

Cultivating Student Leadership through Real-World STEAM Solutions in Qazaqstan

Global STEAM & Leadership Challenges – Case Study



“Transformation happens the moment students step up, apply STEAM to real-world challenges, and prove that their leadership creates real impact.”

—[Ramazanova Zhuldyz](#), Program Manager, [Teach For Qazaqstan](#)

Context & Community: Inside the Mining Towns

The towns of Aksu, Khromtau, and Rudnyi bear the enduring marks of industrial Kazakhstan—hardworking, mono-industrial communities built tightly around mining and metal production. For generations, life here has followed the rhythmic patterns of heavy industry. In these local schools, classrooms traditionally mirrored the factories outside: highly structured, quiet, and dependent on rote memorization from rigid textbook boundaries. In recent years, Eurasian Resources Group (ERG) invested heavily in modernizing school infrastructure: new buildings, renovated classrooms, and advanced technical equipment. In Rudnyi, a completely new school rose from the ground, while in Khromtau and Aksu, existing schools were completely rebuilt and equipped with state-of-the-art facilities.

After the ribbon-cutting ceremonies faded, a quieter crisis emerged. The advanced equipment sat entirely unused. Science labs remained locked. Teachers, trained exclusively in traditional lectures, lacked the pedagogical confidence to integrate robotics kits, digital tools, or 3D printers into their daily lessons. Students walked past modern workstations but continued learning exactly as before—from textbooks, by rote, and for exams.

Career guidance, where it existed, was abstract and ignored the massive industrial operations surrounding their towns. The data told a sobering story: less than 30% of newly installed STEM equipment was being used regularly, and student interest in science and math was actively declining. The communities had dramatically upgraded their physical capital, but their human capacity was trapped in inertia.

The Solution Design: Turning Classrooms into Co-Design Hubs

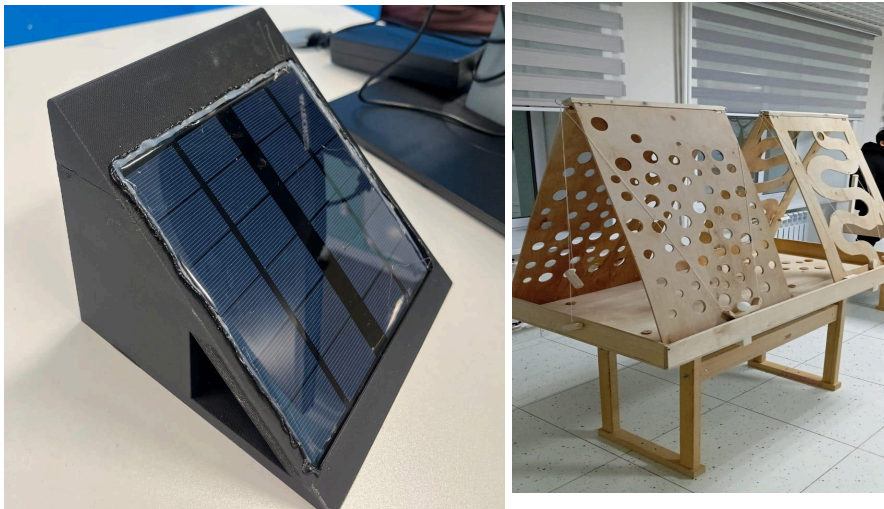
Recognizing that traditional school frameworks alone could not arrest the decline in student STEAM capacity, [Teach For Qazaqstan](#) introduced a fundamental shift in perspective: *What if the real lever for student growth wasn't rigid curriculum compliance, but who stands in front of the classroom?* To address this, Teach For Qazaqstan formed a specialized, one-year operational partnership with the Eurasian Resources Group—the ERG Mektep project. Nine highly qualified educators, including Teach For Qazaqstan alumni, were deployed directly into the heart of industrial communities to serve as the vital catalysts for student leadership. Rather than enforcing a top-down, rigid curriculum, these teachers began their first month by hosting community student focus groups. Together with the students, they unlocked the labs, audited the equipment, and asked a simple, student-centered question: "What do you want to build?" Through these co-design sessions, the students explicitly requested spaces that blended technical engineering with creative self-expression, providing the blueprint for what would become localized Smart Labs and regional STEAM challenges.

