Mexico (UNETE)

Combined Monitoring Note

Technology as a Tool to Support Teachers and Enhance Social and Cognitive Skills of School Communities

UNETE (the Union of Businesspeople for Technology in Education) is a Mexican non-profit organization that aims to improve the quality and equity of public education in Mexico. We introduce technology into teaching-learning processes, which we begin by installing media labs into classrooms after which we create and support an environment designed to improve the digital proficiency of students and teachers alike, as well as to develop certain cognitive and non-cognitive skills in alignment with the ILE framework.

Main focus of innovation: Teachers, classrooms, students
Other keywords: Equity, quality, social, cognitive, non-cognitive, critical thinking

General Information

Name of the ILE: “Technology for Equity and Quality in Education”
Location/Address: Nationwide, Mexico
Website: http://www.unete.org/
ILE Submitted by: UNETE

The opinions expressed and arguments employed herein are solely those of the authors and do not necessarily reflect the official views of the OECD or of its member countries.
**Rationale**

Why do you suggest that it be included in the project? How does it respond to 21st century learning challenges?

**Organization of the ILE**

How is learning organized? How do learners and facilitators interact? What kind of pedagogy do they follow? What curriculum is used?

UNETE introduces technology into the teaching-learning processes in Mexico’s poorest public schools. While implementation of our model correlates strongly with improved academic outcomes, we focus our model on developing 21st century skills of students such as critical thinking and collaboration.

We begin our three-year support model by installing appropriate technology, often computers and occasionally tablets. Then, with the help of teachers and the community, we design a learning environment structured to better support the development of 21st century skills among students and teachers. Our desire to take a holistic approach means that we also offer training courses for teachers to develop digital skills and provide appropriate open content such as lesson plans and tutorials.\(^1\) Also part of the UNETE model is an educational portal designed to address teachers’ needs and concerns, which also offers a call centre for teachers to receive support on pedagogical and technical concerns. Finally, UNETE also has an in-person mentorship programme wherein mentors visit schools and provide teacher support.\(^2\)

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1. After three years, participating schools are connected with other resources to sustain the ILE framework and resources.
2. UNETE Mentors are individuals with a technical background in pedagogy and are trained by UNETE.
The UNETE model is based on several principles, many rooted in the ILE framework. As mentioned above, we also design learning environments to develop 21st century skills based upon the ILE framework.

**The ILE principles most evident in our model design are the following:**

**Collaboration**—UNETE believes that teachers should lead by example and that in order for students to develop collaboration skills, it is best if their teachers are doing the same. As such, teachers are encouraged to collaborate with their on-site mentor, with their principals, and with teachers across the country. Students are encouraged to collaborate through group assignments and project-based learning. This collaboration does not end in the classroom, though. Students often take lessons from school home to their families as the project-based learning emphasis stresses the importance of relevant coursework that can be applied in students' lives.

**Sensitivity to Individual Differences**—One of the greatest opportunities technology provides in education is that of an increased ability to individualise learning. When UNETE works with schools and teachers, we help them understand what content might be best for their particular school's circumstances, and how they might be able to use technology to individualise student learning. As an example, in some schools we work with, we are piloting the effectiveness of Duolingo as a supplemental language instruction program that is completely individualized by each learner. Furthermore, we lead by example. UNETE provides individual mentoring and support to our teachers with a sensitivity to their needs and concerns.

**High Level of Demands**—UNETE facilitates demanding learning through the creation of national academic competitions, individualising learning such that all students are both challenged and motivated.

**Horizontal Connectedness**—UNETE fully embraces project-based learning as a way for students to see connectedness between academics and their lives outside of school. See the example below:

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**Addressing Relevance and Horizontal Connectedness, an example: Increasing Plot Yield through ICT**

In light of the information garnered through “Finding #2”, the following lesson plan was implemented in appropriate communities:

Households in rural areas tend to have vegetable patches in their backyard. Through our mentorship programme, we help teachers to develop school projects such as:

The teacher asks children, working in teams, to conduct research on the Internet about how to improve vegetable plots. Students are instructed to research their particular type of crop(s) grown at home, climate, etc.

