

## Resilience Reconnaissance | Education

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EERI Learning From Earthquakes Travel Study Program, Chile 2017

### Introduction

The EERI Learning From Earthquakes (LFE) study program was conducted in Chile from January 13-18, 2017. The purpose was to conduct a field study trip in Chile because it was affected by the Mw 8.8 Maule 2010 earthquake and to assess the resilience of the communities and the response of the stakeholders, including local and central government, universities, international organizations etc. during the 2010 Maule earthquake. Participants were divided into four thematic groups: housing, healthcare, business and economy, and education. Each group consisted of four members.

This report presents a resilience study on the effects of the Maule 2010 earthquake on education including the performance of school/university buildings during the 2010 Maule earthquake in Chile. The resilience study team interviewed volunteers ranging from students and parents to engineers involved in school building design, government service workers, and professors from universities. During these interviews, study participants were asked to discuss performance of the school buildings during the 2010 earthquake, the response and situation of students during and after the earthquake, and things that have been changed after the earthquake and that need to be improved for future earthquakes. Due to time constraints and holidays during the study, the study team could not visit many schools. However, three universities namely Pontificia Universidad Católica de Chile, Universidad Técnica Federico Santa María and Universidad de Talca were visited and buildings were observed and discussed with professors.

About 3,300 schools were affected by the earthquake and tsunami. Undamaged schools and schools with minor damage started classes normally while those with moderate and severe damage were relocated to other public schools. The government managed to bring all the affected students back to school within 45 days of the earthquake. However, most of participants reported that school buildings performed very well during the earthquake, their children were safe even though classes were disturbed for a long time.

This report is organized in six sections. It begins with an overview of the 2010 Maule earthquake sequence and its impact on education. The methods of this study are then described. Subsequently, three sections detail the themes related to the goals of EERI's Learning From Earthquakes program that were found from analyzing and synthesizing data gathered during the study. The themes are 1) observed state, 2) level of recovery and mitigation method, and 3) transformative improvements. The report concludes with a section summarizing the findings of the study, challenges in collecting information, and recommendations.

### Impact on Schools, Overview and Strategies Followed

#### Overview

In Chile, the education system is divided into four levels: *Educación Parvularia* (Preschools), which receive children between 85 days and 6 years old; *Educación Básica* (1<sup>st</sup>-8<sup>th</sup> grade), for ages 6 to 14; *Educación Media* (High School), ages 14 to 18; and *Educación Superior*, which corresponds to Institutes and Universities that bestow technical and professional titles and degrees.

At the same time, each of those levels is divided into public and private institutions. In the case of the elementary, middle and high schools of the country (i.e. *Educación Básica* and *Educación Media*) there are four categories depending on who is in charge of the funding of the schools. Data from 2013 state that at that moment 43% of the total students of the country attended public schools (funded by the State, directed by each municipality); 49% were subsidized schools (they have an owner, but they receive partial funding from the state); 7% were private schools (completely funded by a manager, board of directors or organization); and 0.6% were delegated administration schools (directed by the Education Ministry) (*La Reconstrucción en Educación. Una Mirada a los Procesos y Desafíos en la Reconstrucción de la Infraestructura Escolar Dañada en el Terremoto y Maremoto del 27/F, MINEDUC*).

This information shows that, for the most part, the State (either directly or through the municipalities) is the one in charge in taking action to guarantee the safety and proper functionality of the schools of the country, which implies that they must define and execute the protocols and strategies to do so in an efficient manner.

## Performance

According to the one of most comprehensive reports developed by the incumbent government at that moment, 4,645 schools were damaged in some way by the earthquake, affecting over 1.6 million students. The estimated losses in this regard ascended to a total of 30 billion USD, representing an 18% of the GDP of the country at the time. From the total of 1.6 million students affected, about 1.25 million were unable to start their classes at the official date, which corresponded to the first week of March (*La Reconstrucción en Educación. Una Mirada a los Procesos y Desafíos en la Reconstrucción de la Infraestructura Escolar Dañada en el Terremoto y Maremoto del 27/F, MINEDUC*, December 2013).

