

**Executive Brief**  
**Annual Report - Results Mati-Tec**  
**Mati-Tec: Education for Every Child**  
**Tecnológico de Monterrey**

## Background

Mati-Tec: Education for every child was founded in 2011, as Harppi-Tec. Mati-Tec is a research project, currently holding the status of Legacy Project at the Tecnológico de Monterrey, with the objective to generate a positive change in learning for students from public elementary schools in Mexico, through the introduction of innovative pedagogical resources with the support of mobile devices which can be used inside and outside the classroom, promoting active, and permanent learning.

## Accomplishments

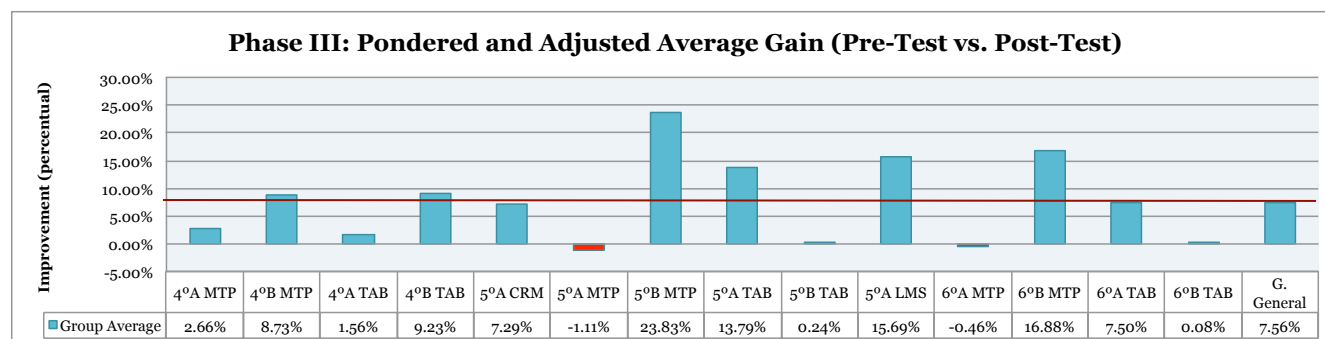
- **Economic Agreements**
  - o External funds by Fundación Telefónica México and the Mexican National Council of Science and Technology (CONACyT)
- **Transparency**
  - o All accountability has been proven in order by two different audits during the year.
- **Media and research**
  - o Validation of a research article of scientific character for exposure at the CIES Congress in March 2015
  - o Several chapters for a book, in collaboration with Fundación Telefónica México, written by researchers from the Tecnológico de Monterrey who have been involved in the project. Publication pending at the second quarter of 2015.
  - o Mati-Tec has been presented in several national and international forums.
- **Beneficiaries**
  - o Intervention in more than 50 schools (January-December 2014) with 2,027 students, in 7 states in Mexico and 2 states in Peru.
- **Parallel projects**
  - o A parallel projects to Mati-Tec, WikiMati in Mexico City

## Results

The fourth phase of the project has been stated (December 2014) in collaboration with Fundación Telefónica México, for its implementation in Puebla, Veracruz, Oaxaca, Chiapas, Jalisco and Quintana Roo, achieving a total of **1302 students and 46 teachers**. Thus, directly influencing during 2014 a total of **2027 students and 75 teachers**, which have received training to implement Mati-Tec in their classrooms.

During the **third phase**, data from **440 students and 17 teachers** showed that, in average, Mati-Tec was able to positively influence the digital and mathematical skills of students from the fourth, fifth and sixth grades of elementary school with an **average gain of 7.56%**.

*Image 1: Pondered and Adjusted Average Gain (Pre-Test Vs. Post-Test)*



## Annual Report - Results Mati-Tec

### Mati-Tec: Education for Every Child

#### Tecnológico de Monterrey

### Background

In 2011, Mati-Tec: Education for Every Child, formerly known as Harppi-Tec, is created. Mati-Tec is a research project, currently holding the status of Legacy Project at the Tecnológico de Monterrey, with the objective to generate a positive change in learning for students from public elementary schools in Mexico, through the introduction of innovative pedagogical resources with the support of mobile devices which can be used inside and outside the classroom, promoting active, and permanent learning

This will improve the quality of life of citizens with social underdevelopment in Mexico, impacting directly on improving the skills of participating students and their community, through the inclusion of parents, teachers and principals in the project.

Mati-Tec, as Legacy Project, focuses on research in education; measuring the impact of educational technologies in digital skills both quantitatively and qualitatively; improving reading and math skills through a ludic system, with select resources, which is an all-OS compatible upgradable platform via a mobile application and web, which allows parents, teachers, administrators and researchers, to follow the individual performance of each student in real time.

