

The Human Education Behind a Career in AI

By Patrick Russell

Whole-person preparation for life and work in an AI-shaped world



A child who asks why a bridge stands deserves more than a quick answer. Give that child some cardboard, a few weights and the freedom to discover what makes a structure fail. Ask what happened, what might work better and whether the evidence supports the explanation. A serious education can begin with that exchange.

An education for an AI-shaped world has to leave that child's future open. He may become a physician, farmer, teacher, electrician or entrepreneur. AI may enlarge what he can accomplish in any of those callings. His preparation begins with curiosity, independent thought and care for other people, then deepens through knowledge of the work he chooses. Programming is one path within that much larger opportunity.

Education Before Specialization

Parents and teachers have work to do long before a student chooses an occupation. Read stories together and discuss why a character kept a promise or betrayed a friend. Encourage experiments, drawing, music and close observation of nature. Let children explain their reasoning. When a project fails, reward an honest account of the failure. These are practical ways to make curiosity welcome and truthfulness worth practicing.

THE WHOLE PERSON

Intellectual

Homeschooling can provide continuity within an environment deliberately shaped by principles that nurture the whole person. Intellectual growth belongs alongside moral, emotional, social, physical and spiritual development. Parents can follow a child's questions and developing interests across years, connecting academic study with the values and relationships of daily life. A lesson can continue in family reading, a conversation about fairness or a project pursued over several seasons.

Imagine a home project following a small vegetable plot. A younger child measures growth, records rainfall and draws observations. In later years, the same interest can lead to spreadsheets, soil sensors and an investigation of irrigation and plant nutrition. Why did two plants grow differently? What did we fail to measure? The parent asks the child to distinguish observation from guesswork and to revisit earlier conclusions. A familiar patch of ground can become the beginning of serious study in agriculture, conservation or scientific research.

Moral

Emotional

Social

Physical

Spiritual

Expectations of honesty and careful work can remain steady as the material becomes more demanding. The pace can change with the child's needs while parents keep the child's development as a whole in view. Preparation for a career grows from that broader formation. Sustaining this continuity takes time and preparation, and families differ in the resources and support available to them.

EARLY OBSERVATION

- Measure growth
- Record rainfall
- Draw observations

LATER STUDY

- Spreadsheets
- Soil sensors
- Irrigation research

A PARENT REMAINS THE GUIDE

AI can assist parents who teach their children from home to adapt a reading passage, prepare practice questions or try another explanation. The parent should verify sources and facts, check the material's suitability and ask the child to explain the reasoning independently. For younger children, an adult can operate the tool and bring the reviewed material into a lesson. Protecting personal information and respecting product age requirements belong to that responsibility. The parent continues to guide the learning and judge whether understanding is growing.

Learning for a Wider World

Homeschooling

District public

Charter public

Private schools

A child's curiosity has destinations we cannot know in advance. An interest in living things may grow into farming, medicine, conservation or research. Education can nourish that interest while leaving room to discover a vocation.

Homeschooling, private schools, public charter schools and district public schools give families different ways to pursue that education. In every setting, parents and teachers can exchange observations about the child's interests, choose a project worth pursuing and introduce a knowledgeable mentor. This is how an interest gets the attention and encouragement it needs to develop.

KNOWLEDGE GIVES THE TOOL PURPOSE

Consider what AI can offer the people these children may become. A farmer could combine field observations with AI-assisted analysis to direct water where crops need it. A teacher could adapt materials for students who learn differently, with more time left for individual attention. Knowing the people and the work gives the technology its purpose.

TEACHERS LEARNING TOGETHER

Teachers are exploring these possibilities together. In November 2025, Sidwell Friends reported that its teacher-led Co-Lab had connected educators from more than 300 independent schools to experiment with AI and discuss how it could improve learning.

Sidwell Friends / November 2025

OPEN RESOURCES FOR CHARTER AND PRIVATE EDUCATORS

Code.org AI 101 for Educators

Free, self-paced training in classroom use, integrity, bias and privacy. No district approval is needed to begin the course.

Google Generative AI for Educators with Gemini

Free, two-hour course for middle- and high-school teachers covering responsible use, lesson planning and assessment.

School choice: weigh any tuition, financial aid, transportation and local availability.

The reward is seeing a young person discover work he cares about and learn to do it well.

