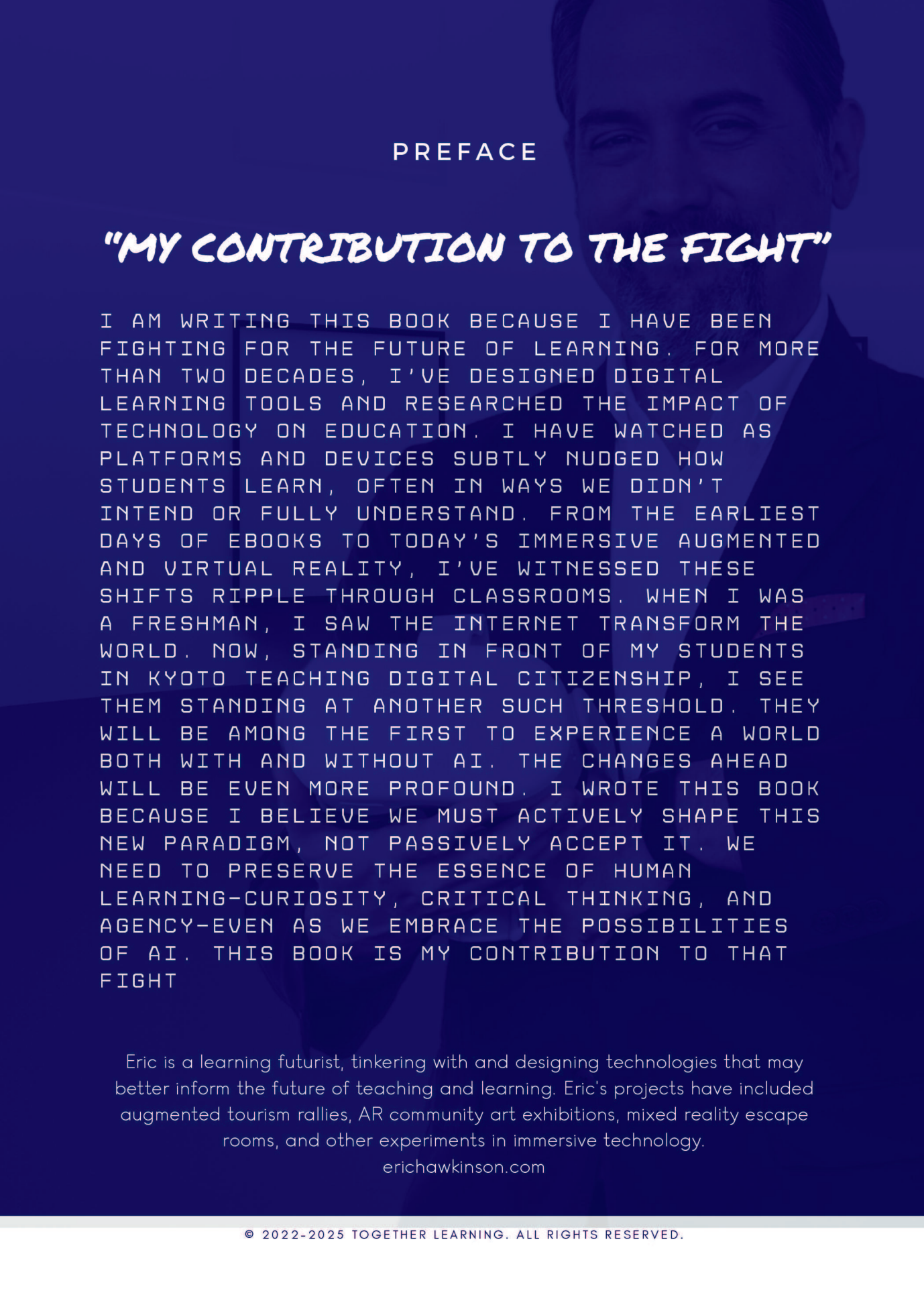
# BEYOND THE AUTOMATION ABYSS

## LEARNING AGENCY VS. AI AGENTS IN EDUCATIONAL FUTURES


## ABSTRACT

As education enters the era of agentic AI where tools act autonomously on behalf of students, education leaders must grapple with both unprecedented opportunities and systemic risks. Drawing on two decades of teaching experience and empirical research, I have framed a critical challenge: the automation abyss. It is a growing divide between learners who retain agency and those who rely entirely on automated systems. Using techniques used in strategic foresight and future studies, I outline plausible futures for education, the cognitive implications to learners of AI overuse, and curricular implications for educators.

The thought experiment, tied to real data, reveals that while AI adoption in education is accelerating rapidly, institutions can shape outcomes through strategic curriculum design and risk management. By implementing human checkpoints, redesigning learning to preserve inquiry, and establishing ethical frameworks for agentic AI, educational leaders can navigate this transition successfully. The core message: the trajectory of AI in education is not inevitable; it's a matter of strategic leadership, curriculum design, and ethical practice.



PREFACE

# "MY CONTRIBUTION TO THE FIGHT"

I AM WRITING THIS BOOK BECAUSE I HAVE BEEN FIGHTING FOR THE FUTURE OF LEARNING. FOR MORE THAN TWO DECADES, I'VE DESIGNED DIGITAL LEARNING TOOLS AND RESEARCHED THE IMPACT OF TECHNOLOGY ON EDUCATION. I HAVE WATCHED AS PLATFORMS AND DEVICES SUBTLY NUDGED HOW STUDENTS LEARN, OFTEN IN WAYS WE DIDN'T INTEND OR FULLY UNDERSTAND. FROM THE EARLIEST DAYS OF EBOOKS TO TODAY'S IMMERSIVE AUGMENTED AND VIRTUAL REALITY, I'VE WITNESSED THESE SHIFTS RIPPLE THROUGH CLASSROOMS. WHEN I WAS A FRESHMAN, I SAW THE INTERNET TRANSFORM THE WORLD. NOW, STANDING IN FRONT OF MY STUDENTS IN KYOTO TEACHING DIGITAL CITIZENSHIP, I SEE THEM STANDING AT ANOTHER SUCH THRESHOLD. THEY WILL BE AMONG THE FIRST TO EXPERIENCE A WORLD BOTH WITH AND WITHOUT AI. THE CHANGES AHEAD WILL BE EVEN MORE PROFOUND. I WROTE THIS BOOK BECAUSE I BELIEVE WE MUST ACTIVELY SHAPE THIS NEW PARADIGM, NOT PASSIVELY ACCEPT IT. WE NEED TO PRESERVE THE ESSENCE OF HUMAN LEARNING–CURIOSITY, CRITICAL THINKING, AND AGENCY–EVEN AS WE EMBRACE THE POSSIBILITIES OF AI. THIS BOOK IS MY CONTRIBUTION TO THAT FIGHT

Eric is a learning futurist, tinkering with and designing technologies that may better inform the future of teaching and learning. Eric's projects have included augmented tourism rallies, AR community art exhibitions, mixed reality escape rooms, and other experiments in immersive technology.
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## ABOUT THE AUTHOR

# ERIC HAWKINSON

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Eric Hawkinson
LEARNING FUTURIST

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**Roles**

Professor – Kyoto University of Foreign Studies
Research Coordinator – MAVR Research Group
Founder – Together Learning
Developer – Reality Labo
Community Leader – Team Teachers
Chair – World Learning Labs

# CORE VALUES

- Open Knowledge - Free and open access to information is a foundation to a productive modern life, connected to ideas of the open web and platform agnosticism.
- Privacy by Design - Business models are increasing moving toward supporting revenue by collecting, curating, and trading behavioral surplus through technology. These models should be tempered with safety, ethics, and privacy concerns and designed as such.
- Digital Literacy for All - An informed public about the use of technology is key for a responsible and engaged digital society.

