JOURNEY ALONG THE TECH TRAIL WITH YOUTH EXPLORERS

How "Charting the Course" Decodes AI Education for Grade 5-9 Students in Research Triangle, NC

IN PARTNERSHIP WITH

FUTURELEAD AI
WAICY
KRAMDEN INSTITUTE

WRITTEN BY

SHUHAN LI
RISHIKESH SANKARAN
ROOZBEH ALIABADI PH.D.

FutureLead AI

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Staff / Organizers

Rishikesh Sankaran

Workshop Organizer, Instructor, Founder of FutureLead AI

Shuhan Li

Program Research Coordinator, Content Developer at ReadyAI

Dr. Roozbeh Aliabadi

Founder & CEO of ReadyAI / WAICY

Marshall Burkes

Education Manager at Kramden Insitute

Dr. Jeffery Shuster

Instructor, Kramden Insitute & FutureLead AI Volunteer

Namita Manohar

Instructor, FutureLead AI Volunteer

Table of Contents

Executive Summary

In today's digital era, the early acquisition of fluency in Artificial Intelligence (AI) among young learners is more urgent than ever. ***Charting the Course* is a groundbreaking, youth-led AI education initiative that demonstrates how K-12 students without prior coding experience can meaningfully engage with AI concepts and grapple with ethical considerations, through hands-on, playful learning experiences**. Spearheaded by Rishikesh Sankaran, founder of FutureLeadAI, and sponsored by the Kramden Institute and ReadyAI, this program redefines the landscape of AI learning by **bridging the digital divide and lowering the traditional barriers to entry**.

Taking place in the Research Triangle Area of NC in March 2025, *Charting the Course* brought together 18 students in Grade 5–9 for a dynamic, gamified, and project-based AI workshop. Synthesizing survey results, interview responses, classroom observations, and student testimonials, the program has seen **significant gains in students' understanding of AI, greater enthusiasm for learning, and increased interest in AI-related careers.**

The program's success is attributed to several innovative design elements:

- **Theme-based gamification** that stimulates creativity and engagement,
- **Project-based learning** that sharpens hands-on applications for problem-solving,
- **Multimodal teaching tools** that support diverse learning styles for inclusivity, and
- **Embedded AI ethics** that promote socially responsible innovation.

Besides instructional design, Rishi's mentorship has established **a supportive and thriving learning environment** for young students to sustain their curiosity in AI within and beyond the workshop. **Youth role model** plays an indispensable part in promoting continuous learning.

We would like to underscore the necessity for **ethical conversations with young learners**. Students nowadays are not only capable of articulating the technicality behind AI, but they are also **keen observers of AI's duality**, with both prospects and problematics. The program's ethics-driven approach has encouraged students to thoughtfully **deploy AI for community betterment and environmental stewardship**.

In summary, *Charting the Course* exemplifies how **youth-led programs can democratize AI education and empower the next generation of responsible innovators.** Anchoring the ethics-by-design curriculum in real-world issues, the program equips students not only with **technical literacy,** but also with the **critical thinking and compassion** needed to use AI responsibly. This **accessible, inclusive, and student-centered method** inspires youth to see themselves as future creators and decision-makers in the AI ecosystem. It proves that with adequate and accessible support, **young learners from all backgrounds can step confidently into the world of AI, engendering both curiosity and community-driven innovation.**

Background

Democratizing AI Education for Young Learners

Artificial Intelligence (AI) has permeated every fabric of education, industries, and everyday life. To prepare the next generation for this digital reality, early and equitable access to AI education is ever more urgent. Despite recent progress in K-12 AI education, most resources remain dependent on prior coding knowledge or digital infrastructures. These may bar students in less resourceful areas from gaining the necessary knowledge and skills in the AI era.

LOWERING THE ENTRY BARRIERS TO AI AND COMPUTATIONAL THINKING

A truly inclusive AI education program must be **accessible for all students**, regardless of their technical experience, socioeconomic status, or geographic location. The foundation lies in **teaching computational thinking**: the problem-solving, pattern-recognition, and logical reasoning skills that underlie AI systems. Traditional instruction models depend heavily on devices, internet connectivity, or advanced technical concepts. This contributes to the digital gap regarding the availability of age-appropriate resources.

To close this gap, alternative approaches such as **unplugged learning**, **multimodal teaching**, and **project-based activities** have emerged. These models reduce dependence on digital infrastructure while still building critical thinking skills and AI literacy. When delivered through engaging, theme-based instruction, they can enhance AI education even in low-tech environments.