Table 1 shows the distribution of the schools according to their evaluated damage. Minor damage implied non-structural damage that did not compromise the school operation, while moderate damage corresponded to non-structural damage that did compromise normal functioning of the school. On the other hand, severe damage meant that the school had both non-structural and structural damage, but its facilities were compromised less than 50%, whereas total damage was defined as structural damage of over 50% of the school infrastructure.

*Table 1: Damage distribution in Chilean schools*

Damage	# of schools	%
Undamaged	3962	46.09
Minor	2988	34.76
Moderate	851	9.90
Severe	666	7.74
Total	130	1.51

According to a survey developed by the Regional Secretary (SEREMI) of the Planning Ministry from the Metropolitana Region, 9.1% of the students of this region saw the start of their school year delayed, while 3.4% had to change schools due to the earthquake. Meanwhile, between the Valparaíso and Araucanía regions, 39.4% of the students started their school year later in the year, while 5.6% had to change schools. This survey was carried out between May and June 2010, and 22,456 homes were surveyed (*Encuesta Post Terremoto: Principales Efectos sobre la Población de la Región Metropolitana de Santiago*, May 2011).

It is important to note as well that 90% of the 130 schools that suffered total damage corresponded to public schools (called *Establecimientos Municipalizados* in Chile), which normally receive students coming from low and middle-low income families, implying that highly vulnerable students became even more vulnerable. This meant the situation was critical, so the government that had just taken office decided it was necessary to act swiftly, favoring that students got back to classes as soon as possible.

## Strategy and Results

When the earthquake occurred on February 27th, classes were scheduled to start in only a few days, as they usually begin during the first week of March. This represented a critical situation in which it was necessary to act as quickly as possible, but at the same time to be able to give proper solutions to all the students affected. Also, only 12 days after the earthquake (March 11<sup>th</sup>), a new government was going to take control of the country, so they also had to devise an action plan because they were going to have to deal with the bulk of the reconstruction process. At the same time, it was very important that incoming and outgoing governments came to terms with the initial steps of the reconstruction process, as they were from different sides of the political spectrum (incoming was center-right while outgoing was center-left). In the end, they were able to agree on some elements, even though the reconstruction process would be subjected to controversies, mostly on its evaluation by both parts.

The damage assessment was the first main action to take. Initially, a basic evaluation guideline (*Pauta de Evaluación Básica, Ficha 1*) was given to each school owner, so they could inform the damage suffered to their infrastructure to their authorities. Public and subsidized schools have access to a georeferenced software to send this type of information. However, multiple schools had to communicate their issues via phone, because they lost access to the elements necessary to access the system in the earthquake. Another problem was that the damage was not assessed in the same way by everyone, because of fear to lose the subsidy from the government in the case of subsidized schools (resulting in the minimizing of their damage), or exaggerate the damage to obtain more resources so they could use them for other purposes besides reconstruction in the case of public schools.

To solve these issues, another survey had to be created called *Ficha de Evaluación Técnica: Estado Físico del Establecimiento, Ficha 2* (Technical Evaluation Survey: Physical State of the School) which was carried out by experts from each regional planning office from the Education Ministry, Public Works Ministry architects, engineering teams, and teachers and students of related careers.

### *Steps of the reconstruction process:*

As of March 11, 2010, 2,953 schools were unable to hold classes, representing a total of 1.25 million students (40.7% of the total students of the country). The highest concentration of students without classes was in the Maule and Biobío regions, which had 59.9%, and 59.8% of their students prevented to attend school, respectively (*La Reconstrucción en Educación. Una Mirada a los Procesos y Desafíos en la Reconstrucción de la Infraestructura Escolar Dañada en el Terremoto y Maremoto del 27/F, MINEDUC, December 2013*). In response to this critical condition, the general plan was divided into four stages: *Emergencia* (Emergency), *Estabilización* (Stabilization), *Reconstrucción Temprana* (Early Reconstruction) and *Reconstrucción* (Reconstruction) (*Plan de Reconstrucción Terremoto y Maremoto del 27 de febrero de 2010; Resumen Ejecutivo. Gobierno de Chile. August 27, 2010*).