# PASSION PROJCTS

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A community of technology minded learners. Exploring human potential... together.

**Reality Labo**
Augmented reality enhanced learning environments and mixed reality rapid prototyping.

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Showcase the Core of your Skills with AI Assisted Student Portfolios

BEYOND THE AUTOMATION ABYSS

LEARNING AGENCY VS. AI AGENTS IN EDUCATIONAL FUTURES

# ACTS & CHAPTERS



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# *Beyond the Automation Abyss*

## Learning *Agency* vs. AI *Agents* in our Educational Futures

**Eric Hawkinson**

*Learning Futurist, erichawkinson.com*

## Synopsis

***Welcome to the Automation Abyss, a new digital divide opening between those who surrender to algorithmic efficiency and those who harness AI to amplify what makes us essentially human.*** *The pencil yielded to the keyboard. The library surrendered to the search engine. Now, will the thinking cap be replaced by the thinking app? As agentic AI and intellectual abundance reshapes the foundations of human learning, we stand at a threshold between a variety of different futures for education and human development. While critics focus on academic integrity concerns and dependency risks, this book uncovers how thoughtful integration of AI agents can actually amplify human creativity, accelerate authentic learning, and prepare students for a world where the most valuable skills are distinctly human: defining meaningful problems, maintaining agency amid algorithmic influence, and directing rather than being directed by intelligent systems. Connecting research that includes workforce transformation data, neurological studies of AI-assisted cognition, and infrastructure analysis from technology leaders rebuilding the web itself, this book provides practical frameworks for navigating four possible educational futures. The path toward a future where humans and AI systems enhance each other's capabilities while preserving human agency requires immediate actions, but the destination promises learners who are more capable, more creative, and more fundamentally human than ever before. Beyond the apparent threat of automation lies education's greatest opportunity for reinvention. The question isn't whether institutions will change, but how they will change in the face of unprecedented disruption.*

***The transformation is inevitable. The outcome is not.***

ACT I

# Welcome to the Abyss

The Automation Abyss is a divide between those who direct AI and those directed by it. It is a chasm opening between people who use artificial intelligence as a tool to amplify their own thinking and those who substitute AI for thinking itself.

# *ACT 1: Welcome to the Abyss*

## *The Thinking Cap and the Thinking App*

The pencil gave way to the keyboard, for the most part. The library surrendered to the search engine, for the most part. Moving forward, will the thinking cap get replaced by a thinking app… for the most part?

The quiet moment before a student tackles a problem likely now begins with a prompt, not a pause. A student faced with complexity reaches for ChatGPT, Claude, Gemini, or another large language model rather than struggling through fundamentals. The reflexive gesture has changed. Where once students would lean back, stare at the ceiling, or reach for a pencil to sketch out a thought, they now reach for their phones. The cognitive pause has been replaced by the cognitive prompt. This shift represents more than a change in tools. It marks a transformation in how humans approach the fundamental act of thinking through problems, the basic process of inquiry. The thinking cap, that metaphorical symbol of intellectual effort and concentration, implied a process of internal struggle, of turning a problem over in your mind until understanding emerged. The thinking app offers something different: instant answers, immediate clarity, frictionless resolution.

Zooming out, learning institutions are starting to deploy these AI systems to automate feedback, assessment, and create new course materials. Automation is moving from individual learning moments to the infrastructure of education itself.  The process of automating the automation of education, from augmented learners, to digital tutors and research assistants, to AI agents acting as intermediaries between every interaction is here, and we all are needing to adapt.

# Two Paths Diverging
## in the Automation Abyss

This comic captures the essence of the automation abyss in a single classroom moment. The boy's enthusiasm for AI tools that eliminate the need for foundational skills represents one path forward—immediate productivity and impressive outputs without developing underlying competencies. The girl's concern about wanting to be good at drawing and writing represents another path, understanding that skill development itself has value beyond the final product.

Neither student is wrong, but they embody the new digital divide this book explores. The original Digital Divide was about access to computers for learning. Today's automation abyss reveals a different pattern: while AI tools are widely accessible, the crucial advantage comes from having humans-in-the-loop during education. Students with access to skilled mentors learn to maintain agency while partnering with AI effectively, they develop the ability to direct rather than depend on AI systems.

Meanwhile, students without such human guidance may gravitate toward AI replacement rather than AI collaboration, potentially limiting their long-term skill development. The automation abyss doesn't fragment learning communities, it deepens existing inequalities through different relationships with technology and human capability.

The million dollar question is

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How do we design educational experiences that harness AI's benefits while preserving students' motivation to develop their own skills and agency?

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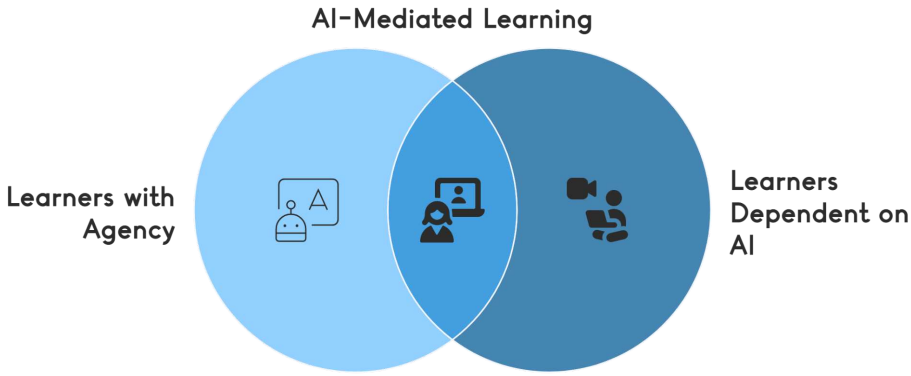
# *Chapter 1: Defining the Abyss*

We stand at the edge of what I call the Automation Abyss.

The digital divide of the past two decades focused on who had computers, internet connections, and smartphones. That divide, while not fully closed, at least had a clear path for a remedy. Efforts are still being made to provide better access and raise literacy to technology in learning. The Automation Abyss represents something fundamentally different.