HARNESSING ETHICS IN AI EDUCATION FROM THE START

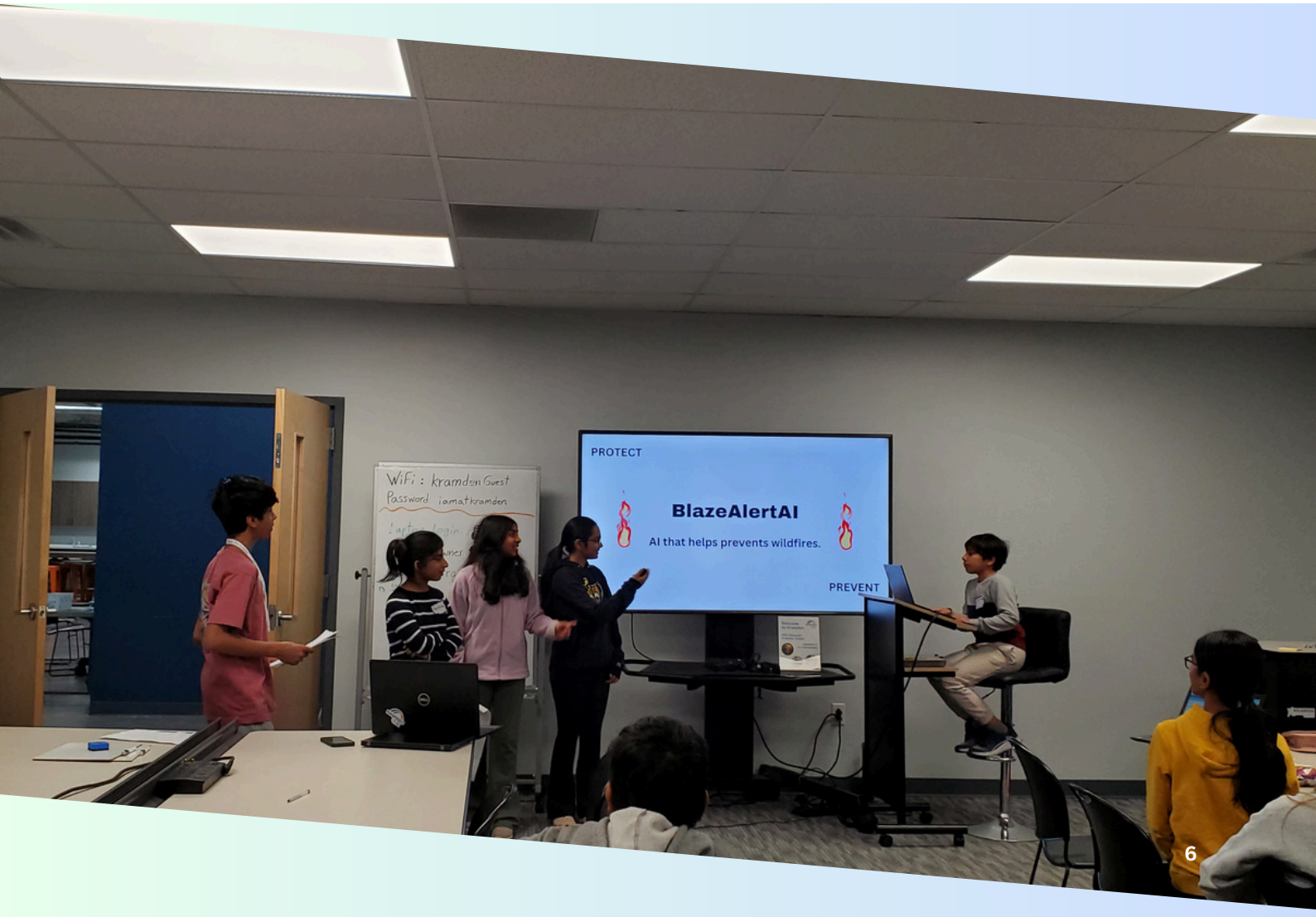
Beyond technical fluency, AI education must address **the pressing ethical concerns**. From algorithmic bias to misinformation, young people must learn not only how AI works, but also how it *should* work for a fair and equitable society. Embedding ethics in curriculum design empowers students to become **critical thinkers, conscious innovators, and responsible digital citizens**.

Ethics-driven AI education helps young learners grapple with questions about the societal consequences of AI. These conversations can't be left until the later stage of academic or career pursuits. **Ethical consciousness must begin early, in age-appropriate ways, and merge into the core of every AI learning experience**.

CENTERING YOUTH AS LEADERS AND DESIGNERS

A growing body of evidence reiterates that young people are not just passive recipients of technology, but they are **powerful agents of change**. With proper tools, supportive mentorship, and creative space, young people can lead the way in designing ethical, inclusive, and meaningful AI solutions. Programs that **center youth voice and leadership** cultivate deeper engagement and long-term interest in AI-related fields.

Charting the Course offers precisely a compelling example of **a pioneering AI program by and for youth**. This **student-led, project-based, and multimodal AI workshop** enabled middle school learners to explore the fundamentals of AI through real-world applications, unplugged activities, and ethical conversations. Students have not only gained **significant knowledge and confidence** but also begun to see themselves as **agential innovators** tackling the imminent challenges facing the world.



Mission & Vision

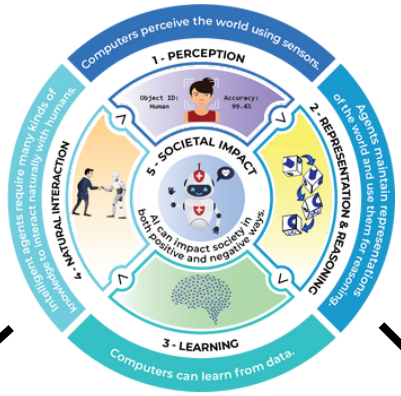
FutureLeadAI empowers the next generation to lead in an AI-driven world by making artificial intelligence education accessible, engaging, and ethical. Through hands-on, student-centered learning, we equip youth from all backgrounds to explore AI's real-world impact and take initiative as thoughtful creators, not just consumers. It is on a mission to **foster a future where young people are confident, capable, and collaborative leaders in shaping AI for societal and environmental betterment.**