### Alliances and Sponsors

Mati-Tec has worked closely with the following instances:

- **Mexican Ministry of Education (SEP):** To manage the permissions and approval for implementation of the project in each of the regions where it has been implemented.
- **Fundación Telefónica Mexico:** Who provides the 3G Internet access and monetary resources needed for the operation of the project and Huawei, who in 2012, donated 2,200 mobile devices, model U8180.
- **Mexican National Council of Science and Technology (CONACyT):** Who gave the funds, via a public tender, for the operation of the project during the last quarter of 2014.

Overall, Mati-Tec has received enough funds for creation, development, and operation and benefit just over 4,000 students in four years.

### The Impact on Education

The educational impact has been evaluated in three phases, with homemade tests applied during the project, and the ENLACE test during the years of 2011 and 2012, benefiting more than **4,000 students over time**. In all cases the project reported **positive improvements**, allowing for its continuity.

During the third phase, data from **440 students and 17 teachers** was analyzed, obtaining Mati-Tec, on average, helped to positively **enhance digital and mathematical skills** for students in fourth, fifth and sixth grade of elementary schools, with a **positive average gain of 7.56%**.

Mati-Tec also participated **outside Mexico** in collaboration with **Fundación Telefónica Perú**, who implemented the project independently (June-October 2014) benefiting a total of **183 students and 7 teachers**; and with other NGO's as Un Mañana para la Comunidad A.C., **with 102 students and 5 teachers**.

The project has started its fourth phase (December 2014) in collaboration with Fundación Telefónica Mexico its implementation in the states of Puebla, Veracruz, Oaxaca, Chiapas, Jalisco and Quintana Roo, adding a total of **1302 students and 46 teachers**. This totals **2027 students and 75 teachers** trained to implement Mati-Tec in their classrooms. Currently, the fourth phase is still ongoing.



## Results

The following shows the results of the third phase (2014), implemented in the following schools: Teófilo Alvarez Borboa (TAB), Martin Torres Padilla (MTP) schools, Colegio Rey Meconetzin (CRM) and Lic. Miguel Serrano (LMS). The totals were obtained by measuring performance in the Pre-Test (test applied before the intervention), the Post-Test (test applied after the intervention) and the crossing of qualitative variables; using weighted gains through Hake methodology with control and experimental groups (with and without access to Mati-Tec).

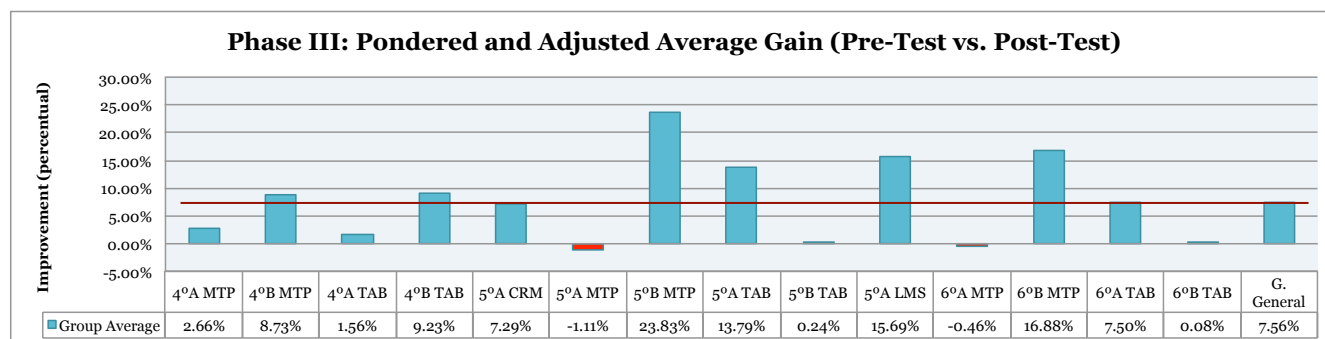
The sample for this phase consists of **440 students and 17 teachers** in four elementary schools in the Mexico City, affecting students in fourth, fifth and sixth grade.

