



NAME _____

DATE _____

CLASS _____

NATIVE AMERICAN HERITAGE MONTH

Danielle Boyer

Designing Technology With and For a Community

Robots, Access, and Language Revitalization

Danielle Boyer is Ojibwe, a member of the Sault Ste. Marie Tribe of Chippewa Indians. She began teaching science to younger children at age 10. As a teenager she saw her younger sister shut out of a robotics team that cost hundreds of dollars to join — a small example of a larger pattern in which cost, distance, and representation keep many Native students out of STEM. In 2019, at 18, she founded **The STEAM Connection**, a nonprofit that designs low-cost robots and sends kits to students for free.

Boyer treats cost as a design constraint, not an afterthought. Her EKGAR ("Every Kid Gets A Robot") is built for under \$20 in parts, compared with hundreds of dollars for many commercial kits. Her robots are **3D-printed** from recycled plastic, which lowers cost and lets communities reprint and repair parts rather than replacing them.

Her best-known invention is the **SkoBot**, a wearable shoulder robot built to support the **revitalization** of endangered Indigenous languages, many of which have few fluent speakers left. The SkoBot uses speech recognition — a narrow form of artificial intelligence that Boyer built and trained herself. On hearing a voice cue it recognizes, it plays a recording of a fluent speaker saying a word or phrase. The design choice is deliberate: the robot never generates language on its own, so the words students hear always come from people in the community.

Reporting on the project has put the cost of an early SkoBot at around \$100 per unit, with a goal of bringing that down much further. Boyer teaches Native students to assemble and program SkoBots themselves, an approach sometimes described as designing **with** a community rather than **for** it. Her work has been covered by NPR, ABC News, and the Lemelson Foundation.

Part 1 • Comprehension & Analysis

1. The passage says Boyer treats cost as a "design constraint." Explain what that means, using one specific example.

2. Why did Boyer choose to have the SkoBot play recordings rather than generate speech? Give two reasons that follow from the passage.

3. What is the difference between designing technology "for" a community and designing it "with" a community?

4. Speech recognition trained on only a few cue words is "narrow" AI. Describe one trade-off this creates compared with a general-purpose voice assistant.

Part 2 • Quantitative Challenge

Scaling a Free Robotics Program

Suppose a nonprofit has a \$12,000 grant to send free robotics kits to students. Each low-cost kit costs \$18 in parts plus \$6 for shipping. Each wearable language robot costs \$100 per unit today, with a goal of \$30. Show your work.

- 1 How many low-cost kits can the grant cover, including shipping?

- 2 How many \$100 language robots could the same grant buy (ignore shipping)? What if the unit cost falls to \$30?

- 3 By what percentage does lowering the unit cost from \$100 to \$30 reduce the cost of each robot?

- 4 The nonprofit spends half the grant on low-cost kits and half on language robots at \$30. How many students get each, and how many in total?

Part 3 • Discussion & Extension

Endangered-language recordings belong to the communities and speakers who made them. If a school or tech company wanted to use those recordings to build a product, who should decide how the recordings are used, and what should the community get in return?

