



Eleventh U.S. National Conference on Earthquake Engineering
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LFE AS A DEVELOPMENT TOOL FOR NEXT GENERATION EARTHQUAKE PROFESSIONALS

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M. Comerio⁵, and A. Julius⁶

ABSTRACT

In January 2017 the Earthquake Engineering Research Institute in partnership with the National Research Center for Integrated Disaster Risk Management (CIGIDEN) led a five-day travel study program in Chile in which students and young professionals engaged in learning from earthquakes activities. The 16 participants attended lectures and field trips and completed two resilience projects to contribute to the body of knowledge about recovery since the 2010 Maule earthquake while also becoming familiar with reconnaissance tools and techniques. The program was created to provide learning-from-earthquakes opportunities for younger members outside the limited post-event reconnaissance teams; and to engage younger members in EERI activities and train them for future reconnaissance, which might include long-term resilience and recovery components. The success of the program can be attributed to the strong partnership with CIGIDEN, experienced mentors who accompanied the group, senior academics and practitioners who lectured and led tours, as well as a strong interdisciplinary team of participants who worked extremely hard interviewing locals and compiling the data for their resilience projects.

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In January 2017 the Earthquake Engineering Research Institute in partnership with the National Research Center for Integrated Disaster Risk Management (CIGIDEN) led a five-day travel study program in Chile in which students and young professionals engaged in learning from earthquakes activities. The 16 participants attended lectures and field trips and completed two resilience projects to contribute to the body of knowledge about recovery since the 2010 Maule earthquake while also becoming familiar with reconnaissance tools and techniques. The program was created to provide learning-from-earthquakes opportunities for younger members outside the limited post-event reconnaissance teams; and to engage younger members in EERI activities and train them for future reconnaissance, which might include long-term resilience and recovery components. The success of the program can be attributed to the strong partnership with CIGIDEN, experienced mentors who accompanied the group, senior academics and practitioners who lectured and led tours, as well as a strong interdisciplinary team of participants who worked extremely hard interviewing locals and compiling the data for their resilience projects.

Introduction

The Learning from Earthquakes (LFE) program [1, 2] has been a foundation of the Earthquake Engineering Research Institute (EERI) since its inception [3]. Participants in the multi-disciplinary reconnaissance teams have brought back observations and lessons of the effects of destructive earthquakes that have served as catalysts for research, code evolution, and policy development.

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Equally important has been the impact on the participants themselves; visiting the location of a destructive earthquake or tsunami provides hands-on applications of principles in fields ranging from the geosciences and engineering to the social sciences.

Recognizing the importance of earthquake reconnaissance, EERI piloted a new initiative in 2017, the LFE Travel Study Program, to conduct field study trips that allow young professionals to engage in learning-from-earthquakes activities as an alternative to participation in the limited post-earthquake reconnaissance opportunities. The program was modeled on several professional development programs, in particular a geotechnical earthquake engineering on-site short course developed by the National Technical University of Athens and Japanese industrial and academic partners that has operated since 1999. The EERI Travel Study pilot was held in Chile in January 2017 and was co-organized with in-country EERI partners from the National Research Center for Integrated Disaster Risk Management (CIGIDEN).

Set in Chile to take advantage of lessons learned from the Mw 8.8 2010 Maule earthquake, participants were able to monitor the reconstruction progress taking place, as well as assess the technological improvements in seismic protection the country has implemented in the last seven years. During the 5-day program 10 graduate students and 6 young professionals engaged in a variety of interactive learning activities including lectures from distinguished local and international experts, field data collection, tours of research and operational facilities, meetings with local professionals from the public and private sectors, and visits to locations impacted by recent earthquakes in Chile. Participants were assigned to four work groups to study the resilience of housing, schools, healthcare facilities, and businesses in Chile. Participants were required to learn and use some of EERI's reconnaissance tools as part of their data collection and reporting.