Curiosity Becomes Discipline



BUILD THE FOUNDATION

As students grow, that curiosity should meet increasing intellectual discipline. Mathematics teaches them to make an argument precise. Science asks them to test it. History and literature invite them to consider people whose experiences differ from their own. Clear writing forces a young person to discover whether an idea actually makes sense. These studies help young people bring understanding of the world to the tools they use.



PUT IDEAS TO THE TEST

Adolescents can explore AI through subjects that interest them. They might compare AI summaries of weather records with a gardener's observations or study a teacher-reviewed explanation of a difficult passage, then present their own conclusions. Programming and robotics offer further study for technically inclined students. Others can deepen knowledge of health, commerce, the arts or public service.

Those who entrust their future to educators determined to resist AI risk manufacturing their own obsolescence. Schools have a duty to teach students how these systems work and how to challenge them. That includes privacy safeguards, age-appropriate instruction and work completed without automated assistance. A refusal to teach the subject cannot pass for preparation.

AFT AND UFT

400,000 educators

Five-year goal, not a completed count

Teachers' unions are already investing in this preparation. In July 2025, the American Federation of Teachers and United Federation of Teachers announced the National Academy for AI Instruction with Microsoft, OpenAI and Anthropic. The \$23 million initiative aims to support 400,000 educators over five years. UFT reports offering more than 20 free trainings since September 2025, covering subjects that include critical thinking and support for English learners.

NEA

5-hour course

Plus a separate set of 12 microcredentials

The National Education Association offers a free, five-hour course, *Enhancing Educator Practice with AI*, alongside a separate set of 12 AI microcredentials. Subjects include evaluating outputs, attribution, bias and ethics. These efforts show that unions can help teachers acquire the competence this moment requires. Their value should ultimately be judged by what teachers can do and what students learn, beyond enrollment targets or certificates.

Powerful Tools Require Judgment

ChatGPT

Unit planning

Diffit

Reading adaptation

Brisk

Feedback

Khan Academy

Planning and feedback

The tools make the possibilities concrete. A teacher can use ChatGPT to help draft a unit plan from approved curriculum materials. Diffit can adapt a reading's level or translate it; Brisk can help prepare feedback within tools such as Google Docs. Khan Academy's AI teacher tools also support planning and feedback. Imagine using these aids to prepare a lesson on a local watershed: different reading materials, clear questions and feedback ready for the teacher's review. The hoped-for benefit is more time for the conversation that reveals whether a student understands.

That opportunity calls for disciplined use. Teachers should work through school-approved accounts, protect student records and check generated facts, translations and feedback before using them. Training should teach educators to recognize a confident error and to decide when students need to work without AI. A classroom can welcome powerful tools while expecting students to explain their own reasoning. The teacher remains accountable for instruction; professional judgment is the very skill these tools should help a teacher exercise.

ONE TECHNICAL CAREER / U.S. PROJECTION 2025 TO 2035

Data science illustrates one specialized career route. The Bureau of Labor Statistics projects U.S. data-scientist employment to grow 35 percent between 2025 and 2035, compared with 3 percent across all occupations. That forecast covers the whole occupation, including work beyond AI. It is a projection for data science, not for every profession using AI.

Data scientists



All occupations



Data science / Includes work beyond AI

Colleges and universities connect professional study with research and internships; community colleges and apprenticeships offer further routes into skilled work. Future nurses, teachers and construction managers need knowledge of their professions and practical AI literacy. Specialized technical careers demand additional preparation. Data scientists typically need a bachelor's degree in mathematics, statistics, computer science or a related field; some employers seek graduate study. They learn programming and databases, separate training data from independent test data, measure errors and explain results. Software developers need system design and testing. Each route joins useful tools to substantive knowledge of the work.

Learning Health and Discovery

Four different ways to improve understanding and human well-being



Healthcare

Clinician or validation specialist

ACQUIRE

Adult-heart ultrasound images

EVALUATE

Nurses use the tool;
cardiologists assess image
quality

VALIDATE

Performance across patients
and settings

The FDA authorized Caption Guidance in 2020 to help medical professionals acquire adult-heart ultrasound images; its evaluation included nurses using the software and cardiologists assessing image quality. International medical-device principles issued in 2025 stress representative data, independent testing, confidentiality and monitoring during use.

