

OECD/CERI ICT PROGRAMME

*A Case studies of ICT and School Improvement at
Ignacio Quiróz Primary School
Tlalnepantla, State of Mexico, Mexico.*

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Guadalupe Gómez, Team Leader

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This case study is a qualitative investigation forming part of the program : ICT and *Learning Quality*, of the project *Education for the Future* co-ordinated by the Center for Educational Research and Innovation - CERI of the Organisation for Economic Co-operation and Development-OECD and took place from the 24th to the 27th of October in the Ignacio Quiróz Grade School, located in Tlanepantla in the State of Mexico.

The research's porpoises are:

- To examine the different ways in which TICs are related to innovation and school improvement under conditions that work as catalyses.
- To pinpoint the critical variables related to a successful implantation of school improvement and ICT effectiveness.
- To detect unwanted impact regarding the students' learning processes and the school's functioning.

1. Overview

The school's prestige has been increased since the headship implemented the current workshops. The cues are long during subscription periods and few students manage to get in. According to information given by Antonio Espinoza, Supervisor for that school zone, each year between 350 and 400 students are rejected from Ignacio Quiróz. Teachers can make classes more agile and go deeper into themes in less time, while students can "visit" other countries, "travel" inside the body and "play" with the alphabet. Also, they get to know different forms of accessing information and new abilities in the use of technology. There is a spirit of co-operation and compromise with education among students, parents teachers and headship, who work together in the same direction.

The school has a big building in which we find the classrooms, the library, the co-operative and

the computer and multimedia rooms. It also has two large outdoor spaces, managerial offices and a store. Classrooms are large and well ventilated, they have adequate furniture and in a good state despite the large student population. It is a clean school with good maintenance and, after the recent remodelling, the bathrooms are to be envied.

Students have a class in the multimedia room once a week. There they can work with interactive programs related to what they have seen in class. They can also participate answering questions set by the teacher or making some comment on them. Furthermore, 4th to 6th grade students get weekly computer classes in which they learn computer history, a computer's parts and the handling of simple programs.

School has expanded its schedule from 7 to 14 hrs. so that students may do other activities. They also reconditioned the two computer rooms and established an annual payment to get more equipment and cover the payment of the person responsible for the media room.

2. The Past

The main obstacles that the school has faced in relationship to technology are how to get resources, how to train teachers and how to deal with managerial-related procedures. Regarding the teachers' training, the school has persuaded them to partake in courses transmitted through EduSat and School Network. However not all of the population has taken a part. The school has made the arrangements so that educational authorities allow teachers in turns to attend the media room while another substitute teacher, paid by the parents themselves, takes charge of his or her group. Such an arrangement was authorised two years ago.

This school has, on its own, obtained the necessary equipment to give the students the possibility of getting to know and handle technology. The school has given itself the chance to be in contact with the latest in education as it established communication with other schools and institutions through the Internet and the Web. The fact of being incorporated into a project such as School Network (1994) allowed the expansion of the school's computer usage capabilities. Though over ten years ago they have been including basic computer abilities into their curriculum, they had not developed projects of direct application in the educational processes, that is, using the technological resources as material aids. Their intention is to continue their expansion in this sense and to contribute in the improvement of the geographical zone in which they are located.

1. Educational Innovations

To talk of change, innovation and the projection that the school has had towards the future, leads us to talk of the headmistress, a dynamic woman with a great capacity for leadership. She comments that since the beginning of her career she started acting in the schools in which she worked, towards an improvement of the educational standards. From organising events for fund raising to spending a whole day waiting to obtain an interview with the local authority, Ms. Irene has done what she has considered necessary to be able to have, in the school at her charge: that which technological development has to offer. The school then, has a long story of actions done in order to make this possible: charging the parents for equipment acquisition,

seeking help from other managerial and educational authorities, as well as from their own teachers. The equipping of the school, which began by the acquisition of typing machines, has grown primarily thanks to the parents help, but also the SEP, through School Network, gave some computers and the school's connection to Internet.

1. The Present

Organisation of Evidence

1- Promotion Patterns

Innovation- the school has ten years working with workshops - its most important innovation. The birth of this transformation is linked firstly to **the school community's awareness** of what the installations were lacking. Parents responded well, they wanted their children to have what kids in private schools do. Secondly, once these necessities were covered, there was the acquisition of computers and the teaching of typing, english and computer abilities.