1) Students created a document on the computer summarizing their research
2) Students present their findings to the rest of the class.

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3) After listening to every group, students are assigned the homework of sharing the information with their parents, and specifically, to put into practice what they learned in their own backyard with the help of their parents.

5) Students share with the rest of the class what they have been doing, and invite classmates to see their results.

6) The teacher requests progress updates on their project.

**High Level of Student Motivation**—It is at the core of UNETE’s belief system that a motivated student can essentially learn anything. This is why we evaluate for student motivation, and hope to augment it through project-based and individualised learning. Our research has also shown that students who use technology through the UNETE model experience a greater level of motivation and commitment to learning than those using technology at non-UNETE supported schools.

**UNETE Exemplifies the ILE Framework in the following ways:**

**Innovating the “pedagogical core”—**UNETE is particularly innovative in this area in that we created an entirely new network for teachers, principals, and students. Prior to our intervention, many teachers do not have a support system beyond their own community. We connect teachers with other teachers throughout the country; we facilitate in-classroom partnerships between students where learning was once an entirely individual undertaking. We also help students, teachers, and parents understand the relevance of curriculum outside of the classroom, thus allowing everyone to rethink what learning means and where it takes place.

**Learning leadership, design, evaluation, and feedback—**UNETE helps teachers learn to embrace challenge and alternative ways of teaching by supporting them, and giving them access to content and information previously unavailable. We work hard to build trust with teachers such that we can evaluate the effectiveness of our programs, and teachers can see that evaluation is only a step to better teaching and learning, as opposed to an action leading to reprimand. Additionally, we work closely with principals and community leaders to develop advocates for new ways of learning and improved education.

**Partnerships—**As discussed above, UNETE facilitates intensive partnerships among teachers, their principles, and communities. We also demonstrate this at an organizational level where we work with federal, state, and municipal governments to implement our programs and ensure sustainability. Students partner more with their classmates, and are able to even “partner” with their families by bringing home relevant knowledge that can improve the lives of those in their households.

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**Further Insight: Comunidad UNETE**

Comunidad UNETE is an online portal designed to support teachers. It contains a digital library called UNETECA, which gathers international and national educational content that teachers can use, grade, discuss, share, and recommend to other colleagues and students.
Comunidad UNETE also promotes information and content exchange through the Teacher Network within the portal. It comprises forums and virtual communities for collaboration, meetings, and discussion of different topics relevant for teachers.

Additional features of the online community and resource centre include:
- Educational tools
- Access to other national and international educational portals
- Training courses available to be downloaded
- Tutorials
- Software to guide teachers to plan their classes
- Information about our training courses
- A section for “Teacher of the Month” and “School of the Month”
- School websites
- Calendar
- Monthly bulletin

As of today, the Comunidad UNETE has approximately 29,000 different users and is one of the most utilized means of communication among principals and teachers in all of Mexico.

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**Evidence**

*Is there any evidence or indications that this initiative achieves the outcomes it aims at?*

**Learning Outcomes**

*What are the learning outcomes achieved by the ILE, including academic, social, academic, interpersonal, and meta-cognitive?*

**Documentation**

*Is there documentation on this learning environment? Is there a website? Films? Research reports? Research reports or evaluations?*

In the 2012-2013 academic year, after researching various hardware and educational software programmes, as well as different methodologies based on ICTs in low-income communities, we began several pilot programmes to gather data from our schools on what would work best for our teachers, students and communities. After many interviews and literature reviews, UNETE reached the point where the only way we could acquire better information was by testing solutions in pilot programmes.

These pilots tested a variety of educational software discerning which objectives or components would be most effective where we work. For example we tested free and purchased software, Learning Management Systems focused on improving math outcomes, others centred on developing values. Some programs or software required little additional work from teachers for implementation, while others demanded high levels of teacher
involvement. Additionally, we also piloted different kinds of hardware devices (notebooks, different types of tablets, smart-boards, servers, routers) in order to identify a proper combination of technology infrastructure to maximize our impact. To ensure we garnered well-rounded information and insight, we ran these pilots in 128 schools in fifteen states. (Aguascalientes, Baja California, Chihuahua, Coahuila, Chiapas, Guanajuato, Hidalgo, Jalisco, State of Mexico, Nuevo Leon, Puebla, Sinaloa, Tamaulipas, Tlaxcala and Veracruz.) The pilots were implemented with the following sample of students, teachers and principals:

