**Technology for Education Projects at The Citizens Foundation**

**Introduction**

With more than 1,800 schools serving 280,000 students across Pakistan, The Economist has called TCF “[perhaps the largest network of independently run schools in the world](https://www.economist.com/briefing/2018/01/04/pakistan-is-home-to-the-most-frenetic-education-reforms-in-the-world).” TCF builds and operates schools in Pakistan’s most underserved urban slums and rural areas where access to quality education is limited or non-existent. TCF schools are not ‘poor schools for poor children". They are modern, purpose-built schools complete with playgrounds, libraries, and science labs.

TCF’s vision is to create agents of positive change: well-rounded, motivated, and capable individuals who will not only be able to steer themselves and their families out of poverty but also seek to improve the future of their communities and society at large.

**Problem and Context:**

The Citizens Foundation (TCF) recognizes the significant impact of technology on education and its potential to enhance various educational processes. Through their experience in leveraging technology for education, TCF has reaffirmed its belief in the strategic importance of exploring technological avenues for improving education. In particular, TCF aims to address three key areas:

1. Teacher training in content and pedagogy,
2. Teaching and learning in classrooms
3. Data collection and utilization for decision-making and performance management.

One of the most significant challenges in this endeavor is ensuring that the technology can operate effectively in areas with low bandwidth. TCF recognizes that many schools in underserved regions might have limited access to high-speed internet. Consequently, the desired solution must be adaptable and capable of delivering content seamlessly even in scenarios where bandwidth is constrained. In a world where internet accessibility is often an issue, TCF believes that no student or teacher should be left behind due to slow or unreliable connectivity.

TCF is committed to finding holistic solutions. It's not merely about providing online access but also ensuring that access can be sustained even when the internet is not available. This means delving into the realm of local network hardware within schools. TCF aims to identify cost-effective and easily deployable hardware solutions that can be integrated into schools' infrastructure. These solutions should facilitate not only online access to content but also the capability to store educational resources locally, enabling offline access for students and teachers. In doing so, TCF ensures that even in areas where connectivity may be sporadic, the learning process remains uninterrupted.

**Project Details**

Network disruptions, though unfortunate, are an occasional reality in many parts of the world. Recognizing this, TCF seeks technology solutions that are not only bandwidth-efficient but also resilient in the face of network disruptions. Whether it's due to weather-related issues, infrastructure challenges, or other factors, TCF envisions a learning environment that remains uninterrupted, ensuring that students can access their resources consistently. This resiliency is a testament to TCF's unwavering commitment to the cause of education. To achieve their goals, TCF is actively seeking to implement technology solutions in the field of education. In summary, TCF is seeking support for the following 3 interventions which will be imperative for ensuring the resilience of its educational ecosystem:

1. **Connectivity to schools for Digital Content & Teacher Training:**

TCF aims to provide schools with connectivity, enabling online access to learning management systems for both students and teachers. The desired solution should be able to function with low bandwidth and tolerate low levels of network disruptions. TCF is open to both wired and wireless options and is also interested in identifying cost-effective and easily deployable local network hardware within schools to facilitate online and offline access to content.

1. **Connectivity to schools for Live Online Teaching:**

TCF is seeking cost-effective solutions to establish connections with 20-30 remote locations for live online teaching. These solutions should operate effectively even with low bandwidth (1-2Mbps) and should have high availability, with minimal tolerance for network disruptions. TCF is interested in suitable wired and wireless services that offer quality of service assurances.

TCF is specifically interested in partnering with organizations that can help expand connectivity to schools located in underserved areas with limited or unreliable internet infrastructure.

1. **Unmetered Access to TCF Learning Management Systems (LMS):**

TCF recognizes the importance of providing unmetered access to specific domains, such as TCF's own learning management system (LMS), for students and teachers. This would ensure unrestricted access to educational content from anywhere, without data limit restrictions.

**Challenges in Implementation**

TCF’s endeavor to enhance education through technology began with a pilot project in January 2023, focusing on the remote regions of Tharparkar, Kathore, and Ketty Bander. The goal was clear: to provide live teaching and real-time access to educational content and teacher training. However, the path to achieving this vision was not without its challenges.