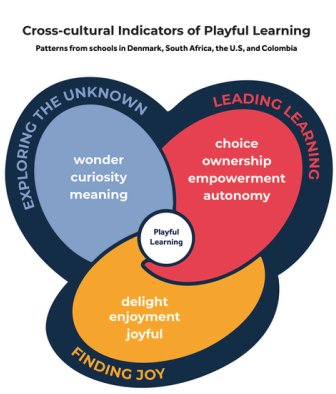
Program Recap

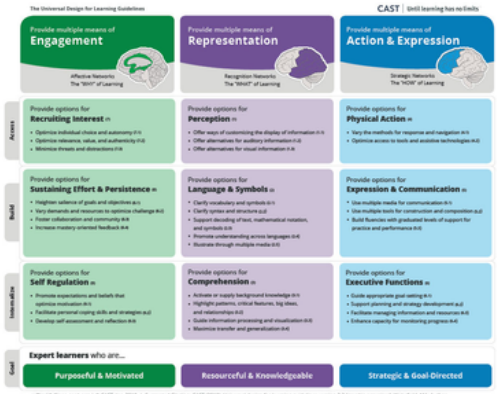
***Charting the Course* is a dynamic program nurturing future leaders who aspire to explore the wonders and possibilities of AI.** It is spearheaded by Rishkesh Sankaran, a high school sophomore and founder of FutureLeadAI. With the sponsorship from Kramden Institute and ReadyAI, *Charting the Course* is a **free-admission weekend workshop** where students in Grades 5-9 partake in **interactive and immersive hands-on projects about AI.** The program offers an accessible, engaging, and student-centered journey into AI fundamentals through an **equity-driven and ethics-focused** lens.

Charting the Course exemplifies thoughtful curricular and instructional design using leading pedagogical frameworks. At its core, the program integrates the **AI4K12 Five Big Ideas of AI** with three proven approaches:

- **Project-Based Learning (PBL)** – for inquiry-driven, experiential learning;
- **Playful Learning** – to promote curiosity, joy, and engagement;
- **Universal Design for Learning (UDL)** – to ensure all students, regardless of background or ability, can access, participate in, and benefit from the experience.







Three Phases of Progressive Learning

1

Introductory Phase – Building Foundations

Students engage with introductory AI concepts:

- Understand what AI is and how it differs from traditional technologies.
- Learn basic AI mechanisms using visual aids, analogies, and real-life examples.
- Establish a shared vocabulary that supports collaboration and critical thinking.

Goal: Demystify AI and create an inclusive starting point for all students.

2

Exploratory Phase – Learning Through Play and Reflection

Students collaborate on guided, unplugged, and simulative activities that dive into specific AI concepts:

- Interactive games and role-plays mirror machine learning, decision-making, and perception processes.
- Group projects and reflective journals help students internalize each of the Five Big Ideas of AI.
- Ethics emerge naturally through facilitated dialogue on fairness, privacy, and bias.

Goal: Strengthen understanding through multimodal engagement and playful inquiry.

3

Application Phase – Solving Real-World Problems

Students apply their learning to a socially relevant challenge, such as wildfires prevention using AI tools.

- Design solutions and use simplified AI models to simulate risk detection.
- Present ideas and reflect on the ethical impact and limitations of their approaches.
- Emphasis is placed on critical tech thinking and responsible innovation.

Goal: Foster agency by encouraging students to use AI for social and environmental good.

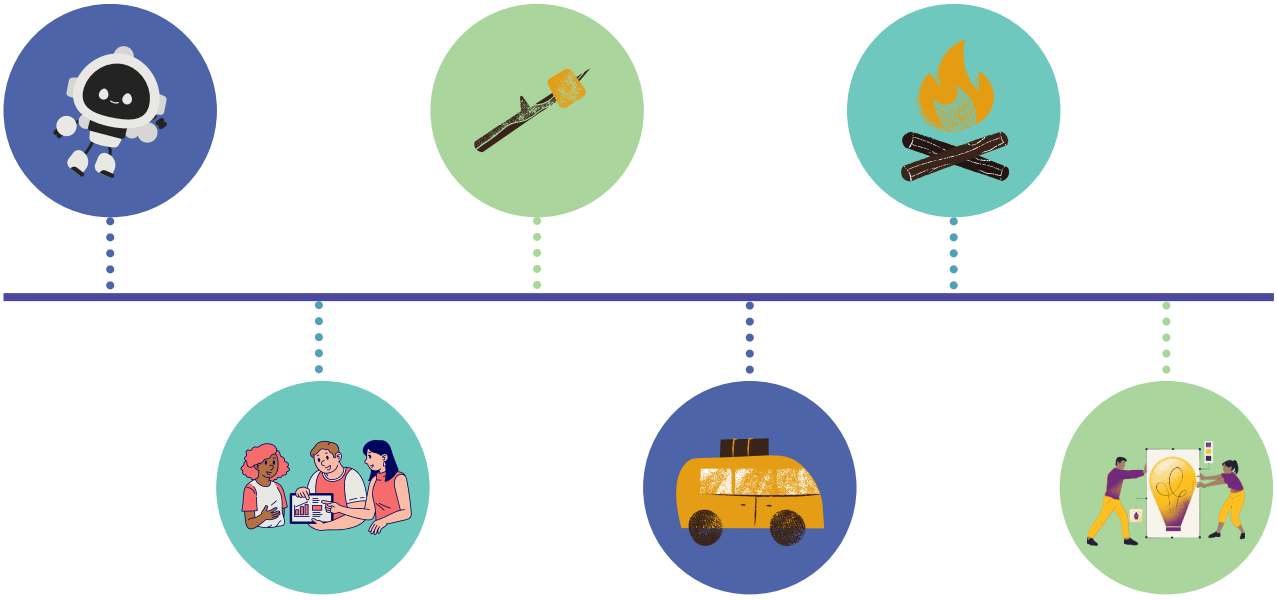
Main Activities

Charting the Course offered students an engaging, hands-on introduction to AI through a series of interactive, project-based activities. Designed for accessibility and impact, the program emphasized **collaboration, ethical awareness, and problem-solving** without requiring any prior experience in coding or computer science.

