AI Skills for an AI World

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Abstract— Humans have consistently adopted new tools, and each new tool has, in turn, reshaped the skills people need to succeed. This paper addresses a specific question: which human skills will be valued most in an AI world, and how can children practice these skills in a safe way? Build-It-Yourself (BIY) is an art and engineering program grounded in technology-in-education research from MIT. Over the past twenty years, the program has worked with more than 5,000 children across three continents and logged over 40,000 workshop kid-hours. Drawing on this experience, we have identified nine critical skills that determine whether a young builder grows alongside AI or is ultimately replaced by it, organized into three sets: ethics, passion, and execution. All nine are equally important to solving real problems. This paper focuses on three of them in particular: ethics as a whole, respect (which we discuss in practice as community), and curiosity (drawn from the passion set). These are the skills we have found most at risk of being neglected, and the ones our workshop is specifically designed to protect. Our aim is to offer both a shared vocabulary and a set of concrete practices that other educators can adopt.

Keywords—AI education, K-12, engineering, curiosity, ethics, community, creativity, workshop, mentoring, human skills.

I. Introduction

Children must learn to use the tools of the future, and today that largely means artificial intelligence. With the right tool, you can move the earth (Archimedes). The more important question is not whether children should have access to AI, but how that access should be structured: whether adults tightly control its use, or provide room for exploration alongside guidance for doing so safely. BIY's position favors the latter.

Consider two classrooms in 2035, both equipped with the same AI system: identical model, speed, and cost. In the first classroom, the assignment is to use the AI to write an essay on climate change. Students enter a prompt, accept the first output, and submit it. Everyone receives full marks.

In the second classroom, the assignment is to use the AI to build something a real neighbor would use to conserve water over the summer. Students debate who qualifies as "a real neighbor." They interview one. They ask the AI for five ideas and discard four. They build a prototype, watch it fail, and revise it. The AI assists throughout, but the students make the decisions. Both groups spend the same hour with the same tool; only one group develops as a result.

This paper examines what the second classroom is actually practicing. Our claim is not a new one: the skills [1], [2] that mattered before AI existed matter more now, not less. AI simply raises the ceiling on what those skills can accomplish.

BIY is an art and engineering program grounded in technology-in-education research from MIT. Its mission is to help the next generation of builders use technology wisely, within what we describe as a global laboratory. Over twenty years, the program has worked with more than 5,000 children, logged over 40,000 workshop kid-hours, and produced projects across three continents [3]. What follows is not a controlled study, but a synthesis of what we have observed to work in practice.

II. The Skills in Brief

BIY's skill model comes from observing what separates a confident young builder from one who gets stuck, over the course of a full project. It emerged from field observation, not from a policy report. The resulting skills fall into three groups, each addressing a different question about the builder.

A. Ethics: the moral compass

Ethics is where the builder decides what is worth making. It draws on two more basic skills: values, meaning a clear sense of right and wrong, and respect, meaning regard for teammates, tools, and users. Capability without ethics is dangerous.

B. Passion: the creative engine

Passion is where the builder decides why a project is worth finishing. It combines imagination, the ability to see what does not yet exist; curiosity, the drive to ask the next question; and entrepreneurship, the willingness to take ownership of the outcome. Passion is what carries a builder through the difficult middle stretch of a real project.

C. Execution: the working craft

Execution is how a project actually gets built. It combines problem solving, first-principles thinking, fluency with tools, including AI, and communication, meaning the ability to explain the work to a real audience. Execution is what turns intent into something another person can use.

These skills reinforce one another. Ethics without communication becomes moralizing, and curiosity without tools remains daydreaming. Tools without ethics is close to where AI

has left most societies today. The builders who perform best are those who move fluidly between all three.

The remainder of this paper focuses on three of these skills in particular: ethics; community, which is the applied form of respect, communication, and shared values; and curiosity, which we separate out from passion because it carries so much of the weight. These are the three skills we see handed off to machines first, and the three our workshop is designed to defend.