#### 1) Emergency Stage

The initial emergency stage of the process had the goal of students being back in classes before April 26<sup>th</sup>, only 45 days after the earthquake. This was to avoid, at all costs, the cancellation of the school year for thousands of students. Also, it was to favor the construction of safe spaces, restoring social order and helping parents reduce the number of difficulties they had to endure, in a short period of time. For

this period, a total of 642 schools were supported in some way, either by the installation of temporary facilities, such as tents, containers, buses, and temporary housing, or by the relocation of students in an undamaged school of the same municipality (which had to be shared with the students attending that school).

Other measures taken during this period were the reassignment of funds from the School Infrastructure Fund towards the most critical cases. This prioritized low-cost projects for schools that applied to this special fund so as to obtain a fast implementation of a temporary solution. The government used this strategy to generate a big impact, to the greatest number of students possible. Secondly, they asked available schools to modify their schedules to allow damaged schools to teach classes in their facilities. This implied partitioning the day into up to three periods, so students from all schools could attend.

The third measure taken corresponded to the flexibility of the infrastructure. When there were no temporary facilities provided for schools to operate, non-educational buildings, both public and private were set up to serve as schools temporarily. The final measure dealing with schools had to do with transportation. Students from rural areas that had lost their school and who had to be relocated to another building far from their homes were provided with transportation services so they could attend their classes.

Finally, there were also measures regarding the universities. This included an emergency scholarship to students that were affected the most to avoid dropping, helping partially to cope with their difficulties, and the exceptional call to apply for state loans, geared specifically to people affected by the earthquake or the tsunami.

## 2) Stabilization Stage

This stage of the reconstruction process took place between April and July 2010 and had the main goal of improving the students' conditions. There were approximately 75,000 students sharing buildings, making them one of the groups that were in critical condition at this point and who needed to normalize their situation. Also, the large group of students in temporary structures required better sanitary conditions, and protection from harsher weather conditions that were approaching imminently (winter season is between June and September, which might include strong rain and snow in some places, especially closer to the Andes). In total, 128 projects were funded through a special plan devised for subsidized schools called *Plan Establecimientos Particulares Subvencionados sin Fines de Lucro* (Non-Profit subsidized Schools Plan).

## 3) Early Reconstruction and Repair Stage

The early reconstruction and repair stages were the ones that included the execution of definitive retrofitting and new buildings projects in the schools that applied and were selected for the different plans devised by the government. These plans were divided into two groups, minor and major repairs, and calls to apply were made every few months. The selection of the schools was made by the combination of criteria such as the number of students, standardized tests performance, possibilities of contributing to the project funding, and damage level. Each school had to present its own projects to apply for the funding. In total there were five calls for minor repairs and two for major repairs, while there were also some special plans called the Replacement Plan, Earthquake Closure Plan and Emblematic Schools Plan. Each of the plans devised is detailed in Table 2.

PRM stands for *Plan de Reparaciones Menores* (Minor Repairs Plan); PRMA, *Plan de Reparaciones Mayores* (Major Repairs Plan); *Plan de Reposiciones*, *Plan Sismo Cierre* and *Plan Establecimientos Emblemáticos* mean Replacements Plan, Earthquake Closure Plan and Emblematic Schools Plan, respectively. Within Universities, there was a plan called *Aporte a Instituciones de Educación Superior*

(Contribution to Superior Education Institutions), which funded a total of 18 projects.