![Representative sample of the pilot study](image)

Afterwards, assessments were made on the initial ILE pilots, from which we began to form our current model. Next, UNETE wanted to understand more about our impact on academic performance. To do this, we analysed math and Spanish scores on the Mexican Standardized Test, ENLACE in 2011, 2012 and 2013. The institution that conducted the evaluation was the Instituto de Fomento e Investigación Educativa (IFIE). IFIE found that the schools supported by UNETE had a higher performance than those that had not been supported by UNETE, in terms of both average scores and tendency in the results and that UNETE-supported schools had improved outcomes throughout the 2011-2013 school years. This same study also found the following:

- Our impact is higher in PRIMARY school than in SECONDARY school
- Our impact is higher in MATHEMATICS than in SPANISH
- The more time children spend using technology, the greater the impact.
- The more marginalized a school is, the greater the impact

We are aware that impacting academic performance depends on many factors, and we cannot definitively say that this improvement was achieved only due to UNETE support, but it is gratifying to see that there is a healthy bias on those schools that use technology under the UNETE model.
Later, when we compared the highest third of scores in schools supported by UNETE against the highest third of scores in the rest of the country, and repeated the same process for those in the middle and in the lower thirds, we found that schools supported by UNETE tend to perform higher than the rest of the schools in their same categories.

Next, UNETE conducted another evaluation with VALORA in a project linked to the WK Kellogg Foundation. These schools were located in fifteen of the poorest municipalities in the Mexico, all in the states of Chiapas, Yucatán or Campeche (southern states).

Here, we were very interested in assessing the motivation of students we work with for a few reasons. The ILE philosophy stresses the importance of student motivation. Additionally, we believe that a motivated student, in essence, can learn anything. In this respect, the UNETE model had outstanding results, with UNETE students being very motivated relative to their peers. However, it will always be the goal that UNETE students are able to answer that they “mostly are able to do” whatever task is before them. With this in mind, we strive for improving these results in the future.

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3 Being that this is the first evaluation of that nature that we have conducted, it was appropriate to use a control group, but equally useful is the fact that our results can serve as a baseline for time-lapse or ex-post studies.
In regards digital proficiency, students that had access to our model had a greater level of digital literacy than those who did not.
The study also revealed that elementary school students in UNETE-support schools were able to utilize online learning strategies more frequently than their peers. See below:

**Elementary: online learning strategies**

- Solve problems individually and research information
- Write research questions individually
- Write research questions in group
- Identify keywords to make a search online individually
- Perform complex research team involving locate information, process it and present it in a product
- Performed individually a complex investigation that involves locating information, process it and present it in a product
- Locate accurate information on the Internet about a subject individually

![Graph showing usage frequency of online learning strategies](image)

**Critical thinking**

- I make an effort, even with difficult tasks
- I try to deliver work in a better way than I am requested
- I enjoy generating new solutions to handle tasks
- When I have questions I seek different viewpoints
- I think about my arguments before I share them
- I search for new and original ways to present my work
- Although it takes me longer, I look up different sources of information
- I use good arguments to explain a point of view
- I search in several Internet pages to make sure the information is accurate
- I rather doubt the information I find on internet

![Graph showing critical thinking skills](image)

UNETE saw significant results in critical thinking skills both independently and relative to control schools with students making a greater effort in their schoolwork, and being more open to asking questions.
UNETE was excited to observe a correlation between schools we support and high levels of problem solving skills, especially compared to control schools as indicated in the graph below.

When observing the effect on developing communication skills, the impact is more limited, though still significant as indicated in the graph below. Students at UNETE-supported schools were more likely to cross the threshold into being able to independently complete tasks such as designing and giving presentations, communicating through drawings and images, and writing assignments according to instructions.
Furthermore, when we examined the collaboration and inter-personal skills of kids at UNETE-supported schools in comparison with those who were not, we realized there was a difference in the students’ self-report of their abilities. According to the results, UNETE students felt more confident, felt they were better listeners than their peers felt, and expressed greater openness to other points of view.