"As public schools, we go beyond that which the program says. To teach our children in public schools things such as english, computing, typing, and internet abilities this last three years, is something we are doing. Internet and EduSat were donated by the SEP. They asked if we wished to apply such technology and we were willing because that's what our children will need to handle not only in the future but in the present day. " (E/Dir-P.1)

" ?parents were willing to work towards our purpose of teaching computer studies in 6th grade, they asked that it be included in other grades and we incorporated it from 1st to 6th? I have a parent's team that has seen the benefits of the program and are paying an extra teacher, they also pay for the maintenance of the equipment and besides are always willing to co-operate.. they wish for the children to have the same facilities found at private schools. Those are too expensive for them, but here its \$ 102.00 pesos a year." (E/Dir-P.14)

There is a work 'mysticism' in this place, formed throughout the years, which always seeks the best for the children. This is why the buying of the computers was done with that hope in mind. There is a **compromise** which demands a greater effort from all the community, especially regarding schedule amplification. There has been no opposition.

"?definitely, anyone who comes here knows that he comes to work, that he's going to get up early for a 7am class, he'll have to have lunch late once a week since there is a compromise among teachers, students and parents." (E/Dir-P.4)

Here, if Ms. Irene asks all parents to give, they just do and don't complain. Why? Because she has always responded."

ICT- The computer room has 15 computers. The 4 found at the multimedia room belong to ILCE, but there they have an IBM with a server for greater connectiveness and from there you can handle videos that are demanded by the teachers who already have TVs in their classrooms.

Ms. Irene, the headmistress, started the innovation. Despite the lack of interest of her immediate superiors (supervisor and educational and local authorities) she went on. The personnel that was involved at first were mostly young, enthusiastic people who wished for a change and felt compromised towards the headship's project of giving the children tools and teaching them how to handle those tools.

At first, only one 6th grade group got computer classes with only four computers, then, four more were bought and another group was included in the program. Seeing the demand of parents and children alike, the computer room was established, it had 15 computers and 4th and 5th grades were added to the program. A typing course was introduced so that students could handle the computer in an easier form. Finally all children were included in the program, from 1st to 6th grades, but as the computers got damaged all the time, so they reduced it back to kids from 4th to 6th grades. Today children in 1st, 2nd and 3rd go to School Network multimedia lessons once a week.

In this school, the vice-headmistress is in charge of the computer classes while another School Network teacher is in charge of the multimedia classes. The Parents' Association pays the substitute teacher as well as the workshop teachers (computer studies, english and typing).

"?believe me, I want to be honest, my authorities took a year to give me the written authorisation, saying they were not responsible of what I was doing, they left me all the responsibility . I think they were hoping it would not work out, but now its been ten years since then." (E/Dir-P.4)

The main problem was economic. There wasn't any help from the government. The equipment bought was one of the most expensive but included a good guarantee for maintenance. The headmistress justifies the decision by referring to the proverb "spend like the rich so that it may last for the poor." Another problem was that some parents at the beginning thought it was too much for the children since they had to attend school from 7am to 1pm once a week. Even some teachers were uncomfortable as they thought they would have to work more for the same money, but later they saw the advantages and accepted.

2- Personnel Development

INNOVATION- Most teachers are involved in the innovation, whether it be collaborating in School Network projects or explaining to parents the advantages of the project. ("sensibilisation labour").

At the beginning of the project, some teachers took a basic SEP computer course, some too had taken courses on their own.

It must be pointed out that in this school only the multimedia and computer teachers work on the computers with the children. However, there are many teachers who use the multimedia room. The headmistress has never taken a computer course herself, but has encouraged the staff and the children. Another special situation is the fact that most of the improvements done here

have been paid by the school community, they have not received any help from the local nor the federal government..

"When I decided computer studies would be included I told teachers to take the SEP course? that's were they learnt the basics. Afterwards, one teacher took another course and then another, then others followed her because I have told them that in three years they will each have a computer in their classrooms, besides the TV and video." (E/Dir-P. 10-11)

"All that has been done here has been our own initiative, I have been asking for help to introduce teacher training courses, but we have got nothing from the government, nothing." (E/Dir-P.15)

"There's only one person in charge of the room, but we can all use it. We knew nothing and we are learning." (E/Ma-P-4°A, p.2)

"We all have the obligation, as teachers, to go to updating courses, and what we learn there, we bring here." (E/Ma-P-2°A, p.1)

ICT- Teachers participated voluntarily. They were offered the choice but warned that if they decided to take part they must be responsible, specially regarding schedule commitment. They didn't like the idea much at first, they had other interests and little time, besides they didn't like to work more time for the same wage. They did it, like the headmistress herself, because they saw the advantages of technology and did not want to lag behind other schools and other teachers.