AI OR NOT?
Warm-up

CAMPFIRE S'MORES CHEF
Machine Learning; Representation & Reasoning

LA WILDFIRES
Natural Interaction; Societal Impact



HUMAN BINGO
Team-building

CAMPSITE CRUISER
Perception

PRESENTATION
Gallery-style Showcase

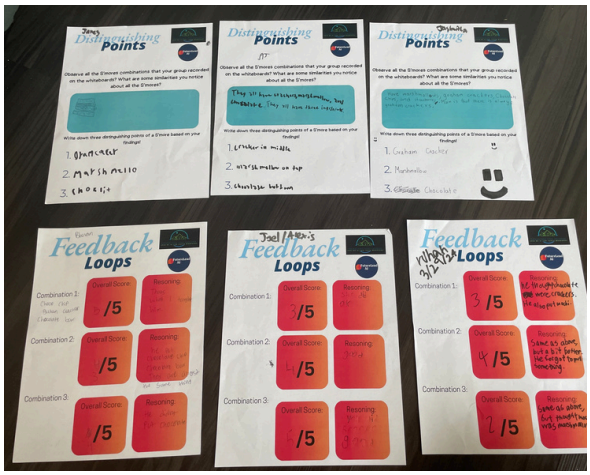
Held at the facilities of Kramden Institute, the workshop welcomed students of all backgrounds from local neighborhoods. The opening session began with icebreakers and a short video introducing the basic AI concepts. Students then participated in **"AI or Not?"**, an interactive warm-up activity where they **analyzed various technologies and debated whether each example used AI.** This exercise familiarized students with how AI functions and where it appears in daily life.

The next activity, **Campfire S'mores Chef**, introduced students to the Big Ideas of **Machine Learning** (supervised learning) and **Representation & Reasoning**. In a simulated camping scenario, each team trained a peer acting as an "AI agent" to build the perfect s'more using paper cutouts of ingredients. Through this process, students learned **how AI models are trained with data, how they make predictions, and how they improve through feedback loops**. The activity concluded with a reflection on how these same principles apply in algorithms like Netflix's recommendation system.

Paper cutouts for "s'mores ingredients"

In **Campsite Cruiser**, students explored the Big Idea of **Perception**, namely, the ways autonomous vehicles navigate the world. After a short lecture and a worksheet comparing human senses to AI sensors, students viewed a virtual demo of a Waymo self-driving car in action. For the Campsite Cruiser mission, students virtually dialed in a conference call with "Sasha," a fictional character dubbed in AI voice who explained the design challenge. Teams were then tasked with **designing their own autonomous vehicles** to transport campers through a forest. Using maps, physical props, and flowcharts, they built and tested AI logic that would help their cars detect and avoid obstacles. Each team presented their solution and reflected on both their technical skills and teamwork strategies. This activity prepared students for the final hands-on project involving AI design and application.

Campsite Cruiser map sheet to simulate road conditions



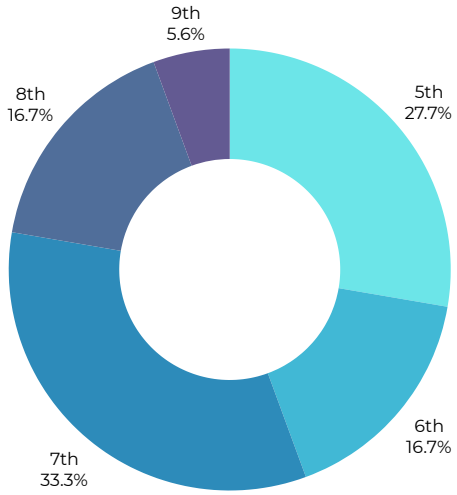
Student worksheets (features and feedback loops)

The final activity, **LA Wildfires**, brought together everything students had learned and applied it to a real-world environmental challenge. After watching a video on the impact of wildfires in California, students worked in teams to **devise innovative solutions that focused on prevention, protection, and / or emergency response.** Drawing from online research and brainstorming tools, they analyzed current AI technologies, developed their own ideas, and created visual models of their designs. Each team presented their project in a **gallery-style showcase.** They received feedback from their peers and reflected on the societal and ethical dimensions of their work. LA Wildfires served as not just a capstone project, but also a mock session for prospective WAICY attendees.

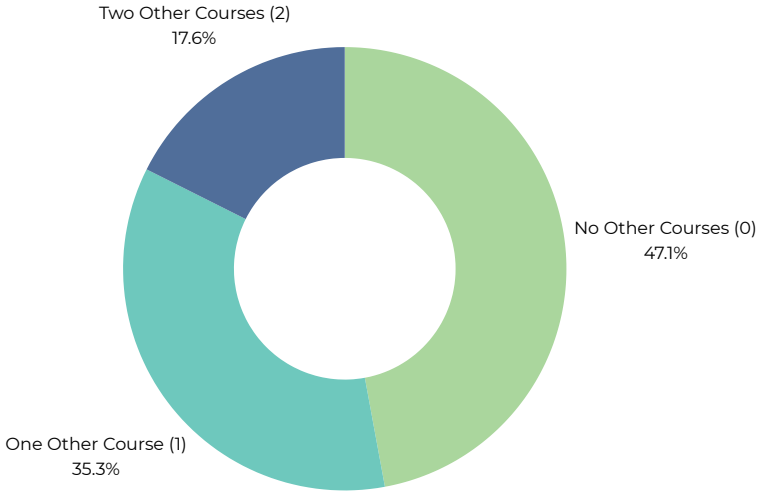
Throughout the workshop, students built foundational AI knowledge while developing critical thinking, creativity, and collaboration skills. Every activity was designed to broaden the access to AI education and to foster a deeper understanding of responsibly using AI to tackle imminent challenges facing the world.