Work and preparation Use authorized tools in nursing and clinical care, or test their safety. Build clinical expertise and AI literacy; add validation skills for testing.

FDA authorization / Clinical evaluation / IMDRF principles



Higher education

Faculty or learning designer

Teach with AI, design courses, train faculty and test independent learning. **Case:** In March 2026, the University of Michigan announced 13 faculty-led AI projects exploring tutoring, professional simulations and better feedback.

Preparation Build subject expertise, teaching skills and AI literacy.

Human check Success means better-educated students; fluent machine conversation alone proves little.

U-M research



Scientific discovery

Scientist or software specialist

Use AI to interpret X-ray diffraction patterns and characterize materials faster. **Case:** A Department of Energy research example uses AI models whose disagreements prompt researchers to reconsider assumptions.

Preparation Build chemistry or physics and experimental skills; add coding for software roles.

Human check Conclusions must remain answerable to measurements.

DOE materials research



Agriculture

Farmer or agronomist

Use digital recommendations to guide water and fertilizer decisions in the field. **Case:** USDA describes research combining field sensors, drone imagery, satellite observations and crop models to guide water and nitrogen applications.

Preparation Build crop expertise and learn to interpret sensor data and AI advice.

Human check Check recommendations against actual field conditions.

USDA research

Building Making and Moving

Digital analysis meets machinery, construction sites, logistics and power



Manufacturing

Machinist or automation specialist

Use AI-assisted monitoring on the shop floor, or develop fault-detection systems. **Case:** NIST's CROW research workcell combines collaborative robots, conveyors, cameras and sensors; researchers introduce faults to test detection.

Preparation Learn machinery and AI-assisted checks; add coding for automation design.

Human check Factories bring imperfect data, changing materials and equipment that must keep running.

NIST CROW



Construction

Construction manager or BIM coordinator

Evaluate automated warnings alongside drawings, inspections and site records. **Case:** Autodesk's Construction IQ uses machine learning to prioritize project issues.

Preparation Learn construction methods, safety documentation and AI-assisted tools.

Human check Important risks can be missed or incorrectly flagged; establish what is happening onsite.

Autodesk guidance



Strategic supply chains

Supply-chain analyst

Compare inventory needs, alternative suppliers and transport options as conditions change. **Case:** Unilever describes AI forecasting and scenario planning, with people supplying context and making final decisions.

Preparation Build operations expertise, commercial judgment and AI-forecasting literacy.

Human check Forecasts leave decisions about cost, capacity and acceptable risk unresolved.

Unilever case



Energy and AI infrastructure

Electrician or data-center technician

Keep data centers running with reliable power, grid connections and efficient cooling. **Case:** The IEA's April 2026 outlook projects global data-center electricity use rising from 485 TWh in 2025 to 950 in 2030. An AWS operations posting covers generators, electrical distribution and cooling; preferred qualifications include trade-school training or an associate degree.

Preparation Electricians commonly take four- or five-year paid apprenticeships; cooling technicians can start with technical school or community college, followed by substantial workplace training.

Human check The electricity projection covers all data centers, with AI an important driver.

IEA outlook / BLS electricians / BLS cooling technicians / AWS posting

GLOBAL DATA CENTER ELECTRICITY

485 ————— **950 TWh**

2025

2030 projected

All data centers / IEA April 2026 outlook

Protection and Public Judgment

The quality of the evidence matters as much as the speed of the system

Disaster response

Emergency planner or geospatial analyst

Satellite observations

Maps and limitations

Emergency managers

Use AI-assisted maps to plan response, or analyze satellite images for emergency teams. **Case:** NASA documents Prithvi-model applications mapping floods and wildfire burn scars, with subject experts helping evaluate results.

Preparation Study emergency planning and mapping; add programming for geospatial models.

Human check Check uncertain boundaries and explain map limitations when time and resources are scarce.

NASA Prithvi

SOURCES AND GAPS

WARNINGS AND FALSE ALARMS

VERIFICATION AND DUTY



Military intelligence

Intelligence analyst

Weigh sources, identify gaps and revise conclusions when evidence warrants. **Case:** The Defense Intelligence Agency's Advanced All-Source Methods combines data science and AI with intelligence analysis.

Preparation Build regional knowledge, source evaluation and AI literacy; add statistics for technical roles.