The Automation Abyss is a divide between those who direct AI and those directed by it. It is a chasm opening between people who use artificial intelligence as a tool to amplify their own thinking and those who substitute AI for thinking itself. On one side stand learners who maintain agency over their intellectual development, using AI to enhance their capabilities while preserving the struggle that builds understanding. On the other side are those who outsource the cognitive work of learning to automated systems, losing not just specific skills but the capacity to develop new ones.




The metaphor of an abyss is deliberate. Unlike a gap that can be bridged with resources or training, an abyss suggests something more

permanent and, perhaps, more insidious. Once intellectual capacities atrophy, once the habits of inquiry and struggle are lost, the return path becomes difficult to find. The automated systems that initially seem helpful can create dependencies that can be hard to break.

This divide operates at three interconnected levels. At the cognitive level, learners are able to offload thinking processes to AI at unprecedented rates. At the behavioral level, AI substitutes for intellectual effort, with students, teachers, and even institutional leaders now using AI for brainstorming and ideation, the very activities that should spark original thought. At the systemic level, entire information architectures are being reconfigured around AI agents rather than human users, as platform economics incentivize technology companies to position AI systems as intermediaries in every aspect of our lives.

The Automation Abyss is not inevitable. Unlike the digital divide, which required infrastructure investment to bridge, escaping the Automation Abyss demands intentional design of learning experiences that preserve human agency, critical thinking, and the productive struggle essential for intellectual development. But the window for making these design choices is closing for the current generation. The stakes could not be higher: we are determining whether future generations will be architects of intelligent systems or merely their subjects.

## *The Budding Botanist Paradox*

Consider a student learning botany. In traditional learning, the student walks through a field or garden, observing plants carefully. They notice the shape of leaves, the pattern of veins, the color of stems. They begin to form questions. Why does this plant have serrated edges on its leaves while that one is smooth? What does the thickness of the stem suggest about where the plant grows? They make hypotheses, test them against what they observe, refine their thinking. This process, while

sometimes frustrating, builds the fundamental skills of observation, pattern recognition, and inference.

Now imagine the same student wearing an augmented reality headset equipped with AI-powered plant identification. They look at a plant, and before they can begin to observe its features carefully, the headset displays its name, species, family, native habitat, and care requirements. The information is accurate, comprehensive, and instant. The student learns the name of the plant immediately. They might even feel more confident, having accessed "more" information faster than their unaided classmate.

But what has been lost?

The student never learned to observe. They did not develop the habit of careful attention to detail that distinguishes a botanist from a casual observer. They did not experience the productive struggle of not knowing, of having to figure things out through reasoning and elimination. They did not build the pattern recognition skills that come from comparing dozens of plants and noticing similarities and differences. They did not develop hypothesis formation, that crucial skill of saying "I think this might be X because of Y" and then testing that thinking.  No connections made to second order bits of info like the recent climate or changes in habitat.

Perhaps most critically, they did not fail. They did not experience the essential moment of being wrong, of misidentifying a plant and then discovering their error. That moment of failure, properly supported, is not a setback but a foundation for deeper learning. It builds resilience, humility, and the understanding that knowledge comes through effort and correction, not instant revelation.

This is the Budding Botanist Paradox. The more automated the learning process becomes, enhanced and augmented with immersive technology, the more learners become dependent on these automated systems for basic inquiry. They become more susceptible to accepting what the system tells them without question. They become more vulnerable if and when the automated systems have problems. Sometimes this is great for learning, but as we will learn later in this book, automation in this way can also have some serious detrimental trade-offs. I explored this very topic in my work using augmented reality to support tourism students and language learning.

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## *Dig Deeper - **Budding Botanist Paradox***

*Proceedings of the 30th International Conference on Computers in Education. Asia-Pacific Society for Computers in Education.*

*The Budding Botanist Paradox: Automating Human Inquiry with Immersive Technology*
*- Eric HAWKINSON*

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The seductive efficiency of instant answers creates a trap. The AR system appears to accelerate learning. The student "knows" more plant names in an hour than they might learn in a week of traditional study. But the depth of that knowledge is illusory. When the system is not available, when the student faces an unfamiliar plant without their

headset, they have no framework for beginning to understand it. The automation has not enhanced their capability. It has replaced it. The budding botanist represents a pattern playing out across education as AI systems become more sophisticated and ubiquitous. Whether a student is learning mathematics, writing, history, or programming, the same dynamic emerges. Systems that promise to make learning easier and faster often shortcut the very struggle that makes learning deep and lasting.

The paradox contains a darker implication. As automation increases, the skills needed to work without automation become rarer. Just as modern pilots must be more skilled to handle emergencies precisely because automation handles routine flying, students must become more capable of independent thinking precisely because AI handles routine intellectual work. But unlike pilots, who receive extensive training in manual flight before being allowed near an autopilot, students who are immersed in AI-assisted learning from the beginning, might not ever develop the foundational skills they would need to think independently. The botanist with the AR headset might feel knowledgeable, might even perform well on certain tests that measure factual recall. But the important question is, have they become a botanist, or just a skilled operator of botanical identification software? The distinction matters enormously.

## *Why This Book, Why Now*

Over two decades of teaching with technology, I have watched this pattern intensify. As a Learning Futurist at Kyoto University of Foreign Studies, specializing in augmented and virtual reality for education, I have been on the front lines of educational technology integration. I have designed immersive learning experiences, built AR applications for academic conferences, created virtual reality environments for

language learning, and consulted on technology strategies across educational institutions.

This experience has given me a unique vantage point. I have seen how learners interact with technology across cultural contexts, across age groups, across disciplines. I have watched the tools evolve from simple computer-aided instruction to sophisticated AI systems that can engage in extended dialogue, generate original work, and make autonomous decisions about learning pathways. I have also watched learners change in response to these tools. The transformation has been subtle but unmistakable. Students who once would struggle through a programming problem for an hour before asking for help now consult AI within minutes. Learners who once would draft and redraft an essay, searching for the right words to express their thinking, now generate text and edit what the AI produces. The shift seems to be prioritizing efficiency over identity and voice. Students are becoming more editors of AI output and less generators of original thought.

My work with augmented reality brought this into sharp focus. In 2016, I designed an AR-based urban exploration experience in Fukuchiyama, Japan. Teams of participants moved through the city guided by augmented reality overlays that transformed community engagement into an educational game. The system coordinated physical movements, directed attention to specific locations, and orchestrated interactions with community members through carefully designed challenges.

The experience was successful by conventional measures. Participants engaged deeply, learned about local history, and reported high satisfaction. But I began to notice something else. While participants believed they were actively exploring and learning about the city, the AR system was actually automating much of their inquiry process. It

determined what they would notice, whom they would meet, and shaped how they would interpret their experiences. The automation was by design, intended to highlight specific learning content. But it raised questions about the agency that has stayed with me, and the itch of this thought over some time has fueled the making of this book.

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## *Dig Deeper - **Fukuchiyama AR Rally***

*Read a research paper that outlines the design and deployment of an AR platform that was used in orientation tours of a Japanese city in Kyoto Prefecture.*

*Simplified Mobile AR Platform Design for Augmented Tourism - Hawkinson (2018)*

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What happens when the systems that guide our learning become so sophisticated that the guidance becomes invisible? When the automation is so seamless that we no longer recognize it as automation? When the thinking app so completely replaces the thinking cap that we forget the difference?