Table 1: Phase III - Weighted Gains through Hake Methodology with Control and Experimental Groups (Pre-Test Vs. Post-Test)

School		Group Average	School		Group Average	School		Group Average
4 <sup>o</sup> A	MTP	2.66%	5 <sup>o</sup> A	CRM	7.29%	6 <sup>o</sup> A	MTP	-0.46%
4 <sup>o</sup> B	MTP	8.73%	5 <sup>o</sup> A	MTP	-1.11%	6 <sup>o</sup> B	MTP	16.88%
4 <sup>o</sup> A	TAB	1.56%	5 <sup>o</sup> B	MTP	23.83%	6 <sup>o</sup> A	TAB	7.50%
4 <sup>o</sup> B	TAB	9.23%	5 <sup>o</sup> A	TAB	13.79%	6 <sup>o</sup> B	TAB	0.08%
Average 4 <sup>o</sup>		5.54%	5 <sup>o</sup> B	TAB	0.24%	Average 6 <sup>o</sup>		6.00%
			5 <sup>o</sup> A	LMS	15.69%			
			Average 5 <sup>o</sup>		9.95%	General Gain		7.56%

From table 1, we can observe a general positive gain of 7.56%, confirming that Mati-Tec is actually generating a positive gain in students in order to enhance their digital and mathematical skills.

Image 1: Pondered and Adjusted Average Gain (Pre-Test Vs. Post-Test)



The image above shows that some groups were not able to present a positive gain in relation to the control group. This was due to two factors: 1) **Internet Connection:** Which was poor or non-existent on those classrooms leading to frustration from the users and teachers, and 2) **Resistance from the teachers** to apply the project. Both issued during the fourth phase adding an *offline* version of Mati-Tec and further training and instruction for teachers. We expect to see all-positive results in the next exploration phase.

On the next page the detailed results are presented by grade and subject, according to the resources used by 440 students benefited during this deployment.

During the third phase, we only implemented topics in mathematics, as the Spanish (grammar) resources were being incorporated into the platform. The latter have already been incorporated and will be deployed in April 2014 during the fourth phase.