![Collaboration and Inter-personal skills](image)

Finally, UNETE went through an institutional evaluation to find more about the strength of its operations and the economic impact of its model. FILANTROFILIA, an organization that ranks the non-profit organizations in the country and calculates their Social Return on Investment (SROI) awarded UNETE an A+ status with a score of 3.8 over 4.0. This is the highest grade ever granted to an NGO by Filantrofilia in its history. Moreover, they determined that our SROI is 25.6, meaning that for every dollar invested in the education system through UNETE, more than 25 dollars or 374 pesos, are generated in the benefit of Mexican society through using the UNETE model of technological integration to help teachers teach and students learn.

Relevant Links and Resources:

*Enlace Results*

*Evaluations*

*Impact in Marginalized Communities*

*Institutional Analysis*
Learning Aims/Intended Learning Outcomes of the ILE:
What are the core learning aims and which knowledge, skills, or attitudes are to be acquired?

UNETE seeks the following learning outcomes through implementation of its model:
- Students who are better able to collaborate and communicate with peers
- An increased level of creative problem solving and collaboration abilities
- Increased student motivation

All of the skills the UNETE model seeks to positively impact are detailed below:

<table>
<thead>
<tr>
<th>Type of skill</th>
<th>Skill</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Digital skills</td>
<td>Technological Alphabetism (in ICT)</td>
<td>Ability to analyse and critically evaluate data and information, using devices to process, organize, maintain and interpret in a more effective way</td>
</tr>
<tr>
<td></td>
<td>Designing projects integrating technology in teaching-learning processes</td>
<td>Ability to analyse and critically evaluate data and information, using devices to process, organize, maintain and interpret in a more effective way</td>
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<tr>
<td>Cognitive skills</td>
<td>Problems solutions</td>
<td>• Critical thinking</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Ability to use knowledge and skills to devise solutions to unfamiliar problems</td>
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<td></td>
<td></td>
<td>• Learn to learn</td>
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<td></td>
<td></td>
<td>• Achieve effective learning in innovative ways</td>
</tr>
<tr>
<td>Non-cognitive skills</td>
<td>Communication</td>
<td>Ability to articulate ideas and thoughts in oral and written communication in front of a large audience</td>
</tr>
<tr>
<td></td>
<td>Collaboration</td>
<td>Ability to be an effective team member. Help your teammates to complete the tasks in order to achieve a common goal; assume shared responsibility in collaborative work</td>
</tr>
<tr>
<td></td>
<td>Inter-personal</td>
<td>Ability to work with similar team members in an environment of respect. Negotiate and solve problems.</td>
</tr>
</tbody>
</table>

Learners
Which group of learners is it aiming at? Who is eligible to take part? How many learners are there? What are their ages?
UNETE partners with 3,200 schools impacting 1.7 million preschool, primary, and secondary learners and 23,300 teachers.

Facilitators
Who are the teachers/facilitators? Who are the leaders? What are their professional backgrounds?
UNETE works with teachers who were hired by their municipal or state departments of education. Levels of education can vary, with a university degree being standard. But due to the fact that teachers in Mexico used to be able to inherit their jobs, they do not necessarily have the suggested level of education.
Learning Context

In which context does the learning take place? What does the physical learning environment look like? Are community resources used to facilitate learning and how?

General Context

Both at the time of the pilot programs and at publication of the results, Mexico was undergoing profound changes in education policy. Many supported the reforms that were said to end dated or no longer useful practices in education (IE: family members or friends “inheriting” teaching positions). The new reforms were structured with an effort to strengthen accountability and teacher qualifications, provide training, and call for the individual evaluations of more than one million elementary school teachers. Needless to say, at the same time there were many teachers who were reluctant to embrace the changes and were apprehensive about being evaluated for the first time in their careers. As such, it was integral to develop trust and rapport with UNETE-supported teachers so they understood we were there to help and to improve, not admonish or criticize.

In the above context, UNETE’s track record of flexibility, speed and execution when testing education initiatives in the public school sector could be very useful in providing quick feedback to the government as it aims to fine-tune large-scale educational programmes before implementation and raise the standards of basic education through the appropriate use of ICT.

