



HOLISTIC
LEARNING
INNOVATIONS

GREENHOUSE MATH

Country: Kyrgyzstan

Target Age: 10–15 Years

Learning Areas: Critical Thinking | Entrepreneurship

| Numeracy | Science | Taking Responsibility |

Respect for the Environment

THE CONTEXT

Sopu Korgon village located in the Alay district at an altitude of 3000 meters above sea level, with a fairly harsh climate, with cold winters and cool summers. The village has a population of over 3,200 residents and the main sources of income for the local population are cattle breeding and crop production, with a focus on rapidly growing crop varieties.

More than 500 students attend Toktogul School, but they face a common challenge: excessive use of gadgets, which often leads to a lack of focus in class. As a result, students struggle to pay attention and absorb the material being taught.

The primary challenge faced by the students of Toktogul School was their difficulty in translating theoretical mathematical knowledge into practical applications. While they were able to understand mathematical concepts in the classroom, they struggled to use these concepts effectively in real-life situations. This gap in their skills meant that the students lacked the ability to perform basic calculations and solve problems outside of the academic environment, such as in everyday tasks and daily life scenarios. The ability to apply knowledge in practice is crucial and represents an essential skill that students must develop.



Grade 4 students are planting new flowers using freshly prepared vermicompost.
Photographer: Dariyakan Sarybaeva, design team leader



Design team members at the reflection of findings
Photographer: Aksana Islamova/design team member



At the focus group discussion with students and teachers
Photographer: Dariyakan Sarybaeva, design team leader

THE CHALLENGE

How might we develop student's skills in using theoretical knowledge of mathematics in real life?

The design team chose to focus on the significant challenges students face in learning mathematics. This decision was based on assessment data, classroom observations, and conversations with students, teachers, and parents. Results showed that students' math achievement averaged just 38%, with over 80% reporting difficulties in the subject. Some ninth-grade students even struggled with basic calculations—one student, Mirbekov Dauren from Grade 9B, admitted, “Of course, I am very ashamed to admit it, but I have a hard time even with simple calculations when I need to multiply and divide. Every math lesson is stressful for me.”

Interviews also revealed a striking contrast: many students aspired to start their own businesses and understood that math was vital to achieving those goals. This combination of low performance and high motivation inspired the team to design solutions that would strengthen students' mathematical understanding and confidence while connecting these skills to their future ambitions.

THE SOLUTION

GREENHOUSE MATH

Through this initiative students apply their mathematical knowledge in a real-world setting by running small businesses inside a renovated school greenhouse. These include planting and selling houseplants, producing bio-humus, and cultivating greens such as dill and green onions, transforming theoretical learning into practical skills.

Planting and Selling Houseplants

In this business, students grow and sell houseplants like cyclamen and violets. They calculate production costs for seeds, pots, soil, and labour, set selling prices, and analyse profit margins. By examining how scaling production affects costs and profits, students gain a practical understanding of pricing, cost efficiency, and financial planning.

Vermicompost Production

Students producing bio-humus learn to estimate raw material needs, calculate both fixed and variable costs, and develop pricing strategies to maximise profitability. They explore how production volume influences costs and revenue, strengthening their ability to make data-driven decisions about scaling and pricing.

Cultivating Greens

By cultivating dill and green onions, students forecast crop yields, analyse market demand, and project revenues based on expected output and pricing. This activity emphasises the importance of market research and statistical analysis, helping students balance supply, demand, and profitability while optimising production.

Across all ventures, students apply fundamental mathematical formulas to manage budgets, control inventory, and analyse performance. This hands-on experience helps them see mathematics as a vital tool for decision-making, building entrepreneurial confidence, problem-solving ability, and a deeper understanding of business strategy.