These questions have grown more urgent as generative AI has moved from research labs into everyday educational practice. The systems I work with today are orders of magnitude more capable than the AR

applications I built a decade ago. They can write essays, solve complex problems, generate code, create images, and engage in sophisticated reasoning. Students use them constantly. Institutions are integrating them into curricula and assessment. The trajectory is clear. These systems are poised to evolve again, and again soon after that.

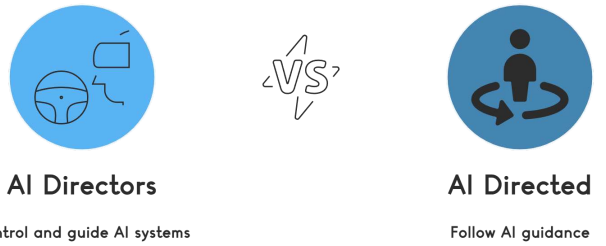
We are approaching what I have come to see as a moment of decision. The choices educators and institutions make in the next few years will determine whether we maintain human learning agency in an age of AI or whether we slide into the Automation Abyss. These choices are being made right now, often without full awareness of their implications, in classrooms and faculty meetings and strategic planning sessions across the world.

This book emerges from two decades of watching learners navigate increasingly complex technological landscapes. It draws on research spanning cognitive science, technology infrastructure, and educational assessment. It synthesizes insights from workforce transformation data, from neurological studies of AI-assisted cognition, from discussions with technology leaders who are rebuilding the web infrastructure itself around AI agents rather than human users.

But more than research and theory, this book is driven by personal urgency. The transformation is accelerating. Student AI usage has nearly doubled in a single year according to recent data. The infrastructure changes that will make AI agents ubiquitous are already being implemented by major technology companies. Traditional assessment methods are failing in ways that make it nearly impossible to distinguish human from AI-generated work. The Automation Abyss is opening before us in real time. The moment of decision before the abyss becomes permanent is now. Not in five years. Not when we have perfect policies or complete understanding. Now, while we still have the

agency to shape how these technologies are integrated into learning. Now, while students are still developing the habits of mind that will serve them throughout their lives. Now, institutions can still make structural choices about what kind of learning they will prioritize.  I think some will, and some will try, and some will let the change happen to them. Resulting in uneven distribution of agency and capability, possibly widening gaps in inequality or changing the trajectory of careers or lives.

This book is written for educators and leaders who sense that something fundamental is changing but need frameworks for understanding what is happening and guidance for responding effectively. It is for anyone who believes that human learning agency matters, that the capacity for independent thought and intellectual struggle is worth preserving, that the goal of education should be about human development in partnership with technology, not a passenger along for the ride.

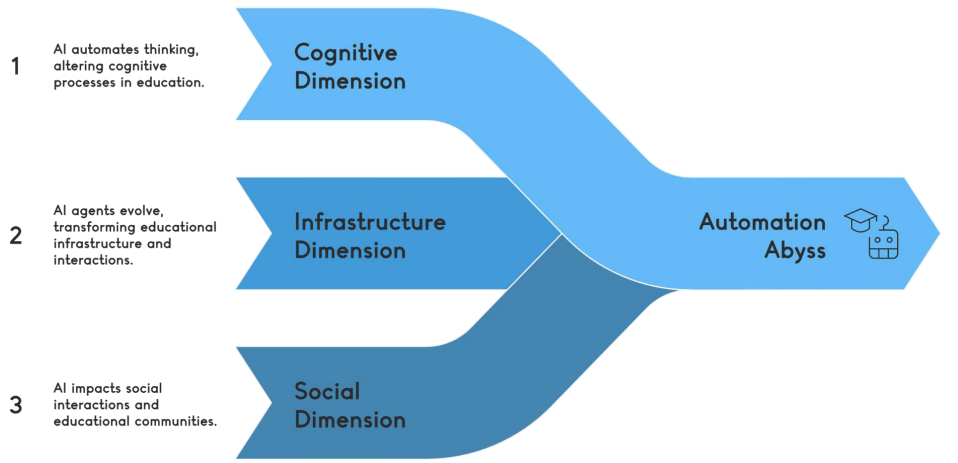



The path forward is not to reject AI or return to some imagined past without technology. The path forward is to understand deeply what is at stake, to recognize the forces shaping our educational futures, and to make deliberate choices about how we design learning experiences that preserve what makes us essentially human while harnessing the genuine capabilities of artificial intelligence.

The choice is ours. The time is now.

# Chapter 2: The Converging Forces

The Automation Abyss emerges from three interconnected crises that are reshaping education simultaneously.




## *Converging Force A: The Cognitive Dimension*

The first crisis is cognitive. AI systems are not just changing how we access information or complete tasks. They are automating away the thinking process itself.