Program Framework

EERI is a multidisciplinary organization whose membership includes researchers, practicing professionals, educators, government officials, and building code regulators. While EERI is based in the United States, it has international membership and strives to support and collaborate with its international counterparts. The LFE travel study program developers felt that it was essential to infuse elements of EERI's mission, which include advancing the science and practice of earthquake engineering; improving understanding of the impact of earthquakes on the physical, social, economic, political, and cultural environment; and advocating comprehensive and realistic measures for reducing the harmful effects of earthquakes. While nothing can replace the experience of going into the field right after an earthquake, the intent was to provide experiences that would inform and train participants so that they would be good candidates for future reconnaissance teams. Further, there was a strong interest in connecting younger members of EERI more deeply to the organization. This led to the following set of goals that guided the program development:

- Engage in learning-from-earthquakes activities as an alternative to participation in the limited post-earthquake reconnaissance opportunities.
- Foster dialogue and interaction among members in various disciplines, as well as participants and the host country.
- Provide an experience that allows younger members to gain stronger connections to EERI and its LFE program, while also inspiring them to become future leaders in the field of earthquake

engineering and earthquake risk reduction.

- Increase the participants' knowledge in a wide range of earthquake engineering, earthquake response and recovery topics related to both research and practice; and encourage thinking about earthquake risk mitigation, preparedness and planning.
- Offer EERI members a unique opportunity to learn directly from local experts in the field, facilitating international knowledge transfer.
- Provide learning experiences that inspire participants to apply lessons learned to preparedness in their own community upon return home.
- Engage experienced members who have conducted reconnaissance for EERI after past earthquakes and provide them an opportunity to transfer their knowledge to the future generation of members via an exciting activity.

Learning Outcomes

A first step in developing the program curriculum was to define what the participants would learn. A set of learning outcomes was developed to guide the content and format of program activities:

1. Recognize the value of both immediate and long term reconnaissance activities.
2. Know, for the visited region, the earthquake impacts; current levels of recovery to natural, built, economic and social environments; and constraints and challenges to recovery and the rebuilding process.
3. Make connections between impacts, reconnaissance, and lessons learned, etc.
4. Understand the multidisciplinary processes and components and challenges in earthquake recovery.
5. Understand the interdependencies and coordination necessary among the many disciplines involved in earthquake risk reduction and the differences around the world.

Program Content and Schedule

To meet the goal of engaging participants in LFE-type activities, organizers considered international locations that reconnaissance teams had visited in recent years. Chile, which had suffered extensive damage from multiple earthquakes and tsunamis since 2010, was a top choice because of a strong in-country partner in CIGIDEN. In addition, by holding the program immediately following the 16th World Conference on Earthquake Engineering (16WCEE), participants could leverage their travel and could attend several sessions at the 16WCEE that would help prepare them for the activities. In addition, experts from the United States who were attending the 16WCEE could stay a few extra days and participate in the travel-study program.

The program, consisting of a mix of lectures, field trips, and hands-on projects, was built around themes of recovery and resilience. Faculty and practitioners from both the United States and Chile gave lectures, and in one case a lecture was delivered remotely from the U.S. through video conferencing. Two U.S. and two Chilean experts attended all events and travelled with the program for all five days. The role of these experts is discussed in the section on logistics.

The participants were broken into four work groups of four, and each work group was assigned two projects to complete. The formation of small groups helped create a sense of community, and the projects were designed to mimic the type of deliverable a reconnaissance team would need to produce after an earthquake. In addition, the projects were designed to contribute

to the body of knowledge about the recovery in Chile and have been posted to the Earthquake Clearinghouse so that they are publicly available [4, 5].

Table 1 summarizes the content of the program. The early part of the week was somewhat lecture-heavy to provide participants with information they needed to complete their resilience projects. In retrospect, the program was very full and more time should have been provided each day for planning and reflection.

Table 1. Overview of Program Schedule

Day	Activities
1	Lectures (4): Chile’s hazards and recovery, with particular attention to housing and health care Activities (2): Geolocating photos and the process for upload to EERI web site; project group planning on strategies for data collection
2	Field Trip: Chilean Navy Hydrographic and Oceanographic Service (SHOA) to view Tsunami Warning system Lectures (2): Lessons from 2010, 2014 and 2015 tsunamis; Elements of tsunami evacuation Activity: Field resilience observation, tsunami evacuation paths
3	Lectures (2): Performance of tall buildings; seismic protection and mitigation Field Trip (2): seismic protection devices laboratory at Pontificia Universidad Católica de Chile; visits to several Santiago hospitals and buildings with seismic protection. Networking with local professionals
4	Field Trip: Based Isolated Social Housing Project; Winery; Repaired traditional adobe construction
5	Field Trip: Riverside tsunami protection park, reconstructed riverside structures, and Villa Verde Housing project designed by Alejandro Aravena Lecture: Community recovery and reconstruction in Talca after the 2010 earthquake