III. Ethics

A. Why ethics comes first

Most K-12 conversations about AI treat ethics as an add-on, something to teach only after children have learned to code. BIY treats ethics as the first skill, taught on day one, because in an AI world every builder effectively becomes a small policymaker. A ten-year-old who can prompt a model is, in practice, deciding what that model will say to whoever reads its output.

Nearly every child eventually asks two questions in the workshop: "Should I be doing this?" and "Who gets hurt if I get it wrong?" Ethics is the muscle that allows a builder to answer those questions without waiting for permission.

B. The Three Laws of the Lab

BIY workshops operate under three explicit rules, introduced on the first day of every program and repeated every day thereafter:

- Respect your teammates. Every project is a team project, and the person across the table is the first user of your work.
- Respect your tools. A misused tool becomes dangerous; a respected tool becomes an extension of the builder. This applies equally to a glue gun and to a language model.
- "Don't do dumb stuff." This rule is stated as bluntly as possible, on purpose. It is shorthand for thinking one step ahead about the consequences of what you are about to build. BIY measures this with a simple test: anything you would be embarrassed to tell your parents is probably "dumb."

These three laws form the base. Alongside them, we maintain a longer library of Build-It-Block tips, small first principles reminders that carry weight in the moment:

- Tool Tip #1: don't cut your finger off.
- The words "I can't" are strictly forbidden.
- No mean machines.

The three laws do the ethical work in the room. They are concrete enough for an eight-year-old to remember, and general enough to survive contact with any new tool, including whatever AI system comes next.

C. How BIY exercises ethics

Ethics is trained the same way any other skill is trained: by placing the builder in situations that require judgment, and then holding them accountable for the outcome.

- **The "I can't" ban.** The phrase "I can't" is not permitted in a BIY workshop. Builders must identify what specifically is blocking them and ask for the help they actually need.
- **Signed work.** Every finished project ships with a short video presentation in which the builder explains what they made and for whom. If a builder cannot narrate it on camera, it should not ship.
- **Consequences over compliance.** Rather than teaching a fixed set of AI rules, mentors ask the builder to walk through who is affected if the project works, and who is affected if it fails. The rules follow from the consequences, not the other way around.

IV. Community

A. Why community is a skill

The default story about AI is a story about one person and one machine. A student enters a prompt; a model responds; the teacher never enters the room. This is a lonely story, and it produces lonely engineers.

Community is the muscle that turns individual capability into shared work. It is how a builder learns that other people see a problem differently, that a good critique is a gift, and that the strongest projects are rarely solo [4]. In an AI world where a single person can generate more output than he/she can meaningfully review, community also functions as a quality control system: other humans catch what the AI, and the builder, missed.

B. What community means at BIY

At BIY, community is exercised through three concrete layers:

- **The team.** Every project runs with a small team, chosen to mix ages and backgrounds. The team is where respect and communication get their first real workout.
- **The mentor network.** Projects are supervised by art and engineering students from well-known universities, which exposes younger builders to what an early-career professional sounds like.
- **The global laboratory.** BIY runs programs across multiple locations, so a project in Boston can borrow a technique from a project in Veracruz, Beijing, Vancouver, or Toronto.

C. Invention Universe: LinkedIn for kids

The vehicle BIY uses to scale community is Invention Universe, a shared, game-like environment in which every member owns a "planet." Kids customize their planet, post finished projects, comment on each other's work, and follow builders they admire. The design is deliberately closer to

LinkedIn or GitHub than to a social feed: what kids post is finished work, not passing thoughts.

D. How BIY exercises community

- Critique is normalized as part of the work. Mentors demonstrate how to receive a hard comment before asking kids to give one.
- Cross-country collaboration is treated as ordinary. A Boston workshop routinely reviews a project from Mexico City, and vice versa.
- The workshop closes with a public showcase rather than a grade. The audience includes families, other kids, and mentors, and the work has to hold up in front of them.

Build together. Create wonder. Help others. Building alone is easier and faster with AI than it has ever been; wonder and help require other people. This raises a fair question: does AI's ability to work solo undercut the case for community? BIY's experience points the other way. Much as multiplayer games have been shown to build stronger teamwork than solitary reading, AI appears to raise the value of collaboration rather than replace it: it clears away the busywork that used to fill a session, leaving more room for the parts of a project, deciding, debating, presenting, that only a team can do together.