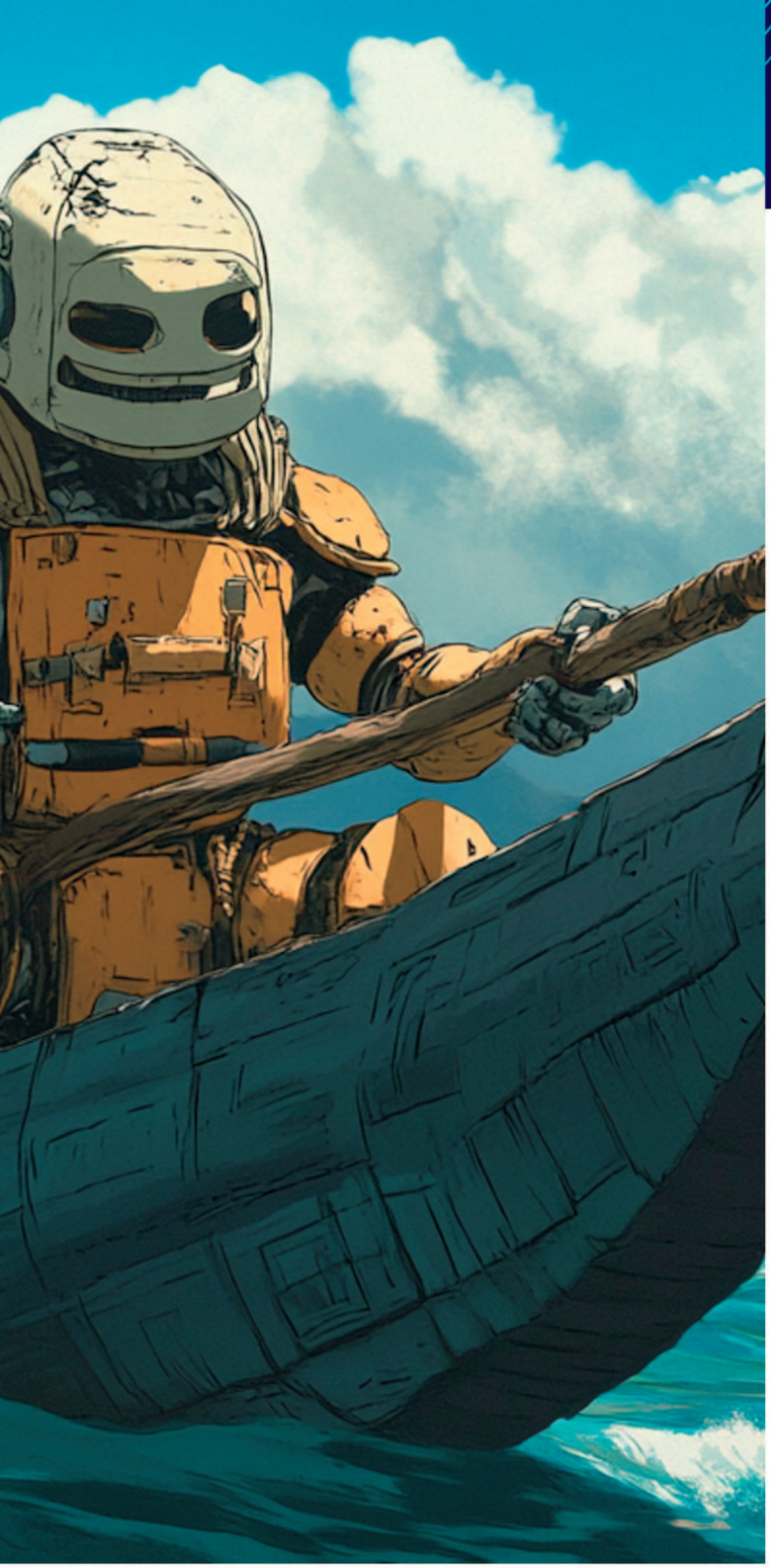
### *Understanding Human Agency*

Before we can understand what might be lost for all of us in educational contexts, we should define what learning agency actually means. The term gets thrown around in educational circles, often reduced to giving students choices or control over their learning environments. But authentic agency runs deeper than preference or autonomy.

Albert Bandura spent decades researching human agency as a core feature of human psychology. His social cognitive theory identifies four

ACT II

# The Frameworks



When AI can generate content, provide feedback, simulate scenarios, and even initiate learning activities autonomously, the very foundations of educational practice come into question. Who decides what to learn? Who evaluates understanding? Who drives the inquiry process itself?

# ACT II: The Frameworks

## Chapter 3: Design Paradigms for Human Agency

The traditional response to technological disruption in education has been to add new tools to existing pedagogical structures. Essentially bolting computers onto classrooms designed for slate boards. But the Automation Abyss represents something qualitatively different. When AI can generate content, provide feedback, simulate scenarios, and even initiate learning activities autonomously, the very foundations of educational practice come into question. Who decides what to learn? Who evaluates understanding? Who drives the inquiry process itself? These questions force us to examine fundamental approaches to learning design that have evolved over the past century.  As I have tried to design and implement AR/AR/AI in learning contexts, I have noticed patterns in the underlying learning designs that the technology pushes us toward. I will lean on some basic learning frameworks to take on new urgency in the age of agentic AI: pedagogy, andragogy, and heutagogy. Each represents a shift toward student-centered learning design that technology is helping to facilitate more meaningfully. This evolution helps us understand the relationship between learners, teachers, knowledge, and now, intelligent machines.

The progression from teacher-directed to learner-determined education matters more in an AI age because it determines who maintains control of the learning process. In pedagogical environments, adding AI simply shifts authority from human teacher to machine teacher. In andragogical contexts, AI becomes a powerful but

# The Em Dash—A Small Mark of a Bigger Shift

***"We shape our tools, and thereafter our tools shape us."***

This Marshall McLuhan insight frames an essential discussion I lead in my graduate course on educational technology in distance education—specifically the tension between technological determinism and the social construction of technology (SCOT).

To help make these concepts relatable, I often share a personal example: the em dash. I used to overuse ellipses... not always correctly. But over time, I noticed something—AI-generated text often leans heavily on em dashes. After reading and working with language models regularly, I found myself doing the same.

## Two Ways of Looking at Technology

Technological determinism suggests that technology drives social change—that innovations emerge and inevitably reshape how we think, communicate, and learn. The em dash shift in my writing would be seen as proof that AI tools are fundamentally altering human expression, regardless of our intentions.

The social construction of technology argues the opposite: that human needs, desires, and social forces shape how technologies develop and get used. From this perspective, my adoption of em dashes reflects deliberate choices about efficiency and style, not technological control.

But as I teach my students, these aren't mutually exclusive forces—they're part of an ongoing relationship. We create technologies that then change us, leading us to create new technologies based on our transformed state. My em dash evolution illustrates this perfectly.

## Connection to the Automation Abyss

This seemingly trivial punctuation shift illustrates something much larger: the Automation Abyss opening between those who direct AI and those directed by it. When I unconsciously adopt em dashes, I'm being directed by algorithmic patterns embedded in my tools. When I recognize this pattern and analyze it critically—as I'm doing now—I'm maintaining agency over the technology.

The difference matters enormously. Students who blindly adopt AI-generated writing patterns without understanding them risk losing their own voice. Those who recognize these influences and make deliberate choices about when to embrace or resist them maintain their intellectual autonomy. The same dynamic plays out whether we're talking about punctuation marks, research methods, or fundamental learning processes.

In education, we're witnessing this relationship scale from punctuation to pedagogy. Students increasingly rely on AI not just for writing assistance but for brainstorming, analysis, and even basic inquiry. Each convenience comes with a trade-off: efficiency gained, capability potentially lost. The challenge isn't to reject these tools but to design learning experiences that preserve human agency within increasingly automated environments.