Impact & Success Factors

18 students participated in the program in 2 cohorts (10 in the first cohort, 8 in the second cohort). A majority of students (33.3%) were in Grade 7. Most students had not taken other courses in AI prior to the workshop (47.1%).



Student Grade Level Composition



Student Prior Course Exposure Level Composition

To evaluate and analyze the effectiveness of the *Charting the Course* program, we implemented a diverse range of impact assessment tools. Numeric data were collected through **pre- and post-program surveys** using a 5-point Likert scale to measure changes in students' interest, attitudes, motivation, and goal-setting. A short **AI knowledge quiz** further gauged students' understanding of core concepts. **Repeated measures ANOVA** provided descriptive data and identified growth trends.

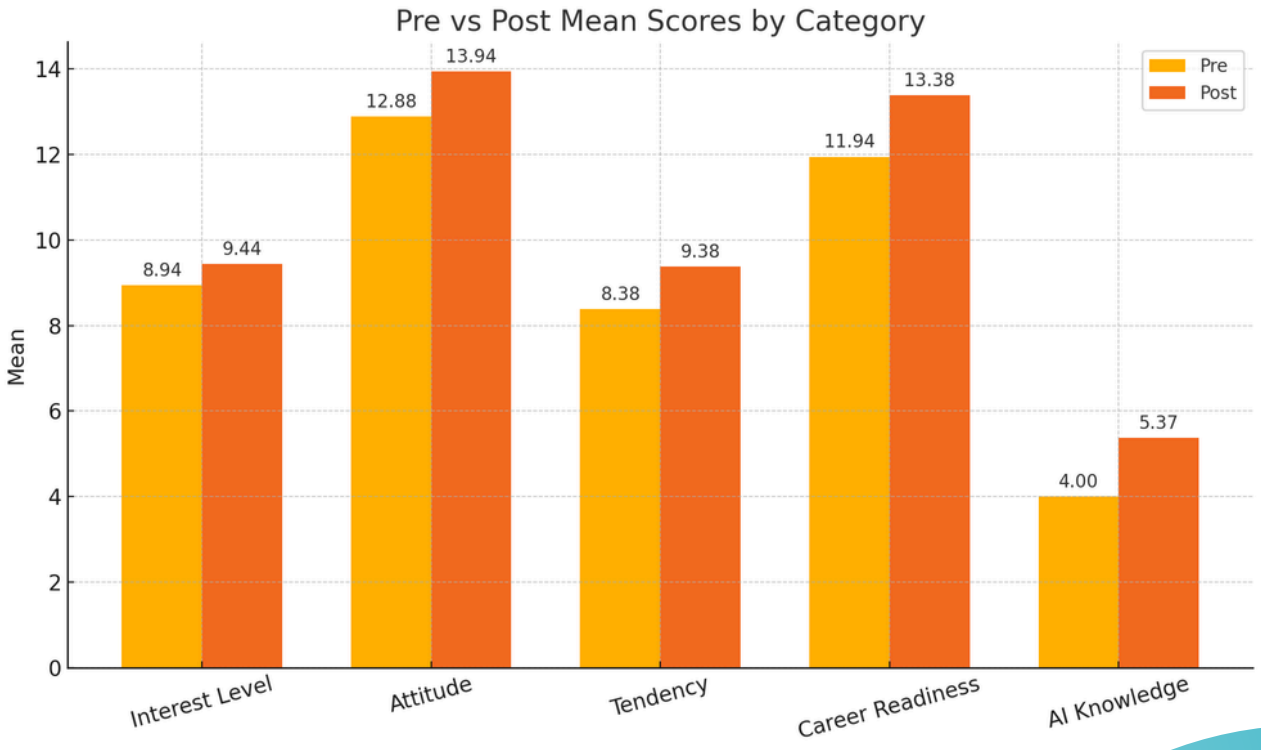
Additional insights in the program design were gathered through **student interviews, open-ended written responses, classroom observations, and instructor feedback**. These tools complemented the numeric data by adding richer descriptions of the exact design elements. Together, the myriad assessment tools paint **a holistic picture of student experience and success factors**.

Measurable Gains in AI Awareness and Engagement

The program's effectiveness was validated through statistically significant increases across key learning metrics. Among the 16 respondents (response rate 88.9%):

- **Attitudes toward AI, knowledge acquisition, career interest, and motivation to continue learning all showed significant growth** ($p < .05$).
- The only non-statistically significant increase was in interest level, attributed to already high pre-program scores (mean = 8.94), indicating **strong initial enthusiasm.**
- Post-program, students expressed **a clearer understanding of AI's real-world relevance**, especially its **ethical dimensions and applications in problem-solving**.

These results suggest the preliminary success of a youth-led, project-based AI education model, underscoring its scalable and transferable potentials.



"I want to solve the problem of wasting paper in schools," shared JR (G7), demonstrating solution-oriented thinking.

Evolving Perspectives, Empowered Learners

In-depth qualitative analysis via interviews, student reflections, and observer notes revealed transformative learning outcomes across three thematic areas:

1. Evolving AI Narratives: From Tools to Systems

Prior to the workshop, most students associated AI with popular tools like ChatGPT and viewed it as a helpful assistant.