Students are carefully measuring the flowers.
Photographer: Dariyakan Sarybaeva, design team leader



Students are watering the dill plants.
Photographer: Dariyakan Sarybaeva, design team leader

Competencies Targeted

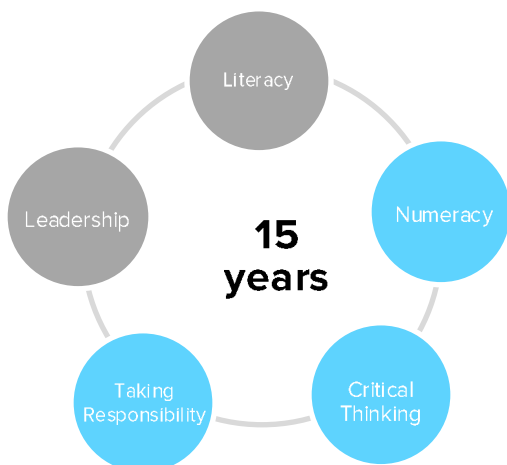
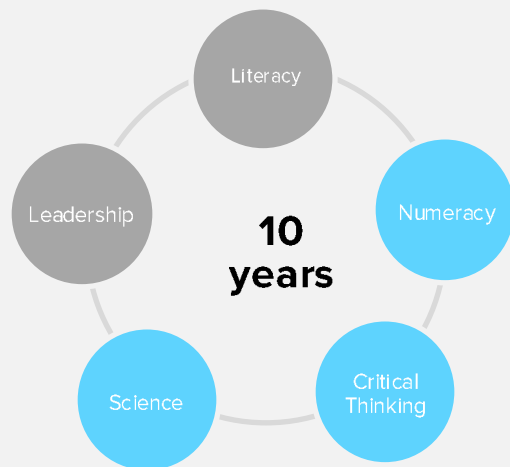


5-year-old Domains

[Please add here any supporting information you would like to regarding the targeted domains]

10-year-old Domains

Total	40
Girls	19
Boys	21



15-year-old Domains

Total	36
Girls	14
Boys	22



Students are planting the new flowers.
Photographer: Dariyakan Sarybaeva, design team leader



During the math lesson
Photographer: Dariyakan Sarybaeva, design team leader

THE IMPACT

A new appreciation for what learning can be

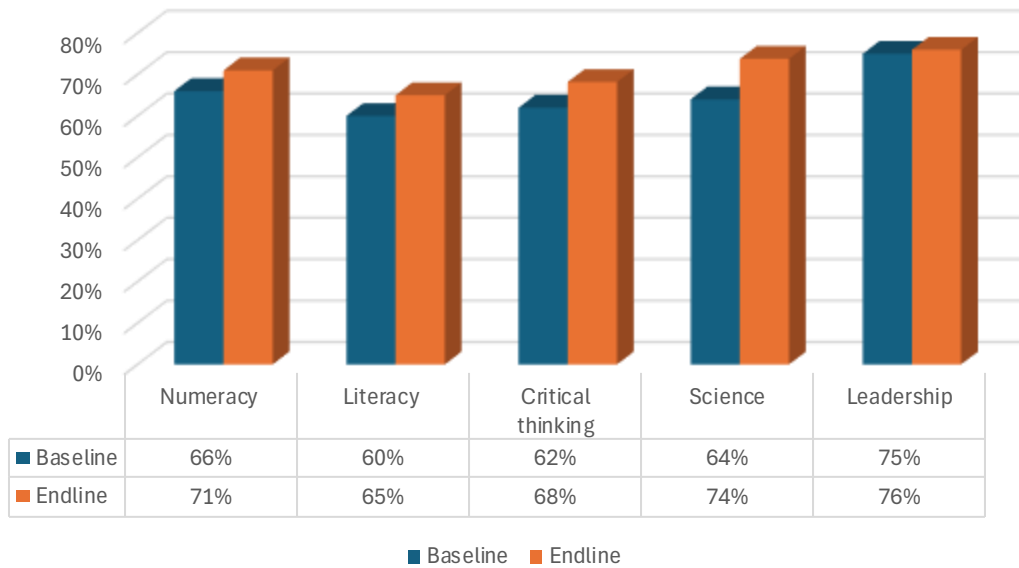
Students are now directly applying their theoretical math knowledge to real-world business scenarios, bridging the gap between abstract concepts and practical entrepreneurship. They use key mathematical principles—algebra, calculus, and statistics—to analyse financial data, forecast trends, and develop pricing strategies. As one student shared, “We organised a successful fair where we sold flowers and dill. Before the event, we carefully calculated our expenses to set the right prices, which taught us the importance of budgeting and making data-driven decisions.”