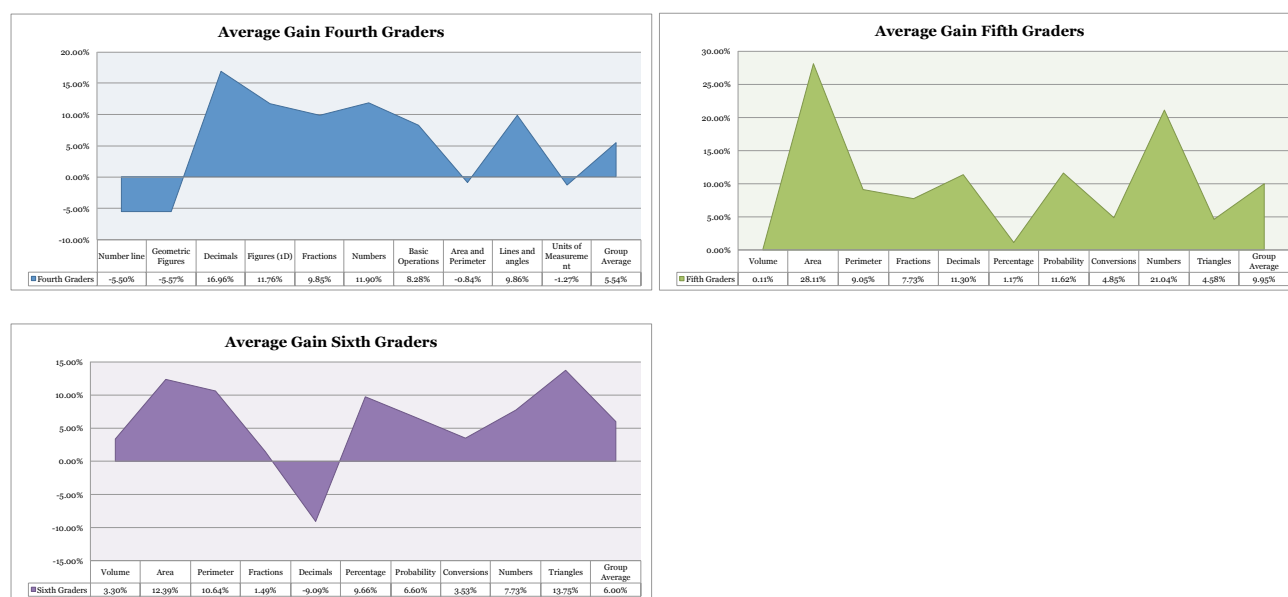


Table 2: Phase III - Pondered Average Gains by Group and Theme

Phase III: Pondered Average Gains by Group and Theme											
School	Number line	Geometric Figures	Decimals	Figures (1D)	Fractions	Numbers	Basic Operations	Area and Perimeter	Lines and angles	Units of Measurement	Group Average
4 <sup>o</sup> A MTP	-7.21%	-11.90%	0.12%	11.88%	19.10%	4.76%	2.33%	0.17%	11.98%	-4.57%	2.66%
4 <sup>o</sup> B MTP	1.96%	5.88%	17.65%	27.45%	19.61%	19.61%	2.94%	-12.75%	0.98%	3.92%	8.73%
4 <sup>o</sup> A TAB	-24.45%	-11.11%	24.45%	0.00%	-4.44%	15.56%	2.22%	6.67%	11.11%	-4.44%	1.56%
4 <sup>o</sup> B TAB	7.69%	-5.13%	25.64%	7.69%	5.13%	7.69%	25.64%	2.56%	15.39%	0.00%	9.23%
<b>Average by Theme</b>	<b>-5.50%</b>	<b>-5.57%</b>	<b>16.96%</b>	<b>11.76%</b>	<b>9.85%</b>	<b>11.90%</b>	<b>8.28%</b>	<b>-0.84%</b>	<b>9.86%</b>	<b>-1.27%</b>	<b>5.54%</b>
School	Volume	Area	Perimeter	Fractions	Decimals	Percentage	Probability	Conversions	Numbers	Triangles	Group Average
5 <sup>o</sup> A CRM	0.00%	22.92%	8.33%	0.00%	16.67%	2.08%	8.33%	2.08%	-2.08%	14.58%	7.29%
5 <sup>o</sup> A MTP	-64.82%	14.82%	0.00%	3.70%	18.52%	-16.67%	0.00%	1.85%	33.33%	-1.85%	-1.11%
5 <sup>o</sup> B MTP	18.33%	46.67%	20.00%	20.00%	16.67%	10.00%	26.67%	16.67%	51.67%	11.67%	23.83%
5 <sup>o</sup> A TAB	37.88%	21.21%	4.55%	7.58%	10.61%	10.61%	24.24%	4.55%	15.15%	1.52%	13.79%
5 <sup>o</sup> B TAB	-14.28%	23.81%	-11.91%	19.05%	-14.29%	-16.67%	-7.14%	0.00%	26.19%	-2.38%	0.24%
5 <sup>o</sup> A LMS	23.53%	39.22%	33.33%	-3.92%	19.61%	17.65%	17.65%	3.92%	1.96%	3.92%	15.69%
<b>Average by Theme</b>	<b>0.11%</b>	<b>28.11%</b>	<b>9.05%</b>	<b>7.73%</b>	<b>11.30%</b>	<b>1.17%</b>	<b>11.62%</b>	<b>4.85%</b>	<b>21.04%</b>	<b>4.58%</b>	<b>9.95%</b>
School	Volume	Area	Perimeter	Fractions	Decimals	Percentage	Probability	Conversions	Numbers	Triangles	Group Average
6 <sup>o</sup> A MTP	-9.26%	29.63%	0.00%	-3.70%	-9.26%	-16.67%	-7.41%	0.00%	21.30%	-9.26%	-0.46%
6 <sup>o</sup> B MTP	5.55%	36.81%	-8.33%	30.56%	-2.78%	-8.33%	27.78%	16.67%	40.28%	30.56%	16.88%
6 <sup>o</sup> A TAB	16.74%	-8.41%	51.74%	6.59%	-9.13%	25.80%	-7.32%	2.61%	-16.81%	13.19%	7.50%
6 <sup>o</sup> B TAB	0.15%	-8.48%	-0.86%	-27.49%	-15.19%	37.84%	13.36%	-5.17%	-13.84%	20.50%	0.08%
<b>Average by Theme</b>	<b>3.30%</b>	<b>12.39%</b>	<b>10.64%</b>	<b>1.49%</b>	<b>-9.09%</b>	<b>9.66%</b>	<b>6.60%</b>	<b>3.53%</b>	<b>7.73%</b>	<b>13.75%</b>	<b>6.00%</b>

The latter shows that fifth graders achieved the greater gain, while fourth graders achieved the smaller gain. The project has been implemented more times in the fifth grades and the resources have been revised. This accounts for the all-positive gains in all the themes. Nevertheless, all the grades present a positive gain after their exposure to Mati-Tec.

Image 2: Phase III - Summarized Average Gains by Group and Theme Represented Graphically



## Conclusions

Since 2012, and through the alliance with Fundación Telefónica Mexico, Mati-Tec has proven to be a working project that creates positive results. During 2015, the number of final beneficiaries will grow to about 4,000, as well as the capacities of the platform and software, allowing the project to migrate from a digital laboratory, to a large-scale replicable project in the near future.