"AI is a short term for Artificial Intelligence. Some examples are ChatGPT and Gemini." – JG (G6)

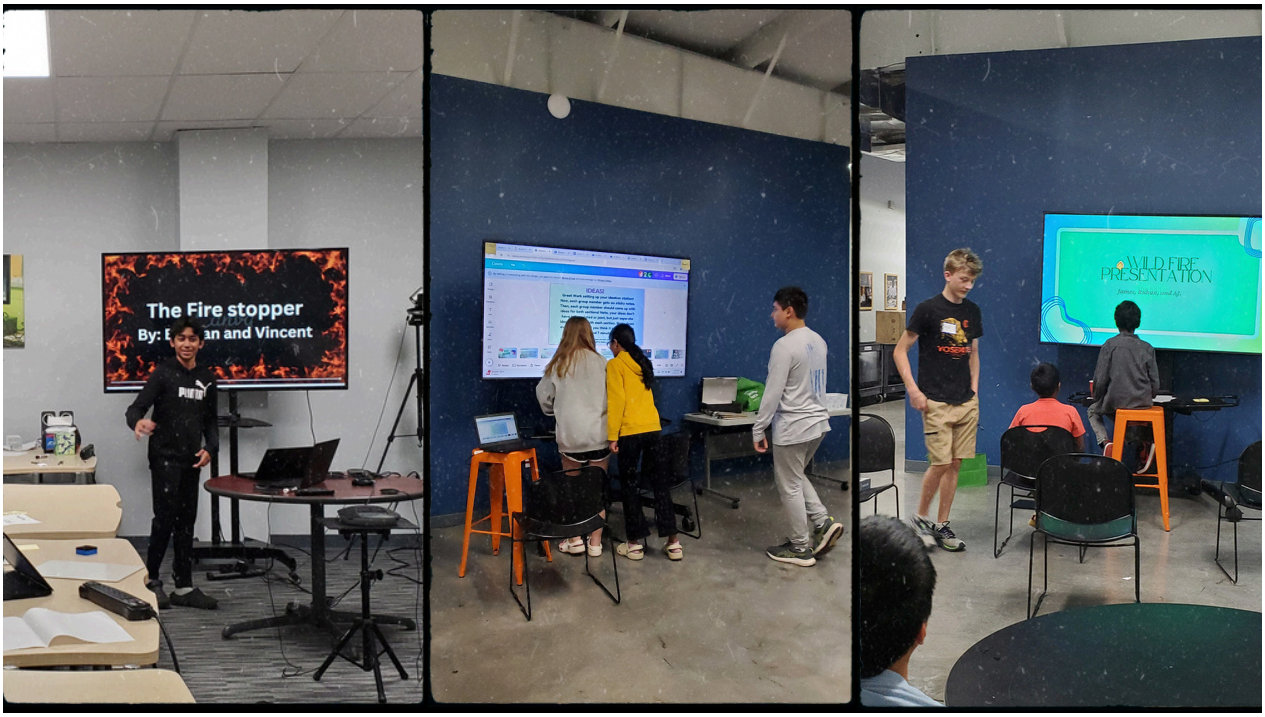
However, by the end of the course, students began to describe AI as **adaptive systems capable of learning, reasoning, and improving**.

"AI is something that can learn off of every piece of information it is given to the best of its ability." – JH (G7)

VT (G8): "[AI is] an artificial form of intelligence that can solve problems, reason, perceive, and learn."

Students also developed **a more nuanced ethical lens**, recognizing both opportunities and risks, such as misinformation and job displacement:

"AI can improve human life... but it can also get rid of jobs." – SK (G7)



2. Multimodal Learning: Hands-On, Fun, and Student-Driven

The workshop's **playful, multimodal design** included collaborative games, hands-on projects, and presentations. **Learner agency through immersive scenarios** was a highlight for students.

"Wildfires... [I was able to] apply what I learned and interact with others." – RV (G7)

"I really enjoyed making our own product. It was really fun and something I would love to do again." – KB (G6)

Students appreciated **the balance of creative freedom, teamwork, and real-world relevance.** Activities like the Wildfires AI project were especially impactful, linking technical knowledge with environmental awareness.

"[The activity I liked the most was] presenting on a real-world problem like a wildfire and how we made our own app which can help out other people too!." – TP (G5)

Challenges such as time constraints and dense worksheets were noted but managed effectively through **responsive teaching and student engagement strategies**.

3. Family Support & Youth Role Model

Pre-existing interests in STEM subjects, family encouragement, and peer influence were key motivators for participation. Several students joined the program through **parental encouragement**, while others were drawn by their own curiosity or prior exposure to coding.

The presence of Rishi, a youth instructor, also fostered **a more relatable and welcoming learning environment**, reinforcing the unique strength of peer-led education. Students expressed their sincere appreciation to Rishi's instruction styles and leadership. Dr. Jeffery Shuster, who volunteered at Kramden Institute, expressed his highest praise to Rishi as **a role model in leading AI education by and for youth**.