Resilience Projects

Based on a “resilience reconnaissance” framework developed through the National Science Foundation funded Resilience Observatory project [6], participants were assigned to four focus groups to study the resilience of housing, schools, healthcare facilities, and businesses in Chile. The goal of ‘resilience reconnaissance’ is to understand how an earthquake affects the continuity of different services and functions (in this case: housing, schools, healthcare facilities, and businesses), and how disruption of these vital services and functions impacts different groups within a community. This approach to reconnaissance requires field investigations that span the dimensions of time, space, and perspective. The following resilience framework questions were given to the groups to guide their investigation so that the interplay between different disciplines, perspectives and spatial scales could be explored.

- What was the overall performance of the service in past earthquakes?
- Which elements or components proved to be critical to the function of the service and why?
- Did the service have any cascading impacts—positive or negative—on other community systems, services, or functions? Did other community services (i.e. water, sanitation,

electricity, communication, and transportation) have impacts on the performance of this service?

- Were transformative improvements made to the service (or any policies/codes/plans influencing its operation) before the earthquake(s) that somehow changed the service and its function in the earthquake?
- Are transformative improvements being undertaken in the aftermath of the earthquake (or have they already been undertaken) to allow the community to surpass its pre-disaster state/condition?

Each team was comprised of four participants with at least one native speaker of Spanish to facilitate the interview process. Participants were given assigned reading before the program and were asked to attend specific sessions at the 16WCEE to prepare. They also were given an interview protocol that was developed through the Resilience Observatory project piloted in previous earthquakes. Groups were given time (though not enough) to develop a strategy for collecting data. During lectures and on field trips participants interviewed individuals to investigate the resilience of their assigned service. Groups documented their interviews through notes and photographs. Each group authored a resilience report that is posted on the EERI web site in the clearinghouse [4]. The business recovery group [7] and the housing group [8] documented their findings in more detailed conference papers.

The second group project was to assess the tsunami evacuation plan of the city of Viña del Mar by identifying elements that could obstruct an evacuation process after an earthquake. A goal of the activity was to make participants aware of the impact of urban planning on the seismic risk of physical systems. Each group was assigned an official evacuation route proposed by the Chilean National Emergency Office, ONEMI. The groups worked with the inundation maps provided by the Chilean Navy Hydrographic and Oceanographic Service, SHOA, and the official evacuation map provided by ONEMI that identified the safe paths and the emergency meeting points for evacuation.

Each group simulated the evacuation process in their assigned section of the city, assessed the portion of the section that serves each of the meeting points, and identified and mapped the obstacles in the evacuation routes as well as the critical and strategic facilities, infrastructure, lifelines, and utilities (e.g., schools, healthcare facilities, fire and police headquarters, public buildings, pharmacies, bridges) present within the inundation zone. Groups took geocoded photos of the obstacles and hurdles along the evacuation routes which were posted to the resilience page on the EERI earthquake clearinghouse web site [5]. Each group authored a tsunami resilience observations report that is posted on the EERI web site in the clearinghouse [5]. In addition one group documented the activity in more detail in a conference paper [9].

Contributions to EERI Earthquake Clearinghouse

The EERI Earthquake Clearinghouse provides a means of facilitating information dissemination after major earthquakes [1]. Since 2009, information has been shared through virtual clearinghouses in addition to the physical clearinghouses set up by reconnaissance teams in the field. This allows reconnaissance team members, as well as others around the world who may have relevant information, to quickly share plans, reports, and data from an affected area. A virtual clearinghouse was set up following the Chilean earthquakes in 2010, 2014, and 2015; virtual