Table 2: Summary of the different repair plans applied by the government

Plan Name	Date	Objective	Min. % of co-funding	Schools selected/applying	Students benefitted
PRM1	07/06/2010	Recovery of basic conditions	20 %	601/971	302,240
PRM2	08/19/2010	Recovery of up to 50 % of the infrastructure	20 %	333/708	166,323
PRM3	04/19/2011	Up to 30 % infrastructure	10 %	432/665	191,004
PRM4	09/27/2011	N/D	10 %	123/215	47,690
PRM5	04/24/2012	100 % inf.	10 %	138/281	45,656
PRMA1	06/24/2011	Up to 50 % inf	10 % public/subsidized; 50 % private	27/46	20,181
PRMA2	12/15/2011	Up to 50 % inf.	10 % public/subsidized; 50 % private	8/27	6,400
Plan de Reposiciones	09/09/2011	Over 50 % inf., without increasing student capacity	N/D	10/18	4,610
Plan Sismo Cierre	07/23/2013	Full Repair	N/D	56	N/D
Plan Establecimientos Emblemáticos	12/07/2010	Full Repair	N/D	50	N/D

## Problems Encountered

An examination of the reconstruction state published in June 2014 compiled by the Presidential Delegate in reconstruction from the Interior Ministry recognized that the reconstruction process was mostly successful, but presents a few criticisms and suggestions for modification on policies implemented that are important to highlight (*Diagnóstico estado de la reconstrucción, terremoto y tsunami, 27 de febrero de 2010*).

First, the number of schools damaged in different reports is not consistent, showing a total of 6,168 schools damaged in *Plan de Reconstrucción Terremoto y Maremoto del 27 de febrero de 2010* compared to 4,654 in *La reconstrucción en Educación. Una mirada a los procesos y desafíos en la reconstrucción de la infraestructura escolar dañada en el terremoto y maremoto del 27/F* (Ministerio de Educación, December 2013), and 4,635 in *Reporte de cumplimiento de la reconstrucción del terremoto del 27 de febrero de 2010* (Gobierno de Chile, January 2014). However, for this report, the considered values were those from the most exhaustive source, which corresponds to that developed exclusively for the purpose of evaluating education impacts, developed by the Education Ministry in December 2013.

Originally, the government had the objective of having 100% of schools either constructed or repaired by 2012. However, the accomplishments report of 2014 (*Reporte de cumplimiento de la reconstrucción del terremoto del 27 de febrero de 2010*, Gobierno de Chile, June 2014), states, in a convoluted way, that the funding had already been given to 2,001 schools, which corresponded to 2,566 projects, of which 2,353 were completed, meaning a completion rate of 96.7 %. It should be noted that one project does not necessarily mean one school, so the report does not measure the completion of the original goal directly, because they refer to the project funding and not to the actual completion rate of the construction or repairs. Also, that means that by the time the original goal had to be completed (i.e. 2012), the 100% completion rate was far from being achieved.

Another point that is questioned and suggested to be modified in the future has to do with the way the government evaluated the projects proposed by schools after applying for public funding. Most of the various reconstruction plans mentioned in the previous section required that the school co-fund the project by at least a 10%. The evaluators of the projects favored schools that were able to pay their part in the funding with higher scores, thus improving their probability of being selected. This did not help poorer schools, because they were incapable of affording the co-funding. The 2013 report indicates that there were cases in which the schools were able to pay only 5% of the total value of the project or even be exempted from paying at all, but it is never stated how that was determined, nor did it clarify in which cases it was possible to opt for that.

In addition to the evaluation through co-funding capability, the funding methodology favored schools that presented better results on a standardized test that is given annually in Chile, which measures the education quality of each school called SIMCE (the acronym for Education Quality Measurement System, in Spanish). The problem is that, again, poorer schools tend to present worse results on this test, harming them even more in the possibility of obtaining funding from the Ministry.

