Future of Work Initiative

Cultivating Opportunity Through STEAM in Nepal's Mountains

Global STEAM & Leadership Challenges – Case Study

> *"Through UBSAR, we've discovered that when students connect STEAM learning to their own community challenges, education transforms from an abstract requirement to a powerful tool for change. By empowering young minds to solve local problems, we plant seeds of innovation that continue growing long after our project ends."*

—**Alina Shrestha**[1], STEAM educator and Teach For Nepal alumna

A Vision Born in the Highlands

I am Alina Shrestha, a dedicated educator and Teach For Nepal alumna. Nestled in the breathtaking yet challenging terrain of the Panchpokhari Thangpal rural municipality in Upper Melamchi, I witnessed firsthand the profound educational gaps affecting mountain communities. In these remote villages, our students faced multiple barriers beyond just academic challenges—inadequate nutrition, insufficient clothing, and health issues were daily realities that competed with their learning. Yet, amid these struggles, I saw incredible potential waiting to be unleashed.

What struck me most during my early days in the community wasn't just material scarcity, but a deeper poverty of aspiration. Most students showed little interest in their studies, rarely communicating their challenges to teachers or parents. After a year of careful observation, we realized the root causes: limited exposure to broader academic possibilities and a critical absence of educated role models from their own communities. Their singular ambition—to become wealthy, regardless of means—reflected not a lack of dreams, but rather dreams confined by what they believed possible.

Creating Opportunity Through Collaboration

The primary issue identified was the absence of qualified Physics and Chemistry teachers, which had left students struggling with fundamental concepts in these subjects. Without proper instruction, students found it nearly impossible to grasp more complex ideas and theories. This deficiency led to widespread boredom and a lack of participation in science classes. Further research revealed that this was not an isolated issue but a systemic problem affecting many schools in the area. In some schools, there was only

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one science teacher available, making it difficult to provide adequate support and instruction. As a result, less than 25% of students were enrolled in science classes, discouraged by the lack of proper teaching and support. This situation was not only impacting their current education but also limiting their future opportunities in science-related fields.

Designing a New Educational Approach

The situation in Panchpokhari revealed a fundamental disconnect between traditional education and students' lived realities. In a region where immediate economic pressures often outweighed long-term educational benefits, we needed an approach that could demonstrate education's tangible value to both students and their communities.

STEM education was relatively new in Nepal at the time, and the integration of arts to create STEAM education was even less common. We saw this as an opportunity to introduce cutting-edge educational practices tailored to our unique mountain context. Our strategy centered on four periodic skill-based workshops that introduced students to:

1. STEAM education fundamentals
2. Design thinking and prototype development
3. Problem identification and solution frameworks
4. Place-based learning that connected global concepts to local contexts

What made our approach particularly innovative was its peer-to-peer component. The five students from each school were tasked with transferring their knowledge to an additional 20 students at their respective schools, creating a multiplier effect that extended our reach to over 100 students across the region.

Transforming Communities Through Student Innovation

The results of this approach were nothing short of transformative. As students engaged with real community challenges, we witnessed a remarkable evolution in their thinking and capabilities. Previously disengaged students became self-directed learners who approached problems with resilience and creativity. They developed critical asset-based thinking, becoming confident individuals capable of managing stress and complex situations. Most importantly, they began to see themselves as connected citizens and active contributors to their communities' futures.

One standout example among the 40+ community projects was the Drip Irrigation Project. Students from my school conducted extensive community interviews to identify pressing local challenges. Among issues like pollution, water scarcity, child marriage, and lack of human resources, they discovered that underutilized fertile land and water scarcity were consistently cited as major concerns.

Through research and collaboration, the students designed an innovative drip irrigation system using recycled water—simultaneously addressing water conservation and agricultural productivity. This solution not only promised to increase vegetable variety in the community but also potentially reduce child malnutrition through improved diet diversity.

This project sparked further innovation, with another UBSAR team developing a multipurpose tractor design that could simultaneously prepare soil, plant seeds, and irrigate—a single machine performing work equivalent to 100 laborers. These innovations reflected students' growing ability to tackle complex, interconnected challenges through creative STEAM applications.

From Mountain Villages to National Recognition

The culmination of our project exceeded even our ambitious expectations. Our students' innovations were selected to compete in the Bhabisye STEAM Challenge 2019, a prestigious national competition

featuring over 125 schools, including well-resourced private institutions. Despite their limited resources and remote backgrounds, our students earned a special title award for their remarkable innovations.

For most of these students, the journey to Kathmandu to present their projects marked their first visit to Nepal's capital city. Standing before an audience of over 1,000 visitors, they confidently presented their journey from problem identification to functional prototype development. The experience was transformative—not just in terms of recognition, but in expanding their sense of possibility. Witnessing urban development firsthand during their three-day visit sparked new dreams and ambitions previously unimaginable.

Key Lessons That Will Shape Our Future Work

Our journey with UBSAR revealed several powerful insights that continue to guide our approach to STEAM education in rural communities:

- **Community-Centered Learning Drives Engagement**: When students tackle problems directly affecting their families and neighbors, their motivation and persistence increase dramatically.
- **Skills Transfer Creates Sustainability**: Our model of having selected students train peers created a knowledge cascade that continued beyond the project's formal conclusion.
- **Exposure to Broader Possibilities Expands Aspirations**: The competition experience in Kathmandu didn't just validate students' work—it fundamentally expanded their understanding of what futures were possible.
- **Interdisciplinary STEAM Approaches Solve Complex Problems**: The integration of science, technology, engineering, arts, and mathematics enabled solutions that addressed multifaceted community challenges.

Project UBSAR demonstrated that rural students when given the right tools and frameworks, can become powerful agents of change in their communities. By connecting STEAM education to local challenges, we transformed not just learning outcomes but community perceptions about education's value.

As we look to the future, we aim to expand this model to more schools across Nepal's mountain regions, creating a movement where education serves as both a pathway to individual opportunity and a catalyst for community transformation. The seeds planted through UBSAR continue to grow, as students apply their newfound skills and confidence to tackle emerging challenges in their evolving communities.

For **more information** about the **Future of Work initiative** visit the official website.
Join in the **Global STEAM Community** through this link.