V. Curiosity

A. Curiosity as the primary engine

As AI systems take on more of the work of execution, the defining quality of tomorrow's innovator shifts from cognitive speed to judgment. Curiosity is the engine of that judgment. Psychologically, curiosity is driven by the information gap, the felt distance between what a learner already knows and what he/she wants to know [5]. It depends heavily on psychological safety: environments that remove the fear of looking foolish tend to unlock natural playfulness and inquiry [6].

True curiosity, in an AI world, is the refusal to accept machine output as absolute truth. It is the drive to look inside the black box, question its logic, and treat AI as a collaborative sounding board rather than an unquestioned authority. One BIY intern puts it more simply, as the "joy of learning": the same delight a young builder feels taking apart a toy, redirected toward a language model instead of a screwdriver.

B. Why real projects matter

The true measure of a student's fluency with AI is not the quality of the answer a machine produces, but what the student can build from it. AI can assist with research, planning, and simulation, but humans must remain responsible for making an idea actually work.

A simulation may be mathematically correct while a real robot still fails, due to rain, wind, faulty code, or an unexpected mechanical problem. Real projects expose the difference between an answer that sounds convincing and a solution that actually works.

C. Grow or die

Many headlines claim that AI causes "brain rot" or "destroys critical thinking." Recent research supports parts of this concern. An MIT Media Lab study documented "cognitive debt" accumulating in students who over-rely on AI writing tools [7], and coverage in the New York Times has asked what students lose when they stop writing.

BIY's view is that this is a natural, and potentially healthy, progression, provided the lost skills are replaced with more valuable ones. Historically, when humans adopt new tools, they lose some skills and gain others.

BIY's conclusion is to use AI tools aggressively, because they free humans to focus on higher-level thinking and creativity, but to do so inside a workshop that keeps curiosity growing at least as fast as automation is adopted. If a machine produces the first draft, a person should return to the second draft with a harder question.

D. How BIY exercises curiosity

- **A fearless atmosphere.** BIY operates on the principle that creativity requires the freedom to "look silly." Mistakes are treated as data.
- **Art-leading-technology.** Projects begin with an artistic or narrative goal, such as an abstract drawing, a song, or a puppet, and pull technology in as the tool of execution. The art sets the goal, and the technology serves it.
- **Gamify everything.** Friendly competition builds confidence and resilience, and curiosity tends to be more contagious when teammates are playing.

VI. A Growth Path from Kid to Adult

These skills are not a curriculum to be completed by twelfth grade. They form a growth path. BIY observes the same builder cycling through them at eight, at eighteen, and at forty-plus, with the stakes rising each time.

At eight, curiosity looks like taking a pen apart. At eighteen, it looks like reverse-engineering an AI's reasoning. At forty, it looks like refusing to ship a product until the team understands a failed prototype. Same skill, higher stakes.

The environment BIY builds, through project storylines, a curated library of building tips, and a global network of mentors sharing work through Invention Universe, is designed to let a single builder practice all of these skills across each of those stages. The tools change every few years; the most important skills do not.

VII. Conclusion

Return to the two classrooms described at the outset. Both students had access to the same AI. Only one of them grew, because only one of them was in an environment that demanded these human skills.

The three areas highlighted here, ethics as a whole, respect (expressed at BIY as community), and curiosity (drawn from the passion set), are the ones we believe are most at risk of being quietly outsourced to the machine, and the ones the BIY

workshop is designed to protect. Ethics is what keeps the work worth doing, community is what keeps it honest, and curiosity is what keeps it moving.

BIY's experience and portfolio of projects [8] suggest that these skills are teachable and that they compound over time. AI is the newest tool in a long line of tools humans have adopted, from the pen [9] to the printing press to the personal computer. Each looked, at first, as though it would replace the person using it, and each ultimately made a skilled person more valuable. We expect the same of AI.

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