Both of those measurements for funding resulted in schools having to opt for other means of funding (i.e. through NGOs, NPOs, or private companies). The *Reporte de cumplimiento de la reconstrucción del terremoto del 27 de febrero de 2010* goes further by stating that there were some schools that were not funded by any organization at all, which resulted in their closure. Also, it is indicated (though no numbers are presented) that some schools began classes in damaged buildings, exposing people to severe risk by doing so.

Finally, the April 2014 report on the evolution of the reconstruction states that the total number of schools that received public funding were 2,048 (1,477 Public, 562 subsidized, 9 with delegated administration). However, 67 schools of this total finally rejected the funding, either because they opted for other means of funding or because they did not finish all the paperwork required to start the works, and 11 schools were closed definitively. More details are found in Table 3.

*Table 3: Distribution of funding of damaged schools, by type and funding source (April 2014 progress report, MINEDUC)*

School state\School Type	Delegated Admin.	Subsidized	Public	Total	Total Students
<b>Funded with other resources</b>	44	1,160	1,272	2,476	726,481
<b>Funded by MINEDUC</b>	9	562	1,477	2,048	942,808
<b>Closed</b>	0	44	67	111	8,514
<b>TOTAL</b>	<b>53</b>	<b>1,766</b>	<b>2,816</b>	<b>4,635</b>	<b>1,677,803</b>

## Methods

The team spent five days visiting communities that were affected by the 2010 earthquake, observing the physical state of schools and universities, conducting informal interviews with locals about their experiences during and after the event, and discussing with local professionals the state of practice in Chile. After the trip, the team performed a literature review.

## Observed State

In general, there was no observable damage, which is expected given the seven year period between the earthquake and the time of the visit. Every school the team observed was fully functional and appeared undamaged, although several schools and university facilities showed evidence of retrofit (see Figures 1-2)



*Figure 1. Retrofitted School in Santa Cruz (credit: Laura Whitehurst)*



*Figure 2. University of Talca facility retrofitted with steel brace diaphragm (credit: Laura Whitehurst)*

One university visited as part of the reconnaissance, Pontificia Universidad Católica, has placed an emphasis on new buildings being base isolated and two of these buildings were investigated (See Figure 3-4).



*Figure 3. Base Isolated Building on Pontificia Universidad Católica Campus (Innovation Center) (credit: Laura Whitehurst)*



Figure 4. Base Isolated Building on Pontificia Universidad Católica Campus (Engineering School) (credit: Laura Whitehurst)

Santiago residents reported that there was very little damage to local schools. Michael Rendel, a practicing engineer, reported that while there was virtually no structural damage in Santiago, many schools suffered heavy non-structural damage, and this was an impetus to improve the building code provisions for anchorage of non-structural elements.

During interviews, residents of Santa Cruz consistently identified that a school in nearby Palmilla had been heavily damaged, but no other local schools were damaged. The 2013 report on school reconstruction (*La reconstrucción en educación*, MINEDUC, 2013, p.49) shows one school in Palmilla that suffered severe damage. One resident described the Santa Cruz schools as being used for shelters and storage for emergency responders.

A resident of Lolol reported that there was no damage to the two schools in the area, that neither were of adobe construction typical in the area, and that the delay of school restarting did not have a big impact in this community.

In Constitución, residents described schools in the inundation zone as being damaged by flooding during the tsunami, but not by the earthquake, and were thus reopened in the same location. One resident reported that school was delayed by two months due to the psychological trauma to the students, and that everyone in the community had access to group therapy conducted at the schools. In the social housing community of Villa Verde, which was relocated from an inundation zone, there is currently no public primary or secondary school. There is a small kindergarten with limited capacity, which has plans for expansion, according to a teacher working there.

A resident of Talca reported that schools there were heavily damaged, and that they were identified as a top priority in the reconstruction effort.

In Viña del Mar, according to Jorge León, no schools have been relocated out of the tsunami inundation zones. One resident reported that at least one school in the inundation zone has been using a vertical evacuation strategy, which is not officially endorsed by the Chilean government. The resident described a small yard on an elevated level of the school which was not large enough to accommodate the full

capacity of the school.