Implementation: Breaking Skepticism through Action

The primary barrier to this new approach was psychological. Local parents and tenured educators were deeply skeptical of student-centered methods, operating under the deeply ingrained belief that a quiet classroom was the only true indicator of good learning. The teachers systematically broke down this skepticism by introducing Inquiry-Based Learning (IBL) projects that pulled students out of their notebooks and into real-world applications.

- In Rudnyi, Zhandos Aidarkhanov launched the Smart Lab studio, moving students from rote testing to advanced 3D modeling and robotics. Concurrently, Ulbolsyn Sarsenbai created Oqushy Dauysy ("Student Voice"), a monthly podcast project. Instead of passively reading literature, students produced 12 professional episodes interviewing local elders and debating ethical dilemmas. Additionally, Sabina Davletbayeva formed an intensive IELTS Hub to break rural isolation, helping students from non-English speaking households achieve elite scores of 7.0 and 7.5.
- In Aksu, Nurzhygit Kurbonov integrated biology with film production, while Diana Semyonova brought physics and chemistry abstract theories to life through an interactive Engineering Club. Students constructed functional solar ovens from localized materials. They mathematically tracked thermodynamic variables, utilizing digital probes to record how real-time alterations in surface area directly accelerated or decelerated thermal absorption rates, turning abstract chemistry and physics theories into physical data.

The cultural transformation quickly rippled into local homes. In Rudnyi, a working-class factory worker visited the lab after hours. His daughter had utilized the 3D printer to engineer a customized replacement tool for his garage. Standing beside her workstation, he quietly asked his daughter, "*Teach me.*" This simple interaction restored parental dignity while building an organic, emotional bridge between the town's industrial identity and the classroom.



Outcomes & Ecosystem Leadership

The pivot toward cultivating student leadership yielded profound transformations across three distinct dimensions:

- Student Leadership as a Regional Asset:** Students stopped viewing themselves as passive observers of a distant industrial economy. Nurzhygit Kurbonov's filmmaking students didn't just learn to tell stories—they proved their skills on an international stage. At the prestigious [Informatrix](#) global competition, his team won a silver medal, competing against students from dozens of countries. But the recognition didn't stop there. The same students also earned full scholarships to [Margulanov University](#), one of Kazakhstan's leading pedagogical universities, awarded based on their performance at the competition. Students who once doubted their place in the world are now university-bound, with international experience and recognition behind them.
- Dissolving Classroom Walls through Stakeholder Collaboration:** The project successfully bridged the gap between families, schools, and local industry. ERG industrial engineers began visiting classrooms not as distant authorities, but as active judges for student capstone projects, transforming static career guidance into a living community mentorship network. To align administration with this shift, 15 school leaders were sent to Singapore to master the "8 Es of Leadership," shifting school management from strict oversight to active system-building.

Future Plans for Systemic Sustainability

Over the coming terms, the Teach For Qazaqstan educators will transition into a "Train-the-Trainer" co-teaching framework alongside local tenured teachers. This approach will systematically embed Inquiry-Based Learning directly into the state-mandated curriculum. Furthermore, structural pathways are being formalized with regional plant leadership to guarantee annual student internships, ensuring the path from student-led labs to industrial engineering remains open for generations.

For more information about the Future of Work initiative, visit the official [website](#).
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² This case study documents a specific learning initiative within the ERG Mektep project—a specialized, one-year operational program run by Teach For Qazaqstan in partnership with the Eurasian Resources Group. This targeted corporate-social partnership ran parallel to, yet separate from, Teach For Qazaqstan's standard two-year fellowship program.