We met our first obstacle at the state level, when many decision makers familiar with UNETE were removed from their positions after a different political party won the federal elections and the political landscape changed across the country. We worked hard to gain their trust.

Example: Using Context to Inform Evaluation and Model Development

One of the biggest challenges that Mexico has in terms of social development relates to Internet access nationwide. Since UNETE reaches schools located in remote areas where carriers normally lack presence, it is necessary to connect schools with a satellite Internet service. This service is costly; the bandwidth is limited, and the service intermittent and expensive to repair. Hence, we needed to find a solution that would allow us to provide access to our content and to other important components of the Comunidad UNETE.

With this in mind, we piloted the use of a server as a central repository of information in a very isolated community in the Lacandona Forest. The server would connect the rest of the computers of the media lab to generate a local network, improving the experience of the rest of the users.

The project was successful and UNETE received a donation from Nacional Monte de Piedad, to implement the same set up at over eight hundred other schools in twenty-one states. Now, every time UNETE installs a media lab that needs a satellite connection to access the Internet, a server is also set up.
Winning Over Apprehensive School Leadership and Teachers

We faced significant challenges in regards to teachers who did not show up to training courses and/or did not follow program or software instructions properly. There were also some apprehensions on the part of school leaders: some of the materials and software we tested turned out to not be completely aligned with the official syllabus determined by the Ministry of Education. Therefore, teachers sometimes felt overwhelmed or sceptical.

Our Context as Discerned from Field Research

In addition the above contextual challenges, through research conducted by UNETE and our evaluation partners, we gained interesting insight in regards to the environment in which the UNETE model must function. Those findings that elucidated the context in which we work are described below:

Finding #1: Teachers have only a very basic knowledge of ICT.

In a survey given to 5,720 teachers across the country asking teachers about their digital skills, the findings showed only a basic or elementary level of ICT knowledge. The highest level of command was the use of e-mail, although most of the teachers had a relatively low understanding about it and under-utilized its reach. The following graph depicts these findings.

Teacher Knowledge of ICT

UNETE Improves: Further Evolution of the UNETE Model in Light of its Context

Because the digital proficiency of both teachers and students in public schools around the country is unfortunately very limited, teachers are often afraid of adopting technological devices in the way they teach, and thus they require a slow but progressive introduction into the digital world.

That means that investing in sophisticated and expensive software might not immediately be as fruitful as otherwise expected. In a context where there is a vast amount of free educational software available, it is wise for schools to see what low-cost options that
available will be effective for them, before worrying about using content with a licencing cost. Given this, UNETE decided to invest time and resources into providing useful educational content. To achieve this goal, the institution focused on two strategies:

A) **Signing agreements with institutions that have developed educational content for the Mexican market in order for UNETE to distribute it in the schools it supports.**

B) **Identify the content most relevant for teachers given the context in which they work.**

Once we accumulated a significant amount of content, a group of pedagogues classified the material and linked it to the official syllabus of all K12 grades. As of today, there are more than 1,200 educational contents available in the website. Moreover, UNETE migrated from the use of Microsoft Office to the use of Open Office, which was free and developed the same translatable skills as Microsoft Word. Throughout the transition we modified the training material and tutorials available, and found an adequate adoption by final users.

**Contextual Finding #2: Both teachers and students need to be placed at the centre of the Model.**

Many of the software that we tested had features that allowed students to move at their own pace, decreasing their dependence on teachers. However, when teachers were uncertain about the software itself or felt overwhelmed with tasks, students' use of the technology was limited to their own abilities; teachers were less able to help them. Therefore, in order to impact the learning processes of students, we know we also need to involve teachers and not just students.

**Finding #3: Not all educational software is suitable for the Mexican context.**

Educational content that is not aligned with the official syllabus is very difficult to introduce in schools even when it has pedagogical and didactical merits. If teachers feel that the content differs from the official curriculum, or if it unfolds in a different timing, it often leads to under-utilization of the software or program.