A resident of Iloca indicated that the local school had been destroyed in the tsunami and had subsequently been relocated up the hill out of the inundation zone. Upon further research, it was found that this new school is still in the inundation zone, but much closer to the hills.

A university professor reported that there had been no organized effort of qualified university engineering students to assist in post-earthquake damage assessments, and that this was a potential area for improvement.

## Level of Recovery and Mitigation Methods

The officials at the various public entities throughout Chile were forced to make important decisions regarding school operability following the 2010 event. Key decisions, such as the swift evaluation of the affected schools, led to the recovery of the education system.

Per our observations and interviews, it seems that schools were a priority in the recovery process. Now, nearly seven years after the earthquake and tsunami, the level of recovery appears to be nearly complete and the education systems seems back to normal. Of the locals we spoke with, none reported any remaining damage, indicating that the recovery is nearly complete. Several of the schools we visited had already undergone recovery and had been retrofitted. For example, as seen in Figure 2, the University of Talca has a retrofitted lateral system. Several of the other schools that we passed, such as the one from Santa Cruz pictured in Figure 1 also appear to be completely recovered.

Additionally, certain mitigation methods have been put into place for future events. The design code has changed to make schools safer. Tomás, an engineer from Santiago, highlighted some of these changes. For example, a 1.2 importance factor is required on school design. All projects must be peer reviewed and architectural associations have made schools a focus post-earthquake. According to a 2013 government report on school reconstruction, there were many architectural and engineering offices that helped with the design of new or repaired buildings. To further the effort to improve school safety, a recent conference in Chile focused particularly on schools and the theme was “schools are the future” (according to one local engineer). According to the school security plan devised by ONEMI (*Plan de Seguridad Escolar*, 2011) schools must review their security protocols each month, either through simulations (which involve neither the students nor any type of movement) or drills (involving movement of students). We also heard anecdotal reports of schools being relocated out of inundations in Iloca for their future safety; however, some were not relocated in Constitución.

## Transformative Improvements

The transformative improvements that have emerged as a result of the recovery and rebuilding since the disaster are many. All the mitigation methods mentioned above contribute to the betterment of school safety in Chile, however several improvements are notable. Now, in assessing a particular school’s safety, inundation zones are highly considered and this has resulted in the relocation of several schools. Secondly, all schools are now required to have evacuation and/or emergency plans and practice them regularly.

## Conclusions

There are several types of conclusions to be made from the material in this report. In the following section, conclusions about the processes of compiling this report are presented, and then general conclusions about the observed state are mentioned.

In this resilience study, we faced several challenges in collecting information. The locations that were visited did not necessarily align with what would have been ideal for collecting information on the damage to schools and school systems, therefore most of the information had to be second-hand and unverifiable. We were able to interview many locals; however, we had little means to verify the assertions they made and additionally did not have the opportunity to follow up on their recollection of the associated buildings' performance and current state. Additionally, school was not in session. This meant that we did not have the opportunity to visit and inspect public K-12 schools and observe their functionality of serving the community. We did not have any opportunities to speak to teachers about their roles in the recovery and what their perspective of the performance was.

The second type of conclusions we were able to draw are related to the observations we had in the field. Although there was some discrepancy in the amount of damage that was reported (as outlined in the Impact on Schools section) and what we recorded of the locals' report now, we have concluded that overall there was an adequate performance of schools during the earthquake. Locals seemed satisfied with the school's performance. It seems the non-structural damage was adequately addressed in the code. However, improvements can be made in a standardization of emergency response protocol. Additionally, it should be seen-to that every school follows these official protocols, rather than what is convenient. Finally, the greatest improvement that can be made is in the relocation of schools in inundation zones. If this is not possible, providing designed vertical evacuation structures would also do. On a national level, guidance could be provided on the vertical evacuation requirements.