To integrate computers into regular contents was a fundamental factor. Teachers have just recently started to take computer courses, they usually do it on entering School Network. The initial training was done by IBM, they gave an overall panoramic of the computer and its usage, then they took the SEP course. Training has always been voluntary.

"I never say 'you must' but 'who wants to' but always reminding them that if they accept they must work hard and compromise to the full until they can dominate the computer 100%?" (E/Dir-P.10)

"The first challenge was the parents. Some wanted to do it, but as they are not familiar with computers, thought it would be to difficult for the children. But we motivated them, the child's benefit was the most important. For the kids it was also a great challenge, but after 10 years' work they all want to participate? Innovation implies time and effort and people don't always have the time, or have other interests, it is difficult to accept working more time for the same wage. It implied problems even with our families. But we did it out of compromise with our careers and because we wanted to make the change real?" (E/Ma-P-4°A, p.3-4)

"I haven't taken any courses and now I'm sorry because I have a project that is computer related. For me its all new and I worry very much for not knowing. I feel we should get training? I don't know where to begin." (E/Ma-P-4°A, p. 5)

At the beginning an ITESM graduate - "L"- was in charge of the computer workshop and training of some teachers. But he was criticised for not being a teacher by profession and therefore not knowing how to work with children. Now teachers must find their training outside.

"?later, after L's departure, we had to find training elsewhere.. Besides, we've taken the SEP COEBA courses, and the one at Ecatepec (referring to a local administrative training program)" E/Subdir P. P.3)

1. Leadership Role

The personnel is headed by Headmistress Irene, a woman who has a compromise with the children's education, and who gets involved in concrete action to improve the school and its educational standards.

1. ICT-Innovation Connections

The purpose of the project is to reinforce that seen in a regular class by means of a video or an interactive CD. The person in charge of the media room guides the process, whether the regular teacher is present or not. Two students move the mouse and the rest of the pupils see the projections.

The work done to implement technology began with the typing courses and was furthered by the headmistress's actions. Teacher's and Parent's help facilitated the acquisition of the first computers. Today, there is a multimedia room with web access and material to be projected on a TV screen, but which is computer manipulated. Once a week groups receive a class in this room. There has been the need for everyone to spend more time at school and substitute teachers have had to be hired.

1. ICT Infrastructure

The school has two equipped rooms. In the Multimedia room there are five computers, only one of them having web access. There is also one TV and one video player. There's a video card that allows for a computer to be connected to the TV, so that all children may simultaneously watch the images on the screen. Students have sessions once a week and teachers ask questions and comment on what they are seeing. The objective of this type of work is, according to the teachers in charge, to reinforce what has been seen in class. So, ICT are considered a material aid. In this room they watch School Network transmissions and take part in some projects, sending their participation via e-mail

The computer room has 15 computers (half are 386 model and the other half 486) so group instructions are difficult. They don't have multimedia devises. They work in pairs or trios depending on the group's size. They learn a bit of computer history and computer parts. They also learn how to turn it on and off, how to organise files and programs such as Banner.

In the computer room SEP set activities are carried out. Such activities include typing and english abilities. The workshops are paid by the parents so as to be able to acquire equipment and pay the english and music teachers as well as the substitute teacher.

1. **Efectiveness**

Despite the fact that teachers as well as the headmistress say that technology is very important in the present, the scarce usage they make of it is notorious. Most of them barely know how to use a computer.

So, there are always "technical problems", some are due to the equipment and others to the lack of information as to its use. They do not exploit their equipment as could be done. It is this ignorance which leads to the overemphasis of the keyboard handling (with the typing courses), and to the fact that fourth grade students spend all the first term learning the names of the different parts of the computer and a bit of its history before they even get to turn on a regulator

1. **Academic Rigor**

This school has a high prestige and a high demand due to its achievements which are renown in that school zone. Students have won first places in national contests.

1. **Hypotheses**

Hypothesis 1

Technology is a catalyser for innovation and educational improvement, specially when the web is involved. VS When true educational improvement is accomplished technology serves only as an additional resource.

This school has many elements that are required for technology to become a real benefit in educational standards. Such may be said of the degree of compromise, the teacher's attitude to work, the parent's help and the headmistress's active leadership. However, their objectives are not clear, they don't know what they are doing it for, they don't know the potential such media has, therefore, they can not know how to do it. They would need to clarify their objectives in the first place, and then start training, that way they would feel comfortable with the resource on the one hand, and learn how to use it for didactic purposes on the other.