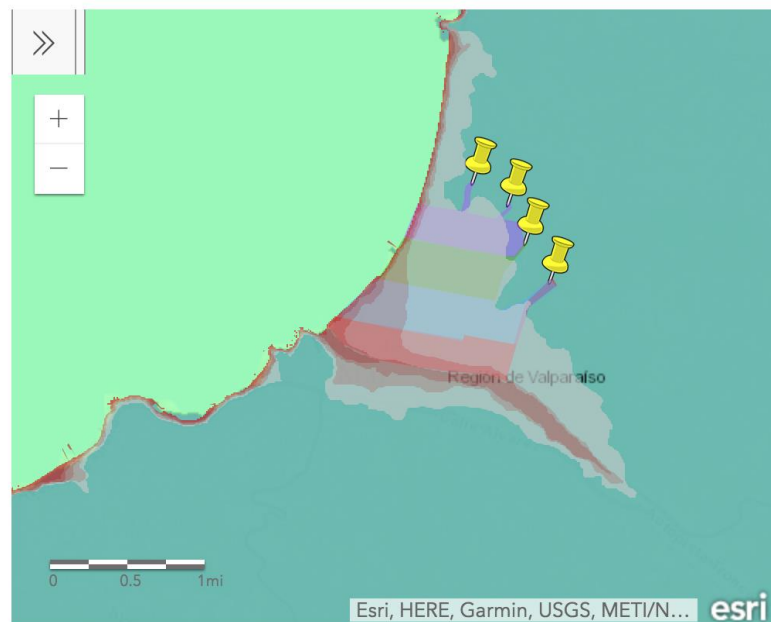
clearinghouses have traditionally been maintained to report only reconnaissance information, but not to report recovery and rebuilding information. The LFE travel-study program provided a new opportunity to archive longitudinal data from Chile. The virtual clearinghouse from the Illapel earthquake in 2015 was used to capture information and data gathered during the travel-study program [10]. Two types of data were captured in the EERI Earthquake Clearinghouse during the travel-study program. First, the virtual clearinghouse served as a repository for group reports. This included the housing, schools, healthcare facilities, and businesses resilience reports, as well as the tsunami resilience observations reports written by each group. Second, the virtual clearinghouse stored photographs on a geocoded map. Prior to the trip, an online ArcGIS map was set up to use while investigating the tsunami evacuation routes in Valparaiso (Figure 1).

Data Visualization Map

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ONLINE ARCGIS MAP

A preview of the data map is shown below. For more functionality (toggle layers, adjust transparency, and view data tables), view the map on ArcGIS Online: <http://arcg.is/2i6hmkw>.



Photos can also be viewed in gallery view here: <http://www.eqclearinghouse.org/2015-09-16-chile/maps-and-photos/photo-gallery/>.

Figure 1. ArcGIS online map of the Valparaiso region embedded into the virtual Clearinghouse, showing tsunami inundation areas and evacuation meeting points.

Participants were taught how to use two tools to process photographs taken in the field: (1) the EERI Photo Upload map to process non-geotagged photos, and (2) the EERI Batch Photo Upload Tool to post-process and annotate a large quantity of geocoded photos. Both tools feed into a database that can be visualized with standardized symbology from a map kml file or as a photo gallery (Figure 2). While studying the tsunami evacuation routes in the Valparaiso region, participants took photographs of notable features, which were processed using the two tools and then visualized on the ArcGIS online map (Figure 3). The travel-study program provided an


opportunity to teach participants data collection and processing methods, and informed them about the benefits of virtual earthquake clearinghouses.

Detail Image Gallery View

[Click here](#) to view tiled gallery view

Filter the listing below by using the pulldown menus

-- All Categories -- - All Photographers - Search

Photo	Description	Category	Photographer
	Vina del Mar Tsunami Evacuation Zone Intersection: Avda. Los Castanos and 5 Norte; no evacuation route sign	Tsunami	Sandra Hyde Edit Delete

[Click to enlarge](#)
[View on map](#)

Figure 2. Sample of gallery of geocoded photographs taken along the tsunami evacuation routes in the Valparaiso region.