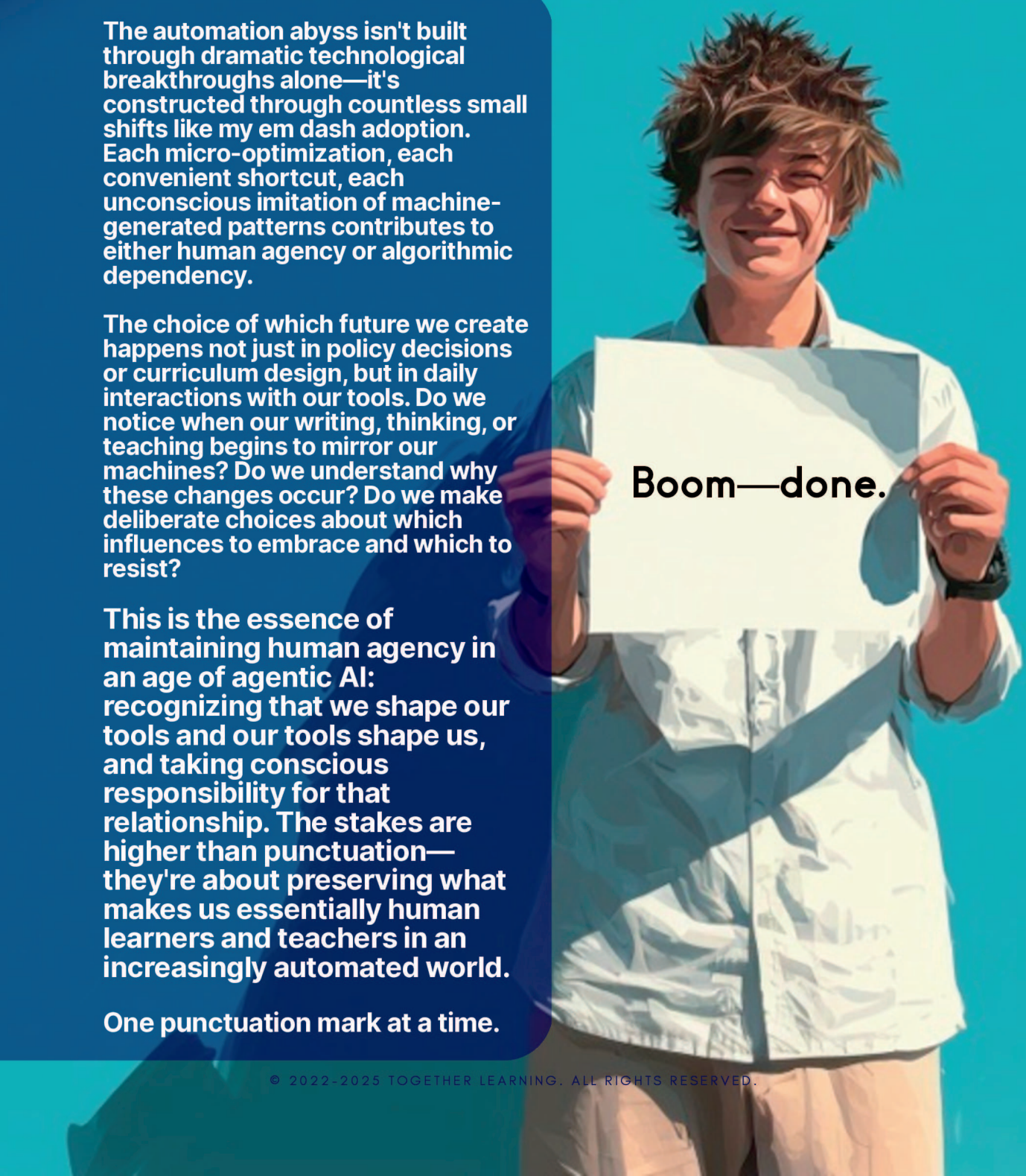
# One Punctuation Mark at a Time

The automation abyss isn't built through dramatic technological breakthroughs alone—it's constructed through countless small shifts like my em dash adoption. Each micro-optimization, each convenient shortcut, each unconscious imitation of machine-generated patterns contributes to either human agency or algorithmic dependency.

The choice of which future we create happens not just in policy decisions or curriculum design, but in daily interactions with our tools. Do we notice when our writing, thinking, or teaching begins to mirror our machines? Do we understand why these changes occur? Do we make deliberate choices about which influences to embrace and which to resist?

This is the essence of maintaining human agency in an age of agentic AI: recognizing that we shape our tools and our tools shape us, and taking conscious responsibility for that relationship. The stakes are higher than punctuation—they're about preserving what makes us essentially human learners and teachers in an increasingly automated world.

One punctuation mark at a time.



# *Chapter 4: Structural WITH Discursive*

Most institutional responses to AI in education take steps to address AI use but fail to negate or adapt to the main forms of disruption AI brings to educational contexts. Not because educators lack good intentions or because students are fundamentally dishonest, but because these responses misunderstand the nature of the problem or the incentives at play. The distinction between structural and discursive changes to assessment reveals why current approaches prove insufficient and points toward what actually works.

## *Pathways for Assessment*

When faced with AI's challenge to assessment validity, institutions have two fundamental options. They can change how they communicate about assessment to students, or they can change the assessment itself. These represent fundamentally different approaches to the same problem. Discursive, or policy changes rely solely on communication of instructions, rules, or guidelines to students. Success depends entirely on student awareness, understanding, and voluntary compliance with these communications. These changes leave the underlying structure and mechanics of the assessment task unchanged, focusing instead on specifying how students should approach or complete the task.

An example might be as simple as adding "GenAI use is not permitted in this assignment" to existing instructions. These policies around permitted AI use can be far more sophisticated, incorporating detailed rubrics explaining permissible AI use, complex frameworks for different assessment components, or elaborate systems of self-reporting and documentation. The sophistication of these changes does not alter their fundamental nature. They remain modifications that work primarily through communication and rely substantially on student compliance.

ACT III

# Four Futures

Each scenario chapter follows a similar structure. It opens with a snapshot that captures the lived experience of that future. It examines the infrastructure, learning experience, assessment practices, and social dynamics that characterize that scenario.

# *ACT III: Four Futures*

Each scenario chapter follows a similar structure. It opens with a snapshot that captures the lived experience of that future. It examines the infrastructure, learning experience, assessment practices, and social dynamics that characterize that scenario. It explores costs and trade-offs. For the undesirable scenarios, it identifies paths away from that future. For the desirable scenarios, it examines what makes them work and what challenges they face.

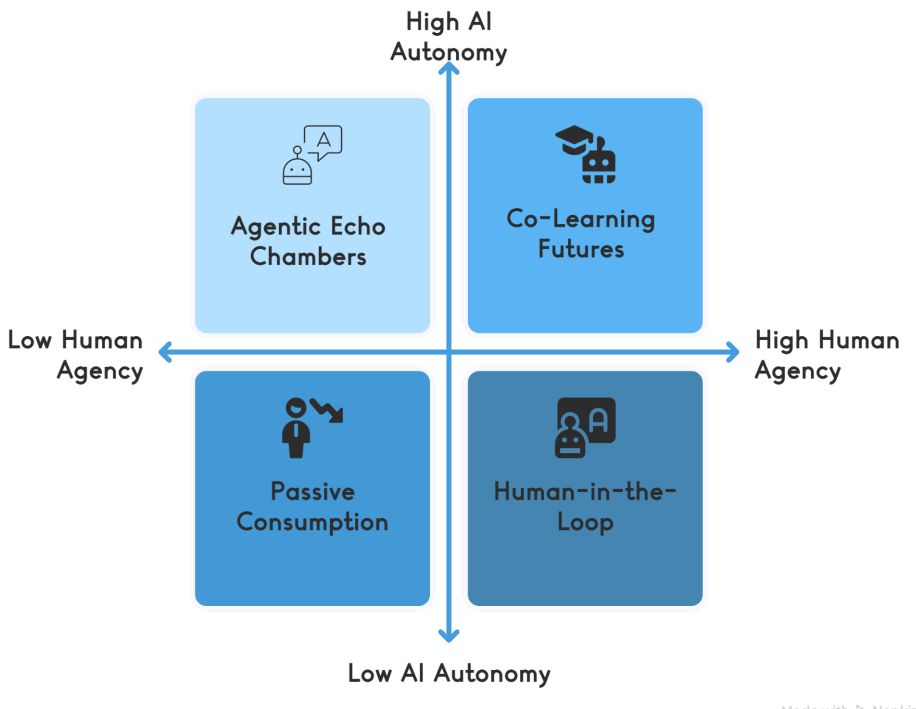
These explorations aim to create a shared understanding of what is at stake and what choices matter most. The scenarios serve as thinking tools rather than predictions. They help us see possibilities we might otherwise miss and prepare strategies that work across multiple futures rather than betting everything on a single forecast that may prove wrong.