The endline assessment showed remarkable progress among Grade 9 students. Math performance increased by 28%, with average scores rising from 38% to 66%. Literacy scores improved from 32% to 70%, while critical thinking rose from 48% to 79%, responsibility from 51% to 83%, and leadership from 44% to 79%. These results demonstrate not only stronger academic achievement but also significant growth in students’ confidence, problem-solving, and leadership.

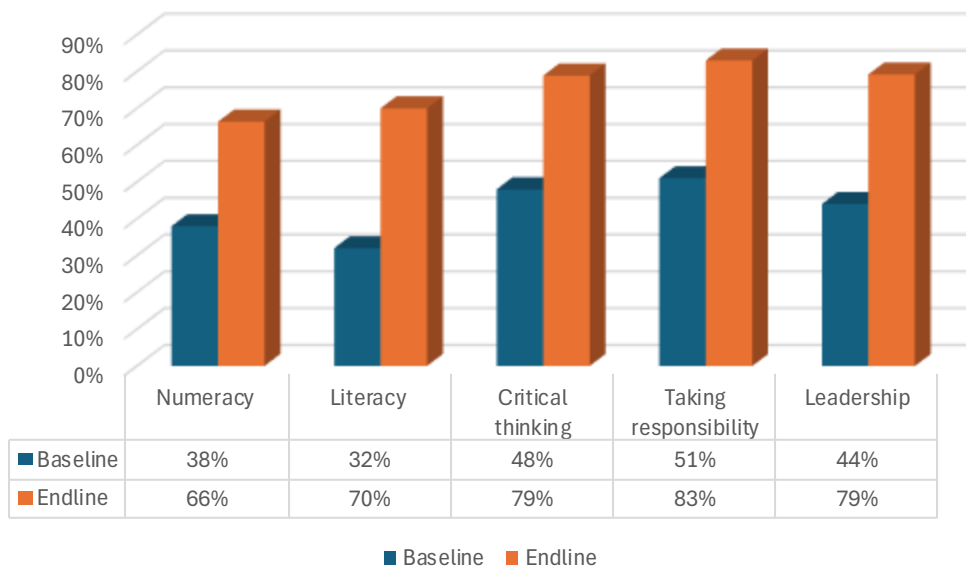
Greenhouse Math also has shifted how students perceive learning itself, transforming mathematics from a challenging subject into a practical and empowering tool for success. By linking education to real-life outcomes, the project cultivates both entrepreneurial mindsets and essential life skills, inspiring students to see themselves as capable innovators.

THE IMPACT (CONTINUED)

Grade 4 students achievements



Grade 9 students achievements



Meet the Teachers



Dariyakan Sarybaeva

*Math teacher,
design team leader*

The most rewarding aspect of being a teacher is becoming a "champion" in the eyes of my students. Having the opportunity to positively impact key moments in their lives, guide their development, and share new knowledge are some of the most fulfilling rewards of this profession. There is also immense joy in working with each child individually, nurturing their growth, and playing a role in shaping their future. Being part of their educational journey is a privilege, and knowing I contribute to their development is truly gratifying.