> **All of the activities went very well.**
>
> I was impressed with the hands-on nature of the activities. As with any activities, the students had different learning styles and I noted that the instructor addressed them with individual teaching methods. Rishi focused on each activity by giving a good background of the activity, how it addressed a topic in AI, and how the activity was related to learning something about each topic...
>
> **The teaching style was excellent.**
>
> Rishi engaged with the students from the beginning of the day and continued to interact and coach them throughout the day. Rishi showed an excellent manner in interacting with the students on an individual basis...
>
> **It was a pleasure to see him excel in all of his roles as instructor throughout the day.**

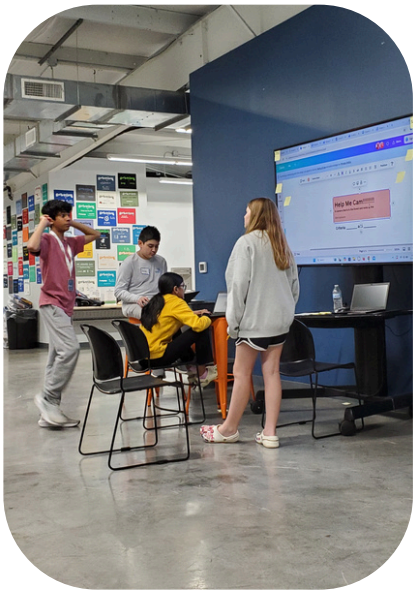
– Dr. Jeffery Shuster (Kramden Institute)

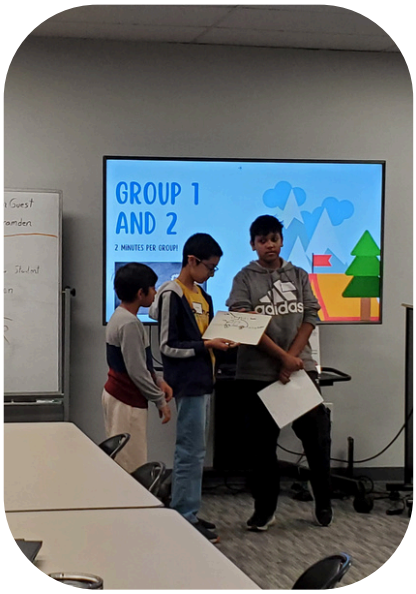
Key to Success

1. Measurable Impact on AI Knowledge and Job Interest
Students showed significant gains in their understanding of AI, their willingness to learn more, and their interest in AI-related careers. The program's design connected AI learning to real-world applications, reinforcing relevance and motivating students to envision AI as a tool for personal and societal betterment.

2. Pedagogical Soundness: PBL, Playful Learning, and UDL Integration
A blend of PBL, gamification, and UDL catered to diverse learner needs. Instruction incorporated multimedia resources, hands-on challenges, and student-selected formats for deliverables. This multimodal strategy enabled deep engagement and made complex AI topics accessible and exciting.

3. Community-Based, Non-Formal Learning Context
Anchoring the program in a local, extracurricular context, *Charting the Course* reached learners who might lack access to formal AI or STEM programs. This non-traditional setting promoted inclusivity and nurtured early interest that drives forward students' academic journeys.





4. Unplugged and Accessible Learning Tools

The course deliberately adopts low-tech, hands-on activities like worksheets, physical games, and role-playing. These unplugged methods rendered AI approachable and equitable, particularly for students with limited coding background or access to advanced technology.

5. Ethics-by-Design: Building Socially Conscious AI Learners

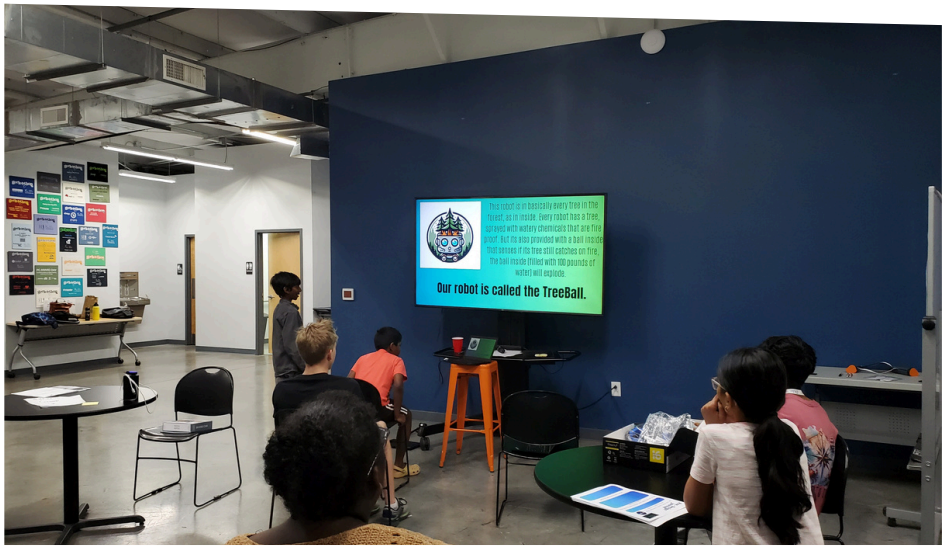
The program embedded ethical considerations in every activity, honing students' ability to critically evaluate AI's societal implications. Through role-play scenarios and guided discussions, students learned to scrutinize biases, beware of misinformation, and channel AI usage for collective good. Ethical consciousness is key for nurturing responsible future innovators.

6. Cultivation of Learner Agency and Creativity

Students received ample freedom to explore, invent, and personalize their projects. Activities like Campsite Cruisers featured collaboration, creative problem-solving, and iterative design. This open framework promoted ownership of learning and empowered students to think beyond conventional AI applications.

7. Youth-Led Instruction and Peer Mentorship

A standout feature was the involvement of a high school student as program leader and instructor. This peer-led approach boosted student engagement, established relatability, and modeled leadership. Peer mentorship fostered a supportive learning environment where students felt seen, heard, and inspired.