Technology implementation in this school has meant the organisation of all involved parties and the openness for training on the teachers behalf. There is a great leadership and an agreeable working atmosphere. There is also respect for everyone's ideas and they all feel fortunate to belong to the school community. There is a need for training and for maintenance and updating of the existing resources.

1. **Projections**

Sustentability and Growth Capability

For the next school terms they are hoping to have a TV and video player in each room. Some teachers expressed their wish to add a computer to this list.

APPENDIX "A"

Methodology Appendix A /

The team who obtained the information was made up of three people. They worked 5 days four hours each day. They interviewed:

1 headmistress,

6 teachers selected by the headmistress (three that were enthusiastic participants - teaching 2nd, 3rd and 4th grades respectively, and three that did not show any enthusiasm regarding ICT - they taught 2nd, 3rd and 4th grades)

6 students (chosen at random from the groups of the first three teachers who did implant ICT usage).

4 parents (one from the Parents' Association, and three parents of the interviewed children.)

1 computer specialist

A methodology for short term case study was proposed, under the consideration that such a modality provides an appropriate design for the evaluation of a program or project which , besides containing important explanative variables, blurs the limits in-between the program itself and its context. (Yin, 1993).

Other significant characteristics of this methodology are:

- The data recollection is derived from a theory with themes or questions pre-established as hypotheses.
- Opposite or rival hypotheses are also previously defined.
- Data recollection is focused on that which is relevant to the hypotheses' resolution, hypotheses which have been previously defined. (CERI/OECD, 2000-junio)

The converging evidence derived from:

- 1-Interviews and questionnaires applied to teachers, students, parents, managerial staff and technicians in charge.
- 2- Class and school observation.
- 3-Recollection of students' and teachers' works, of school publications and plans, etc..
- 4-Surveyal of TIC practices.
- 5- Examination of diverse electronic material.
- 6- Interviews with key people outside school such as community members, inspectors, providers, etc.

The data recollection in each school was carried out on the basis of a five day chronogram established on a previous visit to the headmistress of each school. The people to be interviewed were also set on this visit.

-Instruments.

1-Interview with the headmistress

- 2- Interview with students
- 3- Interview with teachers
- 4- Interview with technical specialist
- 5- Interview with parents
- 6-Practice surveyal
- 7-Class observation
- 8-Observation outside class rooms
- 9-Teacher, student and parent questionnaires

While the OECD methodological proposal includes a choice in the number of students, teachers and parents interviewed, we opted to include a questionnaire using the interview reports as a guide line. Its purpose was to recollect more data to document the case and support the hypotheses.

A relevant fact that I will mention is our decision to include people who were for and people who were against the innovation. This allowed us to have a wider vision of the evolution and development of such an innovation.

APPENDIX "C"

TEACHERS' ANSWERS TO THE ICT PRACTICE SURVEYAL

Tlanepantla Grade School

Diagram 1: Teachers feelings towards ICT tasks

How well do you feel using the computer for each of the following activities?	Very well	well	More or less	not well	Does not do it
Write an essay	4	1	1	0	1

Search for information in the www	2	2	1	1	1
Create and maintain web pages	0	1	1	1	4
Use a data base	1	4	1	0	1
Send and receive electronic mail	3	2	1	1	0
Program	0	1	2	1	3
Make a drawing or diagram	2	4	0	0	1
Present information (Power point)	3	2	0	1	1

Based on the answers of 7 teachers

Diagram 2: Average frequency with which teachers set ICT related work

Last year, how frequently did your students do the following for work you set?	Very frequent-ly	frequent ly	Once in a while	Scarcely	Never
Use the Internet	0	4	2	1	0
Create web pages	0	0	1	6	0
Send or receive e-mail	1	1	3	2	0
Use of a word processor	1	1	2	2	1
Use of a computer to play games	1	1	2	2	1
Use of a calculus sheet	0	1	2	4	0
Use of a graphics program	0	1	1	5	0
Join an on line forum or chat	0	0	2	5	0
Use of a program for presentations (power point)	1	2	2	2	0
Use of an instructor program (simulator)	0	2	3	1	1
Others (specify)	0	2	1	1	3

Based on the answers of / teachers

Diagram 3: Teacher's ICT abilities

	Good	Sufficient	Poor	Did not answer
¿How would you qualify your computer handling abilities?	1	0	6	0

Based on the answer of 7 teachers

Diagram 4: Experiences or policies in which teachers have applied the use of ICT during the last school year.