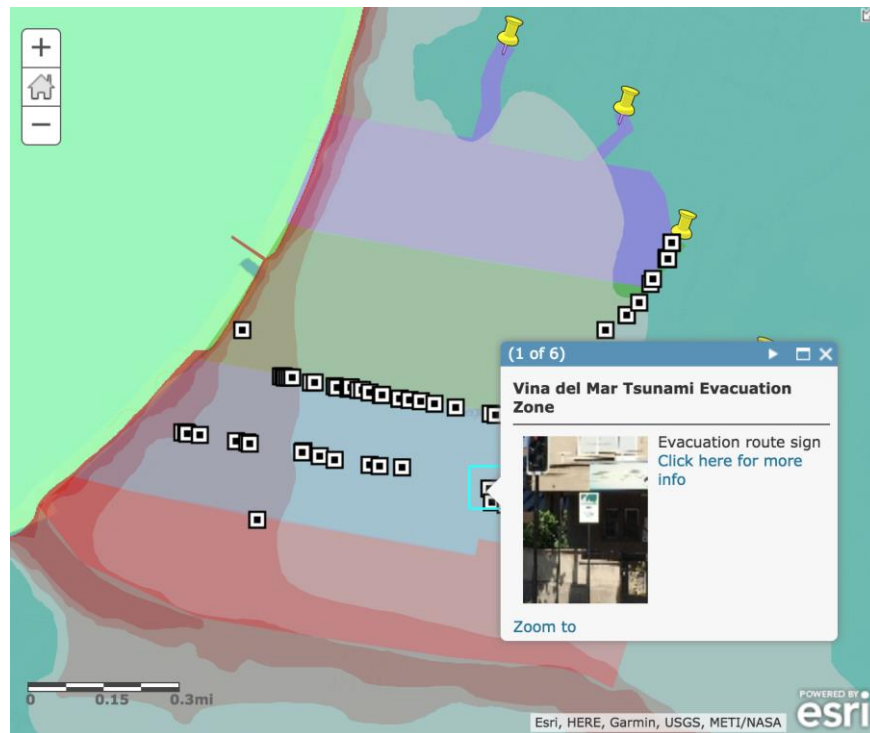


Figure 3. ArcGIS online map of the Valparaiso region including geocoded images.

Ongoing Engagement After the Travel Study Program

While the participants were extremely enthusiastic about what they learned and the colleagues they met, ongoing engagement is needed to continue professional development and support their connection to EERI. Each participant was asked which EERI committees they would like to join, and those names have been given to committee chairs. Several members participated as virtual reconnaissance team members in earthquakes that occurred later in 2017. Other participants were asked to give a presentation at the 2017 EERI annual meeting. As a professional development

opportunity, all groups were invited to submit a paper to the 11th National Conference on Earthquake Engineering to disseminate their findings. As EERI plans for the next travel-study program, participants will be included in the planning committee and possibly asked to serve as a mentor during the trip itself.

Logistics of Trip Organization

Organization and Budget

A planning committee consisting of EERI younger members and EERI staff formed the program goals, learning outcomes, and a timeline with milestones for developing the program. The planning committee brainstormed about where to hold the program and who could serve as in-country partners. Ultimately a recommendation was made to the EERI Board of Directors.

Once a location and partner were selected, a subcommittee met on a regular basis with representatives of CIGIDEN with a goal of creating a draft agenda about six months prior to the start of the program. An important constraint in developing the program was minimizing the costs so that the registration fee would not be too high. Other considerations included ensuring that the program was truly multidisciplinary and supported the investigations for each of the four resilience work groups.

The EERI staff and subcommittee determined the program cost, developed the program announcement, the application and review criteria, and gathered background reading materials about the earthquake and recovery to help the participants prepare for the program. The applications were reviewed by the EERI subcommittee and representatives from CIGIDEN. The potential contributions of each participant was weighted based on their experience in the field of seismic resilience, the impact of the program on their career, and their involvement with EERI. Diversity of disciplines, countries represented, and academia and industry also were considered. Two of the 16 program openings were reserved for Chilean students, thus contributing to engagement of the in-country partner (CIGIDEN), diversifying the group of participants, and ensuring that the program would contribute to strengthening local capacities for future earthquake reconnaissance efforts.

Responsibilities of In-Country Partner

As the in-country partner, CIGIDEN formed a small team to support both technical aspects and logistics. This team was made up of professionals from multiple disciplines and with experience in different aspects of the reconstruction processes. A key issue was to provide a truly local flavor to the technical program. In recognition of the importance of tsunamis as consequential hazards after earthquakes in Chile, the agenda of the program was defined to include tsunami-related topics in the lectures and field trips (see Table 1). An emphasis also was given to exposing participants to a diverse set of stakeholders. To this end, a varied group of practitioners and experts from academia and government was invited to participate in program activities. This proved to be difficult because the program occurred during the summer holidays, and included two days of weekend lectures and field trips.