Human check Evidence must remain open to challenge, however sophisticated the software.

DIA analysis



Cybersecurity

Security or AI-security analyst

Investigate unusual network activity or test weaknesses in models and surrounding systems. **Case:** NIST distinguishes using AI for security from protecting AI systems themselves.

Preparation Build security fundamentals and AI literacy; add model-testing skills for specialist work.

Human check Separate genuine warnings from false alarms and explain why evidence merits action.

NIST cybersecurity



Law

Lawyer or legal-tech specialist

Review contracts and evidence with AI assistance, verifying sources and protecting clients. **Case:** American Bar Association guidance emphasizes verification and confidentiality.

Preparation Build legal expertise and AI literacy; learn tool evaluation for specialist roles.

Human check Lawyers remain responsible; plausible language and software-supplied citations do not establish authority.

ABA guidance

Turning Preparation Into Practice

Experienced professionals also have something to contribute. A nurse who understands clinical workflows, a teacher who can recognize a misleading explanation or a machinist who knows a production process has a basis for using AI well in daily work and collaborating with technical teams. NIST's AI Risk Management Framework explicitly includes domain experts and evaluators among the people involved in responsible AI development and use. Adding data literacy and evaluation skills to established expertise can open new possibilities, although employers' requirements will differ.

Education should connect these ambitions with real experience. Schools can arrange supervised projects with local employers. Colleges can connect professional study with internships and supervised use of relevant tools. A student's portfolio should show the question pursued, the evidence examined and how the learning improved the work. Mentors should insist that borrowed work be credited and confidential information protected. Employers should value those habits when hiring, alongside demonstrable skill.

As home-educated students advance, parents can connect those long-running interests with experience beyond the household. A co-op laboratory project or a knowledgeable mentor can bring collaboration and constructive criticism. Where available, community-college classes can add specialist instruction. California's community-college guidance explicitly includes homeschooled students in dual enrollment and advises families to check local requirements. Registered technology apprenticeships offer another route to investigate as students prepare for work. Such opportunities let a young person's early curiosity develop into demonstrable skill while the family continues to encourage sound judgment.

ROUTES TO EXPLORE AS AVAILABLE

Co-op projects

Knowledgeable mentors

Community college

Technology apprenticeships

The excitement lies in what people may be able to accomplish: give more attentive care, use resources more wisely, discover a material or build a business. Changing technology will also alter existing jobs. Workers deserve practical opportunities to learn, and a future in which their experience continues to count.

An inquisitive child cannot know which job titles will exist twenty years from now. We can still give that child an education rich enough to meet the future. Encourage the question, strengthen the reasoning and nurture the conscience. The education succeeds when he can make something useful of his gifts, the knowledge he has earned and the powerful tools now within reach.

Project, Research, Analysis, Editorial by Patrick Russell; assisted by ChatGPT (OpenAI).

The graphic includes technical specializations. Many practitioners use AI without programming.

The Human Education Behind a Career in AI

Curiosity. Character. Skills. Contribution.

EDUCATION BEFORE SPECIALIZATION



CHILDHOOD
Ask why.
Think independently.
Practice truthfulness, empathy and moral courage.



LEARNING FOUNDATIONS
At home and in school
Mathematics • science • history
Literature • clear writing



ADOLESCENCE
Probability • statistics • programming
Test ideas. Explain errors and uncertainty.



INTO PRACTICE
Degrees • apprenticeships
Projects • internships
Domain expertise



EQUIP PARENTS AND EDUCATORS
Train. Check outputs. Protect privacy.
Keep professional judgment.

Continuity in a principled environment nurtures the whole person.

12 FIELDS. MANY WAYS TO CONTRIBUTE.

 HEALTHCARE Clinical validation	 MANUFACTURING Machine vision
 ENERGY INFRASTRUCTURE Power & cooling	 HIGHER EDUCATION Learning design
 SUPPLY CHAINS Forecasting & planning	 MILITARY INTELLIGENCE Evidence analysis
 AGRICULTURE Precision farming	 CYBERSECURITY Defensive testing
 CONSTRUCTION BIM coordination	 LAW Legal technology
 DISASTER RESPONSE Geospatial analysis	 SCIENTIFIC DISCOVERY Research software

Strengthen the reasoning.
Nurture the conscience.

Use extraordinary power well.