Evaluation of students' abilities in ICT		NO
Have your students' abilities in the use of the computer been formally evaluated?	3	4

Restrictions in web browsing	No restrictions	Some restrictions	Only set sites	Did not answer
If you set web searches, how free were your students to visit different sites?	1	1	2	3

Creation or modification of web sites		NO
Did you create or modify a web site during class time?	0	7

Proportion of computer use in relationship to class contents	All of it	Most	Some	Very little	None
What proportion of computer usage in your class is directly related to the class contents?	1	2	2	0	2

Proportion of individualised student computer usage	All of it	Most	Some	Very little	None
What part of the computer use in your class was carried out by students individually?	1	2	1	1	2

Frequency of computer use at home to prepare classes	Several times a week	Several times a month	Sometimes	Never	I don't have a computer
How often do you use your computer at home to prepare your classes?	1	1	2	0	3

Participation in virtual courses via web		NO
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¿Have you partaken as a student or as an instructor in virtual courses on the web?	4	3
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Student involvement in collaborative learning on the web		NO
Did you get your students involved in collaborative learning projects with other students on the internet?	2	5

Participation in professional forums or chats on-line		NO
Are you currently participating in any on-line forum or chat to collaborate with other teachers?	3	4

E-mail sending and receiving frequency	Over 12	From 6 to 11	From 1 to 5	None
On average, how many e-mail messages do you send a week?	0	0	4	3

Diagram 5: Tasks that are directly directed to ICT programming and installation. (on a 0 to 5 range)

Which of the following, and how much of it, have you done?	0	1	2	3	4	5	Did not answer
Make hardware changes	6	0	0	0	0	0	1
Actualisation of an appliance (word processor, graphics program)	3	0	2	1	1	0	0
Recover a damaged file	5	1	0	1	0	0	0
Create a web site	5	0	1	0	0	0	1
Develop a data base	4	1	2	0	0	0	0

APPENDIX "C"

Other evidence

PDF. IGNACIO QUIROZ GUTIERREZ

School Material

1	Official note. Petition addressed to the teacher in charge of the Media room.	PDF/Of Appointment
2	Multimedia room schedule	PDF/Hr M
3	Yearly working plan	PDF/Plan
4	Organisation chart	PDF/Chart
5	Official note. Petition to participate in School Network	PDF/Of Red
6	Official note. Technicians' petition	PDF/Of Technician
7	Official note. State Government. About the School's participation in School Network	PDF/Of Gob Edo
8	Internet room schedule	PDF/Hr I
9	Instructions for filling in data for on-line schools	PDF/Instructions
10	Official note. Report of Internet workshop activities	PDF/Of Workshop
11	Letter. About the initiation of internet and multimedia workshops.	PDF/Cir Workshops
12	Computer exam.	PDF/Ex Computer
13	Computer exam. 1, 5° Format	PDF/Ex Format1 5°
14	Exam. Computer studies. 4° Format	PDF/Ex Format4°
15	Exam. Questionnaire 9. Computer studies.	PDF/Ex Questionnaire
16	Exam. Computer studies. 2, 5° format	PDF/Ex Format2 5°
17	Exam. Computer studies. 3, 5° format	PDF/Ex Format3, 5°
18	E-mail. Invitation to project: "Armamos una ..."	PDF/Corr Invitation
19	Computer program	PDF/Prg Computer
20	Student computer usage regulation	PDF/Regulation Ao
21	Lesson. Keyboard description	PDF/Lec Keyboard
22	Lesson. Parts of a computer	PDF/Lec Parts
23	Newspaper. Student's participation in ecology	PDF/Per Student
24	Attendance lists and grades, 5 th grade. School Year 99-00	PDF/List 5°
25	Attendance lists and grades, 3 rd grade. School Year 99-00	PDF/List 3°
26	Attendance lists and grades, 1 st grade. School Year 99-00	PDF/List 1°
27	Graduate lists. School Year 99-00	PDF/List Graduates
28	Register of equipment for PROED	PDF/Reg PROED
29	Internal regulation for school parents	PDF/Internal regulation
30	Letter. Informing school activities for parents	PDF/Com Parents
31	E-mail. ILCE about "Matemáticas Cotorras"	PDF/Corr ILCE
32	E-mail. Maths contest. Mexican Science Academy (Academia Mexicana de Ciencias)	PDF/Corr AMC1

33	E-mail. Olympics in the classroom. Mexican Science Academy (Academia Mexicana de Ciencias)	PDF/Corr AMC2
34	Maths Exam. Problems	PDF/Ex Problems
35	Lesson. Typing exercise.	PDF/Lec Typing
36		