Tharparkar, with its limited connectivity, posed a unique set of challenges. Recognizing this, TCF opted to leverage the Thar 3G/4G network to bring online teaching to three schools in Tharparkar. The reach extended to two schools in Ketty Bander, while five schools were equipped with satellite connectivity. Although the project worked remarkably well in four locations within Tharparkar, extending the network proved to be a formidable task.

The partnership with leading telecom sector firms was pivotal in expanding reach. TCF’s telecom sector partner, through its radio network in central Sindh and Mithi, surveyed multiple locations to enable us to connect more schools. However, technical intricacies often stood as roadblocks, making it imperative install satellite towers to bolster connectivity.

TCF’s commitment to education has extended to a plan to connect 10-15 schools within the academic year, specifically targeting students in grades 9 and 10. However, the financial aspects of this expansion have presented significant considerations, with costs for installation mounting up through inflation, these factors require careful financial planning and resource allocation.

Amidst these challenges, TCF recognizes the urgency of online teacher training. To bridge the gap, TCF has deployed trainers who filled in for teachers in Islamabad. These trainers, equipped with expert knowledge, played a crucial role in ensuring uninterrupted education for students in the region. TCF’s commitment to the cause led to a critical realization: the urgent need for digital content and teacher training. TCF recognizes the importance of providing free access to its educational content without data charges. This step was crucial to ensuring that students and teachers in remote areas had seamless access to resources, eliminating any data-related barriers.

Our journey continues, and we remain dedicated to providing quality education to all, irrespective of their geographical location. TCF is driven by the belief that technology can bridge the educational divide, and through persistent efforts and strategic partnerships, we aim to make this belief a reality.

**Next Steps**

TCF's commitment to enhancing education through technology is multi-faceted. From bandwidth considerations to network resilience and a flexible approach to technology solutions, TCF's vision goes beyond mere access. It encompasses a comprehensive strategy to transform education in underserved regions, ensuring that students and teachers have consistent access to the digital tools that can empower them to learn and teach effectively, regardless of the challenges they may face in their environment.

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TCF seeks the assistance of telecommunications companies (Telcos) and other relevant stakeholders to facilitate this access. TCF is also open to exploring the possibility of creating viable data packages tailored for "Education Media."

TCF is fully aware that achieving such an ambitious goal requires collaboration and collective action. TCF is particularly interested in forming strategic partnerships with organizations that share their commitment to expanding connectivity in schools located in underserved areas with limited or unreliable internet infrastructure. Collaborative efforts with these organizations will enable TCF to leverage collective expertise, resources, and innovative solutions to create a network that reaches even the most remote corners, thus making equitable access to high-quality education a reality.

By addressing these technology requirements, TCF aims to enhance education by leveraging technological advancements and ensuring equitable access to quality educational resources and opportunities for students and teachers.

We are looking at 10 locations for AY-2023-24 concentrated mostly in rural Sindh, with some locations expected in Balochistan as well.

**Project Costs**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Setup Costs** | **Average Cost / Location (PKR)** | **Satellite** | **Radio P2P (LOS available)** | **Radio P2P (LOS not available)** |
| In-class hardware | 132,000 | 132,000 | 132,000 | 132,000 |
| Internet Infrastructure setup | 105,600 | 16,500 | 24,200 | 275,000 |
|  |  |  |  |  |
| **Monthly Recurring Costs** |  |  |  |  |
| Teaching | 165,000 | 165,000 | 165,000 | 165,000 |
| Internet Monthly Charges | 25,300 | 41,800 | 16,500 | 16,500 |
| Maintenance Monthly | 3,300 | 1,238 | 1,301 | 6,784 |
|  |  |  |  |  |
| **Program Team Costs (Monthly)** | 30,800 |  |  |  |
| **Total Costs** |  |  |  |  |
| Average Y1 Cost / Location / Year | 2,429,900 |  |  |  |
| Total Y1 Cost for 10 locations | 24,299,000 |  |  |  |