In developing the program content, the CIGIDEN team had to develop a narrative that would integrate all the planned experiences, while contributing technical information that would support participants' understanding of the occurrence of the earthquake and tsunami in 2010, their consequences for the population and the territory, the processes that the Chilean government carried out to rebuild the country after the disaster, as well as the obstacles and problems in the recovery and reconstruction.

The major challenge for the in-country partner was the organization of the field trips. Fortunately, enough lead time was provided to coordinate the many logistics. These included access to very restricted office buildings (e.g. Titanium Tower), touring the group of 20 people around a clinic during the afternoon, and visiting a base-isolation system in the basement of private condominiums. The key issue to gain access to these usually restricted places was the collaboration with a local engineering firm (SIRVE S.A.) that was involved in the design of these buildings and their seismic protection systems. SIRVE also provided experts (Carl Lüders and Michael Rendel) who joined the group and gave detailed explanations, improving technical understanding and discussions during the visit.

With regard to logistics, the most difficult challenge was to fit a large number of activities and trips in and around Santiago, into a very short period of five days. To make it work, collaboration of the local technical program contributors was crucial, as they adjusted schedules to comply with program constraints, especially with field trips in Valparaíso, Viña del Mar, and the Maule region. Another main consideration was the diversity of allergies and food limitations of the group, which demanded finding restaurants and snacks that allowed everyone to eat properly.

It was important to be prepared for the contingencies of the trip. The tour contemplated visiting a series of adobe-built villages in the Maule region; however, the organizers had to change plans on the spot because a large forest fire devastating the regions of O'Higgins and Maule closed the roads. Since alternatives had been planned in advance, the trip could be restructured without interruptions or problems.

Finally, the in-country partner was responsible for keeping track of the expenses of the food and field trips, paying the corresponding bills, saving the bills, and delivering a summary of all the expenses to EERI for reimbursement.

Role of Professional Experts

In typical post-earthquake reconnaissance teams, EERI brings together subject experts that are appropriate for the specific circumstances of the particular event. In addition, they strive to build a team that brings a mix of people with and without prior reconnaissance experience; as well as with and without in-country experience. This allows for younger team members to learn from those with more experience and local knowledge. Similarly, the LFE Travel Study program had two senior mentors (Thalia Anagnos and Mary Comerio) and two in-country experts (Felipe Rivera and Rosario Walker) who traveled with the group for the entire program. These individuals were able to provide detailed technical, local and disaster-specific commentary throughout the program, and served as mentors to many of the group's participants. For example, discussions on the bus

and over meals often encompassed specific earthquake recovery topics but also included career advice, and other personal/professional topics.

Part of the role of the experts was to provide sufficient background information so that program participants experience the territory independently, without the accompaniment of the experts, as was the case in Viña del Mar. In this case, the working groups identified and analyzed the evacuation routes to similar all visitors during the summer season.

Program Evaluation

In February 2017 a survey was sent to participants and 15 of the 16 participants completed the survey. Participants were asked about the length of the trip, its cost, the application process, preparation materials, the quality of the speakers, whether outcomes were met, and how the experience would affect their future goals.

The participants were very enthusiastic about Chile as a location. Reasons cited were the ability to learn about new technology and new buildings as well as damage; the inclusion of tsunami impacts and mitigation in the program; and the variety of places that were visited, ranging from big cities to smaller communities. One participant was disappointed that the program was not able to visit the most damaged parts of Chile. Organizers discussed visiting Concepción, but decided it would be too much traveling and raise the cost of the trip excessively.

Participants felt that they were given enough information to prepare for the trip. Communications included travel instructions, reading assignments, a detailed agenda, group rosters, and the two resilience assignments that the participants completed during the program. In particular, the set of reading compiled before the trip was comprehensive and very helpful in helping them understand the context and the big issues. One or two people felt that there was too much reading, but there may have been a misunderstanding about what was required and what was optional. The readings could have been better organized to help participants prepare for their particular topics. Suggestions for the future included limiting the reading to just a few required papers and not providing the list of optional material, providing more optional materials that covered topics in more depth, annotating the reading list with a one line summary of the contents, asking participants for suggestions about relevant reading materials, and assigning each member a particular paper and asking them to summarize it for the group.