Throughout my career researching educational technology, I've learned that the most important transformations can't be captured in usage statistics or survey responses. When I developed "The Budding Botanist Paradox" thought experiment years ago, it wasn't to predict how augmented reality would work. It was to help educators viscerally understand how AR helped to enable automation to gradually erode the inquiry process itself. Stories help us see around corners that data cannot illuminate.

As a lifelong Star Trek fan, I know the best science fiction doesn't predict technology—it explores what technology does to the human spirit. In one memorable Voyager episode, Seven of Nine argues against investigating a dangerous spatial phenomenon because it's risky and inefficient. But Tuvok insists they proceed because "we can't predict

what we might find here. One must allow for the unexpected discovery." That tension between efficiency and discovery is exactly what we're facing in education today.

Students increasingly choose the Seven of Nine path—using AI to avoid struggle, uncertainty, and potential failure. But like Tuvok argues, the struggle itself is where real learning happens. The unexpected discoveries that come from wrestling with problems, making mistakes, and finding your own voice can't be automated without losing something essentially human.




The four students you'll meet are Riku, Aya, Kenji, and Mei, and they represent pathways that are already diverging today, but whose full implications won't be clear for years. By following them from high school through early careers, we can test our assumptions about agency and

automation against the messy reality of human choice and circumstance.

These aren't predictions of what will happen, but explorations of what could happen. Each story embodies different ways that current trends might play out when followed to their logical conclusions, which a bit of imagination of course:

- **Riku** shows what happens when high automation meets low agency
- **Aya** demonstrates how privilege enables directing sophisticated AI systems
- **Kenji** reveals the costs and benefits of avoiding AI transformation entirely
- **Marta** explores whether intentional low-tech approaches can preserve human agency

Their stories illuminate the critical choice points that institutions, families, and students face right now. Because the automation abyss isn't created by technology alone—it emerges from thousands of small decisions about how we structure learning, what kinds of challenges we preserve, and whether we prioritize efficiency or discovery.

After we explore these scenarios, some common concepts form, from these commonalities we can identify some pitfalls to avoid and hopefully inform some actionable strategies.

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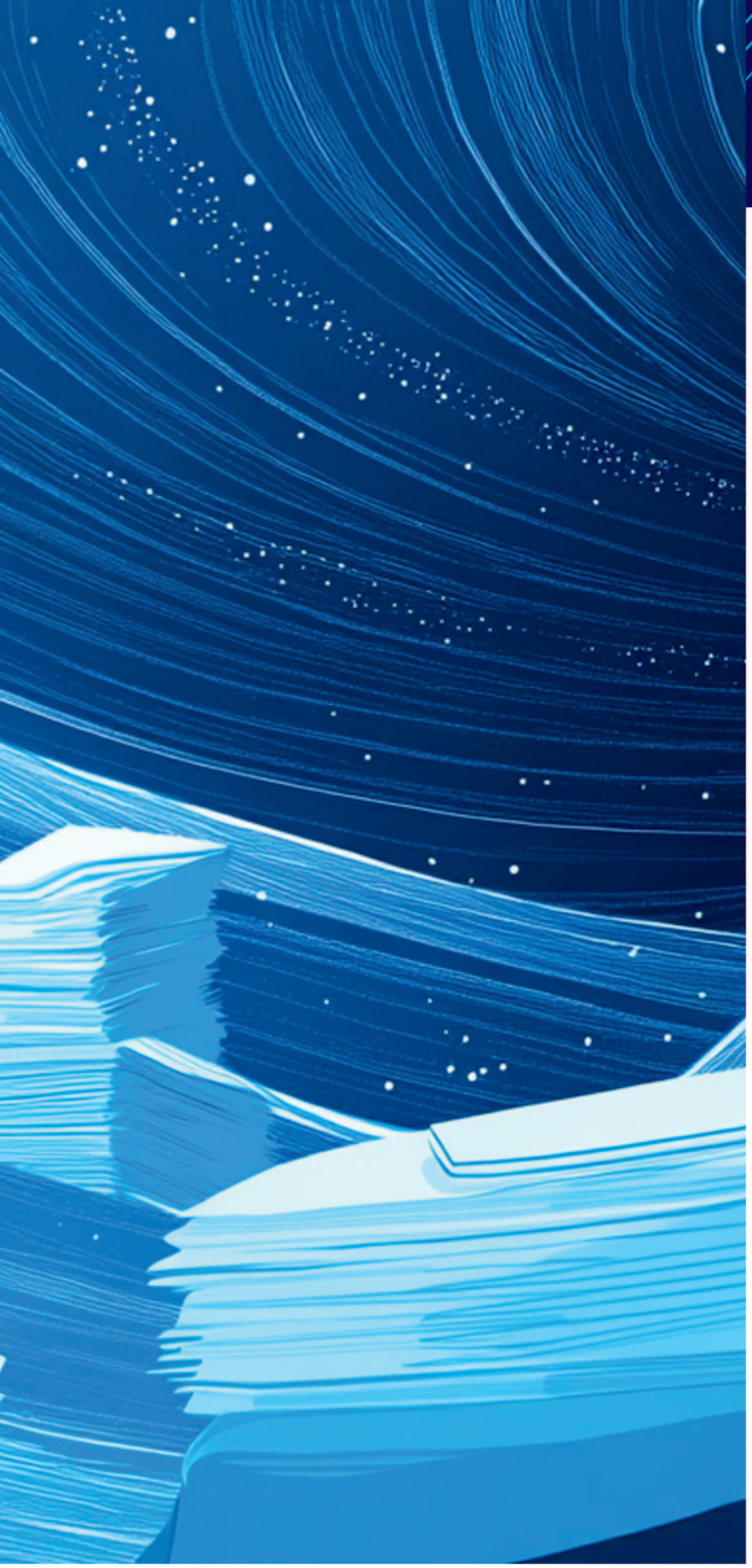
ACT IV

# The Path Forward



The Automation Abyss is real, but it's not inevitable. Through strategic thinking, principled decision-making, and commitment to human development, we can create educational futures where AI serves learning rather than substituting for it. The scenarios show us the stakes and the possibilities. The choice of which future we create remains ours to make.