Additionally, if the examples used in an online or software program are not pertinent to the community’s reality (a rural school vs. an urban school) then teachers and students can lose interest. Finally, if the educational content is translated into Spanish from a different background (Spanish from Spain slightly differs from that of Mexico) then the information might not be completely understood.

**Finding #4: School selection is a key factor in the successful integration of ICT in education, so it is thus difficult to scale.**

A school’s engagement with innovative initiatives such as using ICT to teach depends on several factors. One of which is the ability of the school director to lead the school staff. UNETE, in coordination with the local educational authorities, was careful to choose wisely where to implement the pilot programmes. Thus, when planning to scale our program, the profile of directors and teachers becomes a key success factor in achieving impact As such, though it is time consuming, we cannot neglect this consideration while we attempt to reach more schools.
Finding #5: Providing software in Spanish that individualizes the learning experience is considerably expensive.  
One of the learning principles of ILE dictates that each person learns at his/her own pace. Hence, UNETE-tested software allows us to take into account how much each student knows and what information he/she needs to strengthen his/her weak spots.

However, we concluded that there are not many alternatives of this kind in Spanish available on the market. Those that comply with quality standards tend to have license costs based on the number of students with access to their platforms, the number of subjects taught and the number of school years with the software available. The costs associated with utilizing the appropriate software in a school can be prohibitive when wanting to scale our reach.

Finding #6: Online educational portals were the best received by teachers.  
From the set of different educational solutions that we tested, those that were accessed through online portals were the most utilized, and thus most able to support teachers. Compared to the programmes that used complementary books, requiring teachers to perform very specific actions in the media labs, that necessitated sophisticated training courses, or that depended on teacher material, the educational portals produced the best results.

Teachers and students like to have the possibility of exploring educational programmes that are designed in an intuitive way, that offer tutorials and that adapt their content to the users’ responses.

Finding #7: Each student only uses educational software around two hours per week.  
Though the local education authorities carefully selected the schools where the pilot programmes took place, the actual use of the media lab was unsatisfactory. On average, each child used the computers between one and two hours per week. This fact forced us to reflect on the need for a model that really motivates teachers and students to use technology; otherwise, the impact could be limited. Our current model reflects this change in approach.

Finding #8: The content that provided proper monitoring and training courses to teachers was more widely adopted and generated greater motivation in the classroom.  
When teachers were satisfied with the necessary training and felt guided by a permanent monitoring service from the software companies, they tended to adopt the software in an easier and more engaged way. The problem with this requirement is that the best training courses were normally person to person, as opposed to on-line, and these types of training are also the most expensive. As a non-profit organization, the funds available for each school are limited. The economic implications of promoting software that requires intense training are highly difficult to adopt. This is an area where our mentorship programme has been helpful.

Finding #9: There are many varying realities and contexts to which the UNETE model must be able to adapt.  
The education system prescribes a uniform curriculum for most primary and secondary schools. Teachers are expected to cover a given syllabus and children from different backgrounds should somehow end up developing similar skills to cope with life.
Nevertheless we quickly realized that such an approach is rather naïve. Each school has a different set of circumstances that makes the learning processes unique with regards to variables such as how rural/urban the community is, its security levels, parent involvement, the type of connectivity and type of technology available. The graphic below offers a visual representation of the various constraints and contexts to which our model must adopt:

Finding #10: The mentorship programme is the cornerstone of the UNETE model.
One of the most difficult challenges we encountered when trying to positively impact the quality of education pertains to the actual implementation. UNETE can have a good idea or provide very useful content, but if it is not used, then achieving impact seems unlikely.

Consequently, we have found that our in-person mentoring is a pivotal resource that allows us to have traction at the school level. Even though it only lasts for one school year, it allows us to adequately train and support teachers so they feel capable and confident in their new teaching and ICT skills. Essentially, our programs must happen in the context of mentorship and support.

History of the ILE
Who initiated it? For what reasons was it started and with what purpose?

Max Shein an American-born businessman, who spent most of his life in Mexico, wanted to help Mexico’s youth realize their dreams through creating greater equity and higher quality in education. In 1999 he founded UNETE fifteen years ago. Mr. Shein passed away just one year after founding UNETE, but we proudly carry on his legacy.