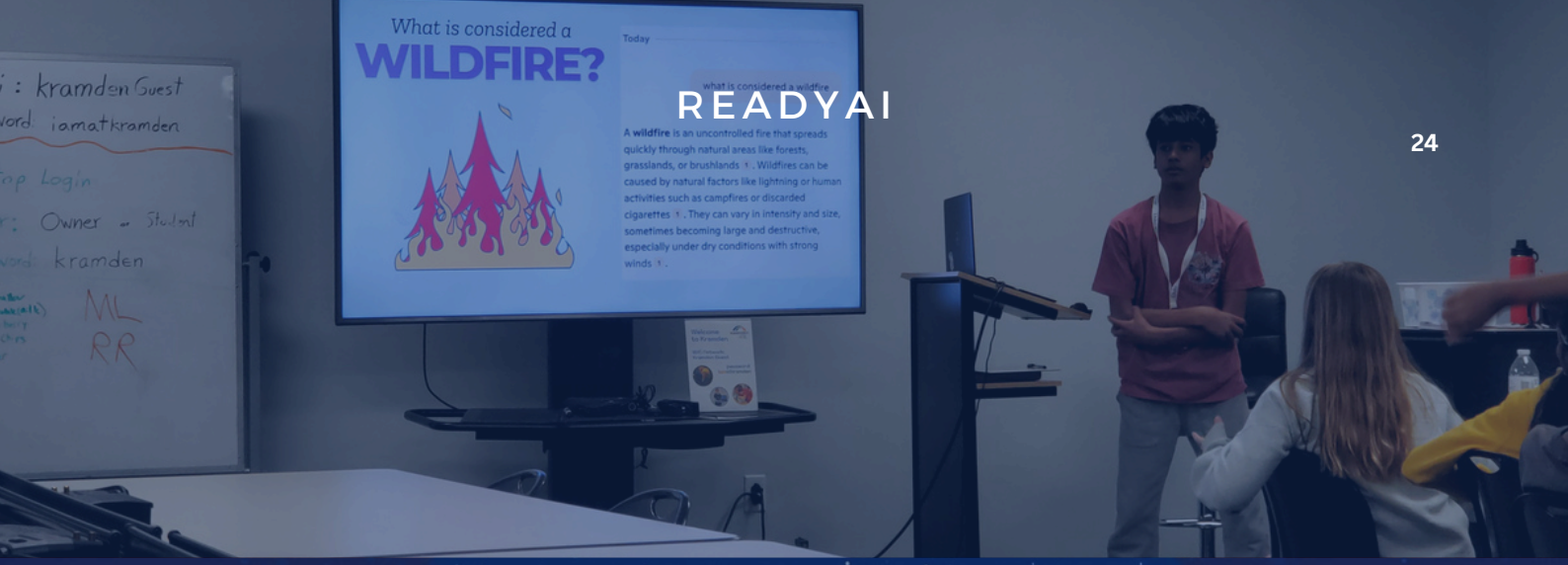


To sum up, *Charting the Course* has demonstrated strong early indicators of success. The program achieved:

- **Statistically significant increases** in knowledge, motivation, and attitudes toward AI
- **A shift in student narratives** from simplistic tools to complex systems with ethical implications
- **Positive emotional engagement** through playful and multimodal learning experiences
- **Emerging student agency and interest** in applying AI for social good

Concluding Remarks

Charting the Course demonstrates **the synergy across multimodal design, ethical grounding, and youth leadership**, ultimately leading to impactful AI education initiatives. The program is a compelling model for stakeholders at all levels seeking to democratize AI literacy, cultivate future talent, and prepare young people to lead in a tech-driven world. **Towards a future driven by ethics, empathy, and innovativeness, Charting the Course has blazed the trail of decoding AI education for youth, removing barriers and sparking curiosity.**



The Course Charters today will evolve into the Changemakers of tomorrow.

Call to Action

***Charting the Course* will reach beyond a one-off program; it will continue passing on the torch of purpose-driven, inclusive, and empowering AI initiatives for youth.** This initiative has proven that with thoughtful design, culturally responsive methods, and ethics at the core, students as young as 10 can decode complex AI ideas and begin to explore their unique immersions in technology and innovation. **Therefore, we hope to expand the impact of the program to garner momentum across various community stakeholders:**

For educators, you may start brainstorming integrations of project-based, unplugged AI activities into your classrooms. You can make space for all AI enthusiasts without the need for advanced tech or coding skills. Open up for reflections and ethical dialogue, so students can grapple with the duality of this emerging technology.

For school leaders and policymakers, it is worth investing in teacher training, curriculum development, and partnerships that promote K-12 AI and digital literacy. Non-formal, low-barrier models like this one demonstrate how we can broaden participation, especially among students in underrepresented or under-resourced communities.

For parents and guardians, your support is vital. Encourage your children to explore AI concepts through play, storytelling, and hands-on discovery. In doing so, you are cultivating the next generation of engineers, artists, community builders, and curious minds of all kinds.

For young AI enthusiasts, the journey is just beginning. Surround yourself with supportive peers and role models. Whether you're interested in solving local problems or designing the next big innovation, you now have the tools to think critically, create responsibly, and lead with purpose.

Showcase Your AI Projects @ WAICY

A powerful next step is to participate in **the World Artificial Intelligence Competition for Youth (WAICY)**. WAICY empowers students globally to tackle real-world issues through AI-driven projects. It's an open invitation to apply what you've learned, collaborate with peers, and showcase your ideas on a global stage.

👉 **Explore WAICY Opportunities**

Together, let's democratize AI education, amplify youth leadership, and ensure every learner can chart their course toward a future they help design.

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Contact Us

www.readyai.org

(+1) 412-676-7065

info@readyai.org