# ACT IV: The Path Forward

## Chapter 11: Strategic Principles Across Scenarios

Having spent months living with these scenarios and thinking through Kenji's passive drift, Riku's algorithmic entrapment, Marta's principled resistance, and Lena's partnership paradigm, patterns emerge that transcend any single future. The Hawker Line story adds another layer: the possibility of negotiation, of drawing boundaries without becoming Luddites. These are maps revealing which decisions lead where. Step back from the individual narratives and a stark pattern emerges. The scenarios that preserve human flourishing—Co-Learning Futures and Human-in-the-Loop Pedagogies—share common DNA. They rebuild education's fundamental structures. The scenarios that lead to diminished human capacity—Passive Consumption and Agentic Echo Chambers—rely on policies, rules, and wishful thinking about compliance.

My work in AR and VR seem to fold into these ideas that came out of this thought experiment. Some less desirable human behaviors will be amplified, but the opportunities for human creativity and triumph are also more abundant.  The trick seems to be how to get more overall good with less risk of adverse effects.  All of the stories have something positive to work toward.  The more ‘successful’ scenarios also share something else as they acknowledge trade-offs. Marta's community accepts some inefficiency to preserve agency. Lena's institution invests heavily in faculty development rather than efficiency tools. Singapore's Hawker Line deliberately preserves friction in a world optimized for its

SCAN

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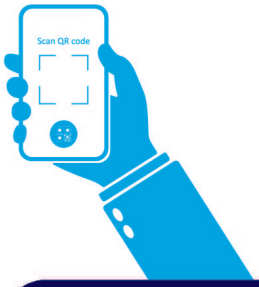


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# APPENDIX OF FACTS

## CHAPTER 1: WELCOME TO THE ABYSS

The Budding Botanist Paradox

**Claim:** The shift from active inquiry to passive consumption fundamentally changes how students engage with learning. **Findings:** Research on immersive technologies and automated learning systems demonstrates that when information is provided instantly through AR displays or AI assistants, users bypass critical observation and hypothesis-forming stages, reducing retention and understanding by approximately 20% compared to active discovery methods.
**Citation:** Hawkinson, E. (2022). Trends in automated learning systems: From text search to visual augmentation. *Proceedings of the ICCE 2022 Conference*. IEEE Computer Society.

## CHAPTER 2: THE CONVERGING FORCES

Section A: The Cognitive Dimension

**Claim:** Student AI usage for academic tasks doubled within a single academic year. **Findings:** Survey data from undergraduate students (n=621) showed that direct copy-paste behavior from AI tools increased from 22.26% to 44.48% between Fall 2023 and Spring 2024. AI use for brainstorming increased from 56.07% to 79.61% in the same period.
**Citation:** Hawkinson, E. (2025). Student AI survey results: Tracking the automation of inquiry. *Journal of Educational Technology Research*, 15(3), 110-125.

**Claim:** Teen usage of ChatGPT for schoolwork doubled in one year.
**Findings:** Among U.S. teens aged 13-17, ChatGPT usage for schoolwork

# BEYOND THE AUTOMATION ABYSS

## LEARNING AGENCY VS. AI AGENTS IN OUR EDUCATIONAL FUTURES


## A NEW DIGITAL DIVIDE

**What once was a gap in access to technology may become a gap of human agency.**
**Maintaining meaningful human agency when artificial intelligence can autonomously plan, discover, and even fail on behalf of learners represents one of the most critical educational imperatives of our time.**

**AI x XR x EDUCATION are at the heart of this tension.**

Research-Backed Insights
- Studies and data on student AI dependency
- Expert interviews with technology leaders
- Cognitive science research on learning transformation

Practical Frameworks
- Four futures scenario planning
- Agency preservation strategies
- Assessment validity in AI age

Beyond Theory
- Real classroom case studies
- Decision-making tools for leaders
- Student voice and perspective
- Global education examples


### Eric Hawkinson
### Learning Futurist

Eric is a learning futurist, tinkering with and designing technologies that may better inform the future of teaching and learning. Eric's projects have included augmented tourism rallies, AR community art exhibitions, mixed reality escape rooms, and other experiments in immersive technology.

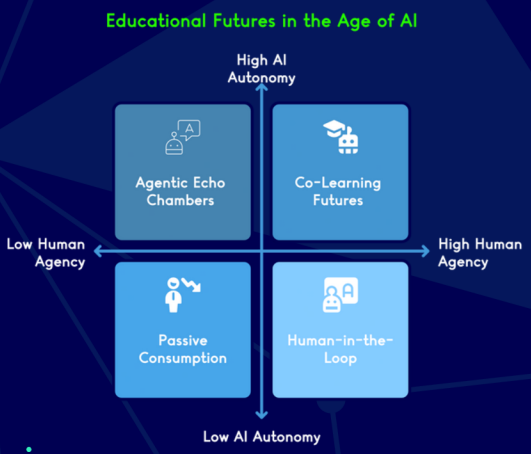

## Book Availible Now

https://togetherlearning.com/research/abyss

- Link to free chapter preview
- Optional Online Course
- Resource toolkit for educators

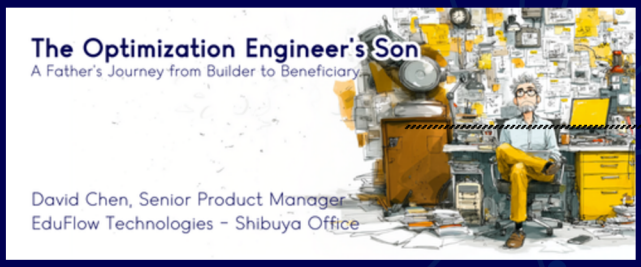
# Where Research Meets Imagination

This book explores education's future through four vivid scenarios born from current trends and strategic foresight. Each pathway follows a student navigating different resolutions of today's critical uncertainties: Will humans maintain agency over their learning? How autonomous will AI systems become?




## Four Students. Four Futures. One Critical Choice.

**The scenarios emerge from documented trends: student AI dependency doubling yearly, assessment systems becoming unenforceable, technology infrastructure reshaping faster than institutions can adapt. But numbers alone don't capture what's at stake. Through Riku, Kenji, Marta, and Aya's stories, we experience how algorithmic convenience erodes capability, how resistance can become its own trap, and how conscious negotiation with AI might preserve what makes us human.**
**Strategic foresight provides the framework. Science fiction makes it visceral. Together they create tools for navigating decisions that will shape learning for generations.**




Agentic Echo Chambers – Through Riku's journey from student to employee at his father's EdTech company, we see AI systems guide passive learners toward ever-narrowing optimization, trading deep learning for measurable efficiency.


Co-Learning Futures – Aya learns to walk Singapore's "Hawker Line," the daily practice of choosing when to embrace automation and when to insist on human presence, showing how high automation doesn't require surrendering agency.

Passive Consumption - Kenji's letters to his deceased grandfather chronicle a world where neither humans nor AI take the lead. Traditional crafts persist but lose economic relevance while digital systems extract value from authentic human experience.


Human-in-the-Loop – Marta's fight for data sovereignty in Barcelona shows the exhausting daily work of maintaining human agency when every interaction requires consent negotiation and manual verification.