Participants felt that the quality of the speakers was excellent and that the trip goals were met to a high degree. Participants were asked if the learning outcomes were met. All 15 respondent indicated that outcomes 4 and 5 were completely met. Two areas that need some improvement are recognizing the value of both immediate and long term reconnaissance (Outcome 1), and knowing the current level of recovery and the challenges to recovery and the building process (Outcome 2). Most participants felt that these two outcomes were met, but those that didn't expressed a wish to have a longer trip and more time to interact with locals.

All participants were responsible for their own airfare plus a registration fee. Students each paid a \$150 registration fee. All indicated that it was just right. The professionals each paid a \$1000

registration fee. Three said it was just right, two said they would pay more, and one indicated it was 20% too high.

Participants generally liked having the program coupled with the 16WCEE because it reduced travel costs, but several people felt that it made for a long somewhat exhausting couple of weeks. On the other hand they liked that we had tied some of the sessions at the 16WCEE to activities in the travel study program. While no one mentioned it, the pairing of the travel study program with the 16WCEE required a Saturday start for the program, which was problematic. It would be preferable to be able to start on a weekday.

Discussion

Successes and Best Practices

Overall the program achieved its goals and a recommendation has been made to continue the program. The two resilience projects focused the curriculum and added meaning to each of the lectures and field trips. The projects helped the participants learn some of the tools they would need in future reconnaissance activities such as how to manage geocoded photos and upload them to the EERI Earthquake Clearinghouse. Because of the enormous amount of work that goes into the curriculum and logistics, a cycle of every 2 years is proposed. Partnering with an institute or professional organization in the host country is essential to ensuring high quality interactions and it provides an excellent opportunity for EERI to strengthen its relationships with international counterparts. It is important that the host country feels that they are benefitting from the program, so EERI plans to continue the practice of reserving some spaces for students and younger members from the host country. Local participants also are important leaders in the data gathering because they know the language and understand the local culture.

In reviewing the applications, attention was paid to ensuring that the cohort was multidisciplinary and included both students and young professionals. To the extent possible the work groups were also multidisciplinary and included both students and young professionals. This mix supported multiple viewpoints and some informal mentoring.

An important element that contributed to the success of the program was the engagement of several EERI members who participated in reconnaissance and recovery studies in Chile. Their participation in planning the program, identifying important issues to cover, and traveling with the cohort was invaluable.

Proposed Improvements and Future Plans

To support ongoing engagement with participants and to improve upon the pilot, EERI plans to expand the membership on the LFE Travel Study Program Subcommittee to include former participants. The committee will be charged with recommending a location to the EERI Board and providing recommendations about program content and structure. The committee will also develop strategies to actively recruit applicants from the social sciences. Also, to support ongoing engagement, an EERI younger member, especially one from a previous LFE Travel Study program, will be identified to serve as a trip planner and trip leader.

The program was very full and a bit exhausting, though in that sense it mimicked the pace of a reconnaissance trip. One option would be to add one day to the program to allow more time for interaction and field study, though that also increases its cost. Perhaps one of the biggest challenges is how to make the program self-supporting while keeping the costs down. EERI subsidized the pilot program from the endowment, but a strategy needs to be put in place to do some fundraising. One idea is to actively recruit companies and EERI members to sponsor partial or complete registrations. To help keep costs down, where appropriate, tie the travel study program to a national or international conference.

Conclusions

The Learning From Earthquakes program at EERI has been a cornerstone of the organization since its inception. The program has changed over time, and has gone beyond the documentation of damage and losses to also include sophisticated data collection methods, use of new tools and technologies, increased multidisciplinary participation, increased coordination with other reconnaissance teams, data sharing through the clearinghouse, the addition of virtual reconnaissance team members (organized by the Young Members Committee) to gather, sort and post news stories and other information available via the Internet, and the development of the Resilience Observatory to evaluate long-term resilience and recovery. The Travel Study Program described here is one more addition to the new techniques and methods employed by LFE to provide opportunities for members to engage in LFE programs and share that learning with others. The Travel Study Program worked with a strong local partner in Chile and built the study team to reflect the multidisciplinary and intergenerational structure of a typical reconnaissance effort, with a focus on learning, not only about the damage from past earthquakes, but also with a focus on the issues encountered in recovery and preparedness for future events.

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