Overall, Chile had an incredible response to the 2010 Maule Earthquake with respect to schools and school systems. Avoiding cancelling school was prioritized and this is reflected in how quickly the students were able to get back to school. The overall satisfaction we observed from the locals is also a great indication that Chile did a good job in the performance, reconstruction and rehabilitation of schools.

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## Summaries of Informal Interviews Conducted

Professor: No organized effort of qualified university engineering students to help out post-earthquake.

Local in Iloca described that the school had been destroyed in the tsunami but had been relocated up the hill out of the inundation zone (verification: There is a new school in Iloca called Colegio Dr. Manuel Avilés Inostroza, which receives students between 1<sup>st</sup> and 8<sup>th</sup> grade, it is still located in an inundation zone, i.e. below 30 meters over sea level, though is right next to the hills.)

Viña del Mar: no schools have been relocated out of the inundation zones (according to Jorge León). Also vertical evacuation is not an official strategy.

José (Viña del Mar): There is a school (private, all ages) located in the inundation zone in Viña del Mar which has been using vertical evacuation as their *modus operandi* in the earthquake and tsunami drills carried out in recent years. The school makes all the students gather in a small yard located in the fourth floor of the main building, which is not enough to hold the entirety of the people that attend and work there (around 1500 people). A matter of concern here is that this method of evacuation is not officially approved or supported by the authorities, so it is important to direct efforts into the execution of the proper protocols by all institutions, regardless of their type (public, subsidized or private).

Patricio Catalán: Kids are the ones you need to teach first (transmit information up).

Pontificia Universidad Católica: Emphasis on new buildings being base isolated

Christian (Santa Cruz): schools in the area didn't have major damage (except Palmilla) because most were relatively new and were used as shelters and storage facilities for emergency responders. Different community without the municipality organized and deployed teams in the region. 1 month before classes started.

Old man (Santa Cruz): Palmilla school was damaged and rebuilt (verification: according to the 2013 report on school reconstruction (*La reconstrucción en educación*, MINEDUC, 2013), the map on page 49 shows that for Palmilla there was one school that suffered severe damage. There is not detailed information in whether or not the school was demolished or retrofitted though). He cleans streets around schools and didn't see much damage.

Many locals in Santiago and Santa Cruz reported no damage to their schools.

Miguel (Santiago engineer): no structural damage, only non-structural damage. Many schools throughout the country were damaged. Requirements for anchorage of non-structural elements was a huge change after the eq.

Irene (Lolol): 2 schools, neither damaged, one was "solid enough" (not adobe), the other was new. Didn't use schools as shelters (people moved to relatives or used tents). Didn't remember if classes were postponed. (verification: Classes were postponed in all the regions affected by the earthquake, however there were schools that started a week or two after the original official date, while others took over a month to start).

Ruth (Constitución): 2 daughters in 2 schools, 1 next to river (not much damage, just flooding), school stayed in same location and was just renewed; other daughter in school 2 blocks from river also flooded, same. School started 2 months late due to the emotional trauma to the community. Everyone underwent group therapy at the schools.

Family (Constitución): Sons were in damaged schools, temporary schools built in the hills, lost 1 year of

classes (verify). In the new Villa Verde (social housing), there is only a kindergarten, and only available for 2 years old and older, which makes it difficult for working moms. The only higher school in the area is a subsidized school (Colegio Bosques de Gaia -- all ages, considered by the Ministry as a middle-high class school), which is not affordable for the people living in social housing.

Kindergarten teacher Cat interviewed (Constitución): Temp structure, planning a permanent one. Only 25 kid capacity currently. This is a new service for the relocated community, there wasn't a similar kindergarten in the old location by the river.

Constitución: local said schools were not damaged by tsunami (except flooding) and were not relocated

Eduardo (from University of Talca): many schools damaged. Schools were a priority in the rebuilding effort.