Gulnaz Maturaim kyzy

Math teacher

I am a dedicated mathematics teacher with 13 years of experience. What truly drives me in this profession is seeing the spark of curiosity and the desire for success in the eyes of my students. Every achievement they make is a source of great pride and motivation for me as an educator.



Peri Bakal kyzy

Primary school teacher

Embracing innovation in education is crucial for the growth and development of both students and schools. Schools should adopt educational methods that harness the power of new technologies, creative ideas, and online resources. By integrating interactive, engaging, and accessible teaching strategies across all subjects—whether math, art, or any other discipline—we can create a learning environment that captivates students and makes the educational process both enjoyable and effective.

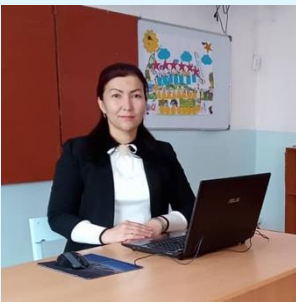
Meet the Teachers



Janargul Abdramanova

Primary school teachers

The development of the education system is essential for shaping a brighter future. Schools must embrace a wide range of technological innovations and interactive teaching methods that foster creativity and critical thinking in students. In the wake of the pandemic, new forms of distance learning have emerged as a significant component in modern education, offering flexible and accessible learning opportunities. Ultimately, education lays the foundation for societal growth and progress, equipping individuals with the skills and knowledge needed to drive positive change and development in the world.



Aksana Islamova

Primary school teacher

The true measure of a teacher's effectiveness is reflected in the success of their students. When my students achieve strong results, demonstrate genuine interest in the lessons, and actively engage in their own learning, it signifies that I am applying my skills and teaching methods in a positive and productive way. Their progress and enthusiasm serve as a clear indicator that I am fostering an environment conducive to their growth and development.



Kunduz Ybyshova

Deputy school principal

I have been dedicated to my teaching career for 19 years, and throughout this journey, what I cherish most is the connection I share with my students. The energy they bring to the classroom has the power to uplift my spirits, even on challenging days. When I arrive at school feeling unwell, I find that I recover, and when I'm upset, my mood shifts in the company of my students. My goal is to be a teacher who contributes to the growth and progress of the school, shaping the future of education. I aspire to nurture competent, well-rounded students who are ready to thrive. With the belief that every child possesses unique talents, I am committed to being the catalyst for their success, inspiring and empowering them to reach their full potential.

Meet the Teachers



Abdraeva Bermet

English language teacher

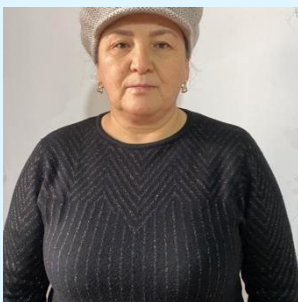
I evaluate my teaching skills through a variety of factors, recognizing that effective teaching is an ongoing process of growth and improvement. It involves continuous self-reflection, mutual evaluation with students and colleagues, and the assessment of results. The true measure of my success as a teacher lies not only in the outcomes but also in the genuine effort I put into creating a meaningful learning experience for my students.



Elnura Keneshova

Computer science teacher

To effectively educate students, it is essential to make lessons engaging and dynamic in every possible way. I assess my teaching skills primarily by the level of interest and interactivity in my lessons. If students are actively participating and feel comfortable expressing their opinions, I know that I have successfully sparked their interest. As a computer science teacher, I am constantly seeking new ways to improve and evolve my teaching practices. Given that today's students are highly proficient with technology, I must stay ahead of the curve and continue to enhance my own skills to meet their needs and keep them engaged.



Bubatma Karakojonova

Primary school teacher

The educational system must be designed to meet the diverse needs of students. It should foster an environment that supports and motivates them to engage in learning, inspiring a drive to continually improve, explore new ideas, and take responsibility for their future. By encouraging curiosity, critical thinking, and a sense of accountability, the system can help students develop the skills and mindset needed to succeed both academically and in life.



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