

AI Learning Partners

A Library-Based Mesh Network Initiative

Pilot Program Cost: \$110,000 | 3 Omaha Library Branches | 6-Month Proof of Concept

Executive Summary

Every year, students in under-resourced schools fall further behind their wealthier peers. This is not a mystery. It is a resource gap with measurable consequences -- lost earning potential, reduced workforce participation, communities that never get to contribute what they could.

AI tutoring tools have begun closing that gap for students who can afford them. Personalized instruction, available any hour, in any subject, at any pace. What was once available only through private tutors is now available to anyone with a paid subscription and a reliable internet connection. That last condition is doing a lot of work.

This proposal outlines a pilot program to change that equation across three Omaha Public Library branches, using hardware that runs local AI models on a mesh network, without subscription fees, without cloud dependency, and without student data ever leaving the building. The program serves young people ages 10-18 who currently have no access to these tools.

The pilot costs an estimated \$110,000 for six months across three sites, serving approximately 75 students -- 25 per branch -- at roughly \$244 per student per month. At scale -- 2,500 libraries in Year 5 -- projected cost drops to \$30-50 per student annually.

The Problem

The Gap Is Not New. The Acceleration Is.

American public education has never delivered equal outcomes. Roughly 37 million American children live in households below 200% of the federal poverty line. A student in an under-resourced school faces a 30:1 classroom ratio, limited tutoring access, and goes home to a household where parents are working too many jobs to sit down for homework help. That student is not less capable. They are less resourced.

Nobel laureate economist James Heckman's research consistently shows returns of \$7 to \$12 for every dollar invested in early educational intervention. University of Chicago research found that students receiving high-dosage tutoring experienced gains equivalent to two thirds of an additional year of learning.

In February 2026, OpenAI introduced advertising into the free tier of ChatGPT. For families who cannot pay for subscriptions, AI learning tools now come with commercial interruptions. The free tier is no

longer neutral access. It is monetized attention extracted from the people least positioned to pay any other way.

The Raspberry Pi 5, the backbone of low-cost local computing, has seen price increases exceeding 75% since mid-2025. The industry building AI for the wealthy is directly raising the cost of building AI for everyone else. This is not a coincidence. It is a resource dynamic with a direction.

The Solution

Infrastructure, Not Intervention.

The model is straightforward. Raspberry Pi single-board computers run open-source AI models locally, inside public libraries, connected to student devices through a mesh network that does not touch the internet during use. No subscription. No account. No data leaving the building.

Why Local. Why Mesh.

The cloud model has a structural problem: it requires ongoing corporate permission. A subscription can be canceled. A free tier can be monetized. A locally-run model removes that dependency. The AI runs on hardware the library owns. The software is open source and publicly auditable. The network is controlled by a Community Advisory Board with binding authority.

Hardware Foundation

The core of each library installation is a Raspberry Pi 5 (8GB) running Ollama. Two units per library provide redundancy. Students access the system through library-provided tablets or their own devices over a local WiFi mesh network. Solar charging systems provide energy independence. The 8GB model now runs approximately \$168, up from \$95 eighteen months ago -- driven directly by AI infrastructure demand consuming LPDDR4 memory manufacturing capacity.

Software Stack

Ollama running optimized 3B-8B parameter models handles tutoring tasks effectively at this scale. The pilot focuses on three subject areas: mathematics, science, and reading and writing. Phi-4 Mini and Llama 3.1 8B are the primary candidates, both prioritizing multilingual capability -- Spanish, Mandarin, Vietnamese, Arabic, Tagalog, and others.

The tutoring approach is Socratic by default. The model asks before it tells. For mathematics and quantitative science, the system prompt requires the model to show every step, flag uncertainty explicitly, and recommend verification rather than assert correctness.

Session Design

Each session begins with two selections: grade band (Elementary / Middle / High School) and subject area. Sessions are ephemeral by design -- no conversation content is retained after the session ends. What gets logged is metadata only: timestamp, duration, grade band selected, subject selected, device ID.

Pilot Program Structure

Six months. Three libraries. One proof of concept.

Phase 1: Build (Months 1-2)

Site selection, hardware procurement, and network configuration. Staff training at all three locations. Community Advisory Board established, trained, and conducts its first quarterly internet connectivity review.

Phase 2: Soft Launch (Months 3-4)

Limited access -- 2-3 hours daily, supervised by library staff. Pre-assessments administered at student enrollment. Feedback collected continuously.

Phase 3: Full Launch and Evaluation (Months 5-6)

Full library hours. Integration with existing homework help programs. Pre and post assessments in all three subject areas across three grade bands. Implementation guide compiled for replication.

Budget

Item	Cost	Notes
Technical Lead (0.5 FTE)	\$30,000	Systems generalist, Linux/networking/AI
Backup Contractor (on-call)	\$3,000	Emergency technical support
Program Director (0.5 FTE)	\$31,471	Program direction, community outreach
Staff Training	\$5,000	2-day sessions at 3 locations
Board Member Stipends	\$5,500	Up to \$500/year x 11 members
Meeting Operations	\$2,400	Childcare, translation, space
Raspberry Pi 5 8GB (6 units)	\$1,008	~\$168 each, current market rate
Solar charging systems (3)	\$1,650	~\$550 each
Tablets for lending (12)	\$1,200	~\$100 each
Networking equipment	\$1,200	Mesh hardware, cables, mounting
Storage and security	\$600	Weatherproof cases, cable locks
Internet connectivity	\$900	\$50/month x 6 months x 3 libraries
Launch events and materials	\$2,000	Community events, parent resources
Evaluation and assessment	\$3,000	Pre/post testing, data collection
Travel and meetings	\$1,500	Site visits, coordination
Contingency (~10%)	\$8,896	Hardware replacement, unforeseen issues
Administration overhead (~12%)	\$10,675	Coordination, reporting, compliance
TOTAL	\$110,000	

Cost per student: Approximately \$244/student/month during the pilot. At scale in Year 5, projected cost drops to \$30-50 per student annually.

Scaling Pathway

Year	Scope	Estimated Cost
Year 1	Pilot (3 libraries)	\$110,000
Year 2	Regional Expansion (25 libraries)	\$350,000
Year 3	National Network (250 libraries)	\$2.5 million
Year 5	2,500+ libraries	\$30-50/student annually

Expected Outcomes

At the end of six months the program will have served approximately 75 students across three Omaha communities, generated real usage data in three subject areas, and produced a fully documented implementation guide for replication.

- Measurable improvement in homework completion rates
- Subject-specific assessment gains across three grade bands
- Digital literacy development
- Strengthened library role as community infrastructure
- Open-source replication guide for any library system

This document is part of the AI Learning Partners toolkit, developed by Charlotte Fulmer-Fife / Anna R. Key Publishing.

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